



# Linking agrobiodiversity value chains, climate adaptation and nutrition: empowering the poor to manage risk

## RESULTS YEAR TWO, GUATEMALA

**Silvana Maselli, Ph.D.**  
**Plant Genetic Resources Unit**  
**Center for Agriculture and Food Studies, CEAA**  
**Universidad del Valle de Guatemala**

**Rome, Italy, May 17, 2017**

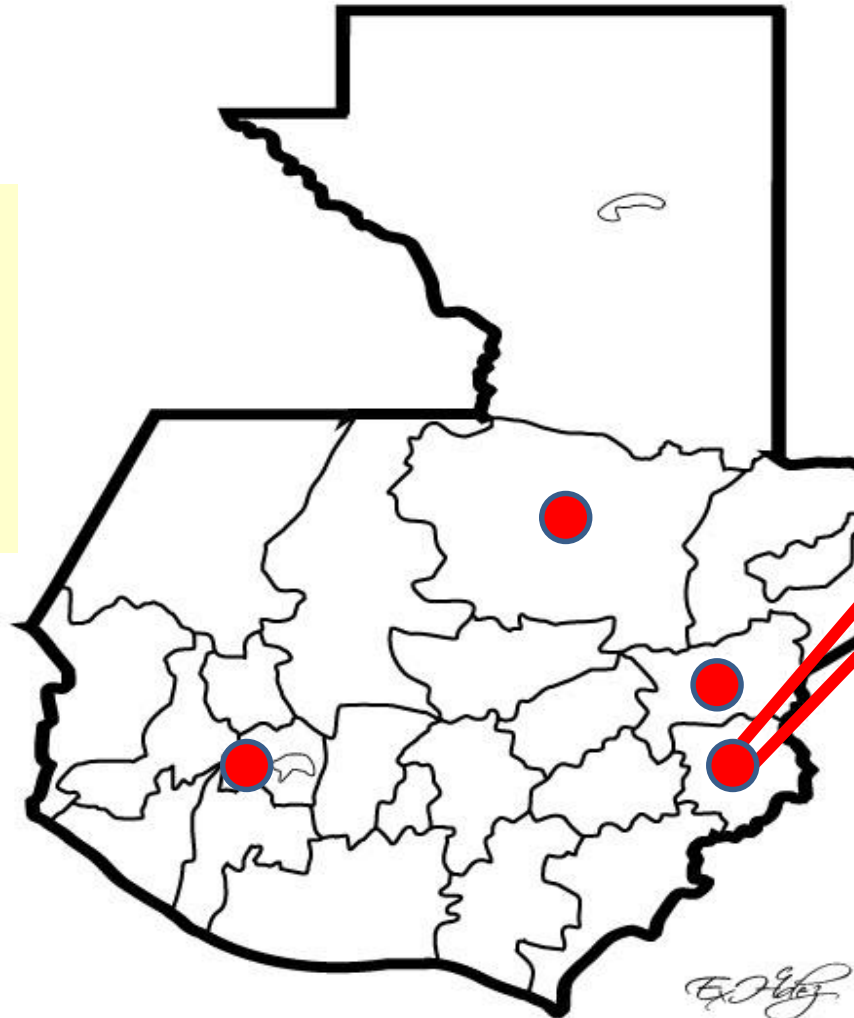
**4 ACTIVITIES AND 5 SUBACTIVITIES WERE CONFIRMED DURING  
FIRST PROJECT'S WORKSHOP JUNE 25, 2015  
TWO SPECIES CHOSEN: Chaya (*Cnidoscolus aconitifolius*)  
tepany bean (*Phaseolus acutifolius*)**



# GEOGRAPHICAL COVERAGE 2016-2017 ACTIVITIES

## Guatemala

- The total of activities were covered in four Departments,



1. Chiquimula
2. Jocotán
3. Camotán
4. Esquipulas
5. Olopa
6. San Juan La Ermita
7. San José La Arada
8. San Jacinto
9. Ipala
10. Quetzaltepeque
11. Concepción Las Minas



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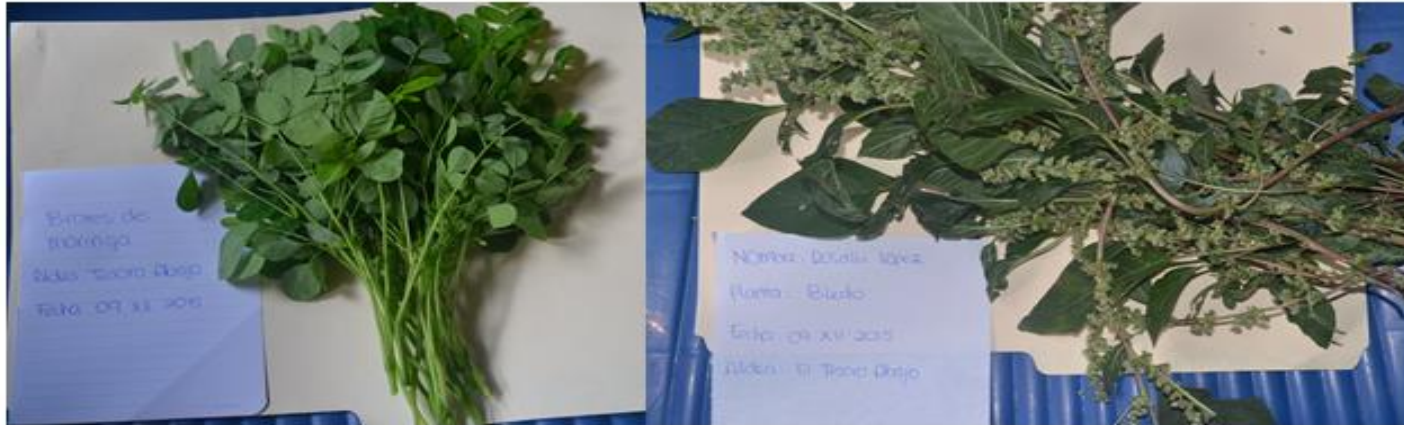
## **Output 1: Improved crops, methods, approaches and tools for coping with climate change**

**Activity 1. Identify and document the type of crops, local food plants tolerant to abiotic factors, nutritional value in the villages participating in the project**



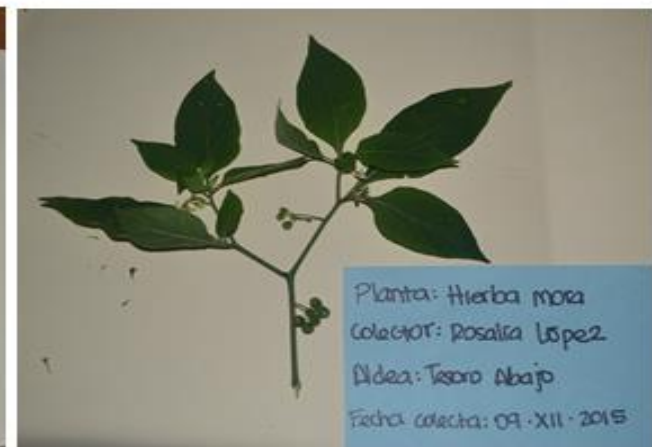
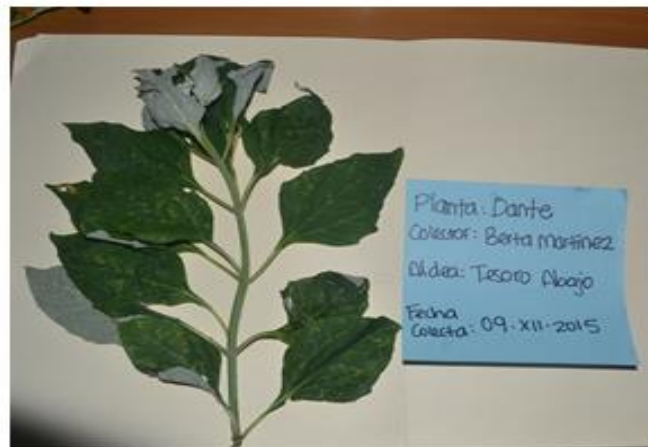
# 1. Identify and document the type of crops, local food plants tolerant to abiotic factors, nutritional value (Lab. Analysis included) in the villages participating in the project

Annex 5.1. Samples of native plants collected for the bromathological analysis



Left: Moringa sprouts; right: Criolle Amaranthus

Left: Probable *Verbenaceae*  
Right: *Solanum americanum*



20 samples from 7 different species of NUS, used as nutritional plants by the community, were provided by women in the villages for the bromathological analysis and were botanically classified

**Table 1. Moisture content, yield percentage and protein content of native Plants´ samples.**

Person that provided the sample	Location	Date of collection	Plant	Whole plant moisture wet basis (%)	Performance whole plant dry matter(%)	Average protein on a dry basis( % )
<b>Candelaria Ohajaca</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	92.85	7.15	31.55 ± 0.14
<b>Berta Martínez</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	85.77	14.23	27.28 ± 0.56
<b>Olga Rosalbina Alonso</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	91.85	8.15	29.39 ± 0.61
<b>Adelina García</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	84.34	15.66	29.62 ± 0.18
<b>Rosalía López</b>	Aldea Tesoro Abajo	09-XII-2015	Moringa sprouts	77.25	22.75	31.73 ± 0.22
<b>Juana García</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	81.70	18.30	30.21 ± 0.69
<b>Ingrid López</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	81.78	18.22	30.90 ± 0.68
<b>Berta Reyes</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	83.08	16.92	27.26 ± 0.51
<b>Francisca Martínez Méndez</b>	Aldea Tesoro Abajo	09-XII-2015	Chaya	83.33	16.67	28.94 ± 0.60
<b>Rosalía López</b>	Aldea Tesoro Abajo	09-XII-2015	Chipilín	74.36	25.64	27.11 ± 0.56

**Table No. 2: Mineral content in samples of native plants leaves  
atomic absorption technique**

Nombre	Procedencia	Planta		Cu (mg/100)	Fe (mg/100)	Mg (mg/100)	Mn (mg/100)	Na (mg/100)	K (mg/100)	Zn (mg/100)	Ca (mg/100)
Candelaria Ohajaca	Aldea Tesoro Abajo	Chaya	promedio	1.15	9.19	410.76	3.12	255.25	1674.25	5.32	866.15
			sd	0.1	0.0	39.7	0.0	3.2	82.4	0.2	105.52
Berta Martínez	Aldea Tesoro Abajo	Chatate	promedio	0.99	12.20	583.08	8.96	184.25	1703.25	6.05	872.22
			sd	0.0	2.1	1.8	0.2	42.8	53.4	0.0	8.57
Olga Rosalbina	Aldea Tesoro Abajo	Chaya	promedio	0.87	12.97	635.58	4.27	236.75	1630.00	5.39	1806.87
			sd	0.1	4.9	45.7	0.0	3.2	45.3	0.1	77.72
Adelina García	Aldea Tesoro Abajo	Chatate	promedio	0.93	12.52	528.26	4.98	139.50	1529.75	5.66	1970.10
			sd	0.0	0.2	8.2	0.1	1.4	146.7	0.0	53.76
Rosalia López	Aldea Tesoro Abajo	Brotos de Moringa	promedio	0.67	7.21	458.56	5.71	134.75	1465.25	3.35	1039.37
			sd	0.0	1.0	16.8	0.4	13.8	298.0	0.3	52.53
Juana García	Aldea Tesoro Abajo	Chaya	promedio	1.00	11.29	552.15	5.87	185.25	1524.50	6.40	842.82
			sd	0.1	1.0	121.8	0.0	15.2	10.6	0.4	338.21
Ingrid López	Aldea Tesoro Abajo	Chaya	promedio	1.08	18.70	526.95	3.39	148.25	1578.75	7.45	1419.12



## **Output 1: Improved crops, methods, approaches and tools for coping with climate change**

**FI 1: 3-5 improved, stress-tolerant crops per country with market potential identified and used by women and men farmers and other value-chain actors in target communities**





# PROJECT'S ACTIVITIES IN CHIQUIMULA

## Guatemala

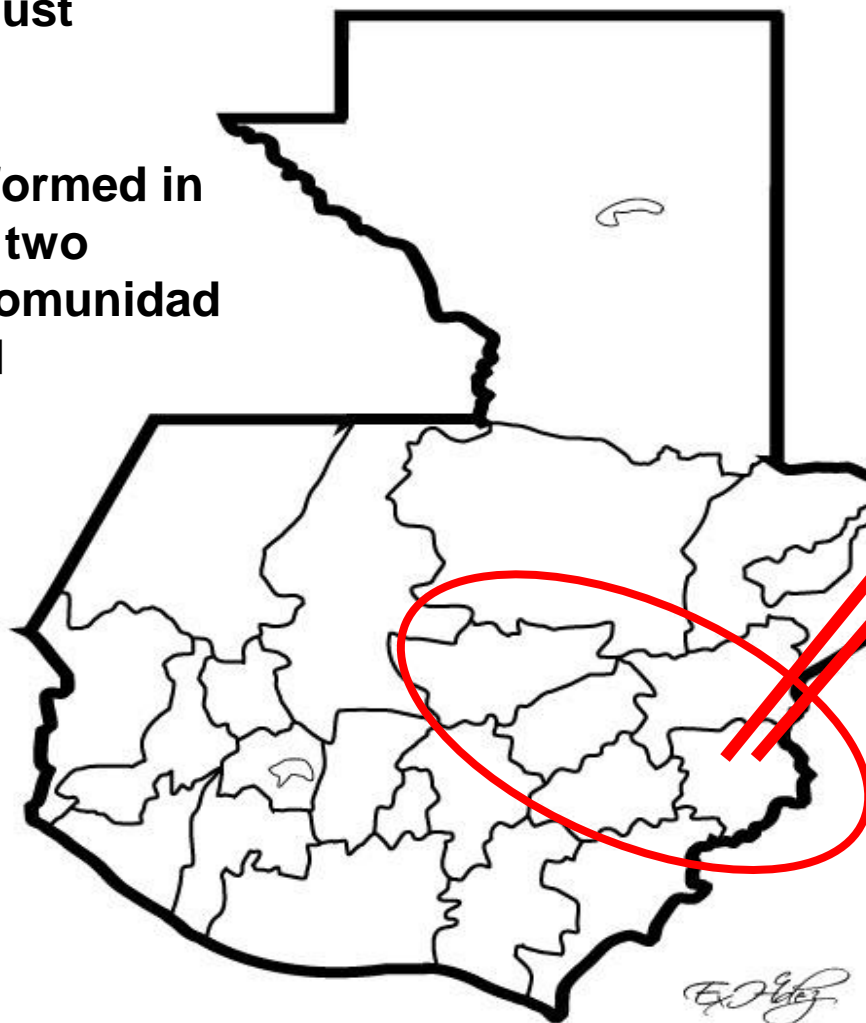
- 7 communities from Jocotán and Camotán participated in project's activities from August 016-January 017
- Activities were performed in collaboration with two institutions: Mancomunidad Copanch'orti', and CATIE's office in Chiquimula



Copanch'orti'  
Mancomunidad



Solutions for environment and development  
Soluciones para el ambiente y desarrollo



## Chiquimula



1. Chiquimula
2. Jocotán
3. Camotán
4. Esquipulas
5. Olopa
6. San Juan La Ermita
7. San José La Arada
8. San Jacinto
9. Ipala
10. Quetzaltepeque
11. Concepción Las Minas

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## Activity 1.1: Identification of the local agrobiodiversity, its use, its conservation and its threats.

**Table 1. Type of crop used by the communities participating in the project**

<b>Community</b>	<b>No. of people interviewed</b>	<b>% of people that cultivated just beans</b>	<b>No. of people that cultivated just maize</b>	<b>No. of people that cultivated both crops</b>
<b>Tesoro Abajo</b>	<b>24</b>	<b>2%</b>	<b>1%</b>	<b>79%</b>
<b>La Brea</b>	<b>20</b>	<b>2%</b>	<b>1%</b>	<b>75%</b>
<b>Petentá</b>	<b>24</b>	<b>0%</b>	<b>1%</b>	<b>75%</b>
<b>TOTAL</b>	<b>68</b>			<b><math>\bar{X} = 76\%</math></b>

**Table 2. List of bean varieties (*Phaseolus*) reported with a few use, or as lost in the communities, participating in the project**

Community	Variety's common name	Conservation status	Causes of erosion	Observations
Tesoro Abajo	1. Chapaneco	1. Few people, few homes	<ul style="list-style-type: none"> <li>• Fungi</li> <li>• Low yield</li> <li>• Plagues (tortugilla)</li> </ul>	1. Important for its flavor
	2. Frijol de arroz ( <i>Vigna genus</i> )	2. Few people, few homes		2. Very important species for food security
	3. Perome	3. Few people, few homes		3. Used to make tamalitos
	4. Frijol de arveja	4. Few people, few homes		
	5. Frijol de leche	5. Few people, few homes		
La Brea	1. Frijol vaina blanca	Lost	It does not grow in the community any more	It needs water and fertilizer
	2. Frijol vaina morada	Lost	It does not grow in the community any more	It needs water and fertilizer

**Table 4. List of maize varieties that have been reported with a few use, or as lost in the Chiquimula communities**

<b>Community</b>	<b>Variety's common name</b>	<b>Conservation status</b>	<b>Causes of erosion</b>	<b>Observations</b>
<b>Tesoro Abajo</b>	<b>1. Maíz negro</b>	<b>1. Few people, few homes</b>	<b>drought</b>	
	<b>2. Maíz amarillo</b>	<b>2. Few people, few homes</b>	<b>drought</b>	
	<b>3. Maíz blanco</b>	<b>3. Few people, few homes</b>	<b>drought</b>	
	<b>4. Maíz carluchito</b>	<b>4. Few people, few homes</b>	<b>drought</b>	
	<b>5. Maíz de cal</b>	<b>5. Few people, few homes</b>	<b>drought</b>	
	<b>6. Arriquín</b>	<b>6. Few people, few homes</b>	<b>drought</b>	
<b>La Brea</b>	<b>1. Criollas</b>	<b>lost</b>		
	<b>2. B-1 mejorada</b>	<b>lost</b>	<b>drought</b>	<b>Plant breeding variety</b>
<b>Chiquimula Mid and low áreas</b>	<b>1. negrito</b>	<b>Few people, few homes</b>	<b>Fungi</b>	
<b>High areas of Chiquimula</b>	<b>2. maíz amarillo</b>	<b>Few people, few homes</b>	<b>Fungi</b>	
	<b>3. Maíz Tunar</b>	<b>Few people, few homes</b>	<b>Fungi</b>	
	<b>4. Maíz cuarenteño</b>	<b>Few people, few homes</b>	<b>Fungi</b>	

# Activity 1.2 Training on the use of the ClimMob platform and EPM (crowdsourcing) trials with tepary bean



10 technicians (UVG-Mancomunidad) attended the ClimMob and EPM training workshop

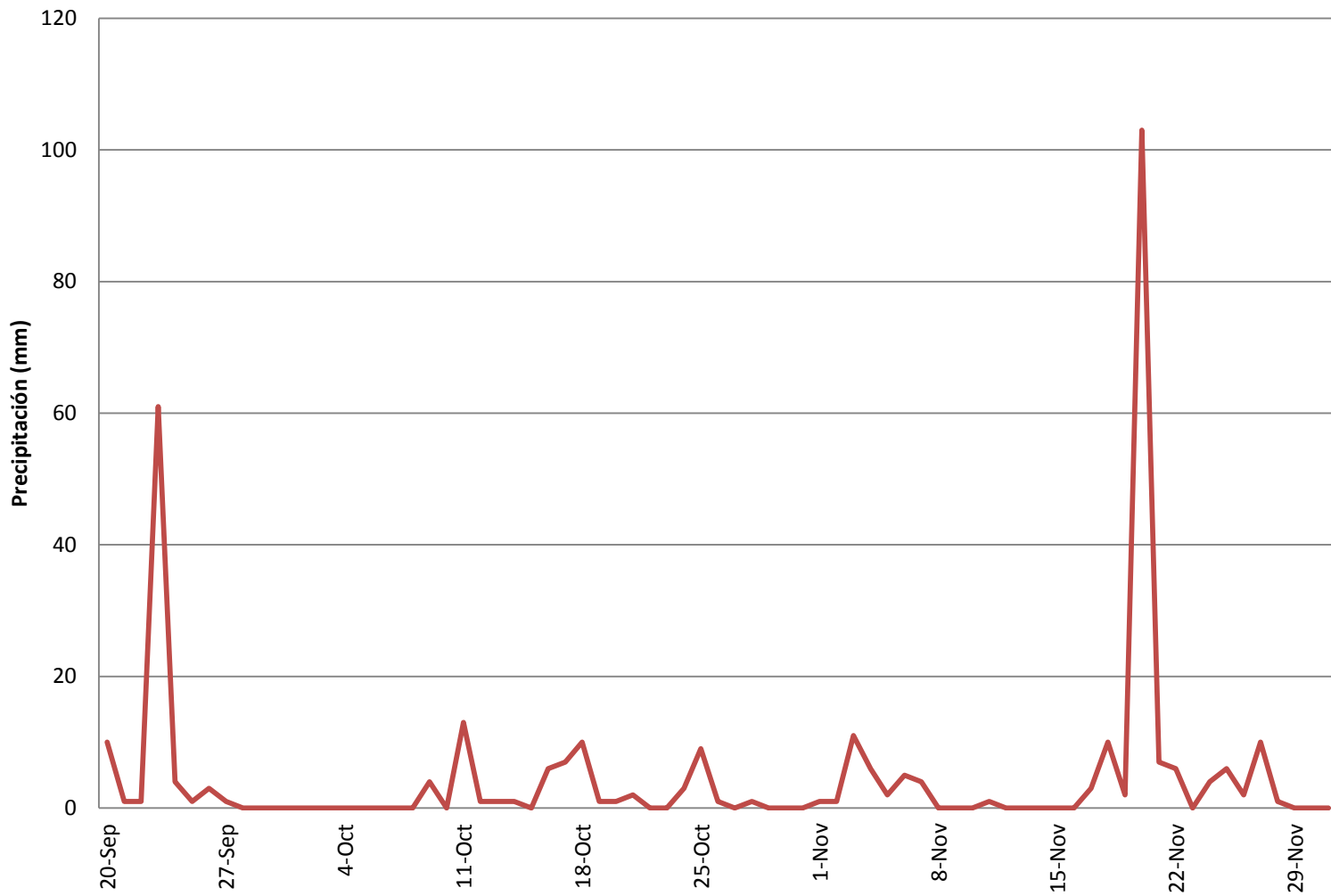


92 farmers from 7 communities attended the EPM Training workshop



**Table 6. Results on the Tepary bean trials, using the EPM methodology in seven communities of Chiquimula**

Community	No. farmers that attended the training	No. of farmers that received the seed	No. of farmers that sowed the seed	No. of farmers with results after 30 days	No. of farmers with results after 45 days	Observations
Las Cruces	8	7	7	4	2	<ul style="list-style-type: none"> <li>• Impossibility to communicate with two of the farmers, after sowing date.</li> <li>• Heat wave dried the essays of five farmers, so results were gathered until the 30 day of monitoring</li> <li>• During field visits, some of the farmers were gone to work on the coffee farms, so they were not available to give all the information needed<sup>2</sup>.</li> </ul>
La Brea	24	20	19	4	1	<ul style="list-style-type: none"> <li>• Farmers expressed that the date of sowing was delayed and that affected the trial</li> <li>• Lack of rain did not let the fruits fill with grain</li> <li>• The crop resisted 45 days, but then it died due to lack of rain</li> </ul>
Marimba	4	5	5	3	3	
Tesoro Abajo	12	8	8	4	1	<ul style="list-style-type: none"> <li>• One person had results after 60 days. She used irrigation.</li> </ul>
Chaguitón Dos Quebradas	18	14	9 with information	9	7	<ul style="list-style-type: none"> <li>• One of the farmers had results after 60 day</li> </ul>
Chantiago El Rodeo	11	11	11	9	9	
Cruz de Charmá	15	8	8	3	2	
<b>TOTALS</b>	<b>92</b>	<b>73</b>	<b>67</b>	<b>35</b>	<b>23</b>	



Source: AccuWeather, 2016

**Figure 1. Precipitation (mm) between September 20 to December 1, 2016 in Camotán and Jocotán, Chiquimula.**

# Seed distribution among farmers and monitoring of the tepary bean trials after 30 days of sowing in Tesoro Abajo.



**Figure1. Seed distribution in Tesoro Abajo.**

**Figure 2. Rosalía López trial with irrigation in TesoroAbajo**



**Figures 3-4 Effect of the lack of rain in the Tepary bean fruits, after 30 days of sowing. On the right, effects of the lack of rain can also be seen in the maize plants sown close to the bean plants by Bertilia Onofre de Gutiérrez en Tesoro Abajo, Chiquimula**



# Crowdsourcing results presentation workshop



**38 farmers attended the Workshop and discussed about the best and worst Varieties, for their regions, after the field Trials.**

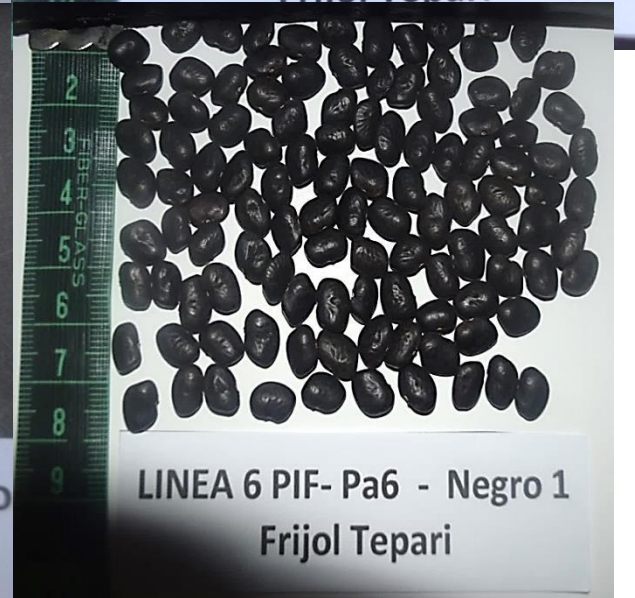
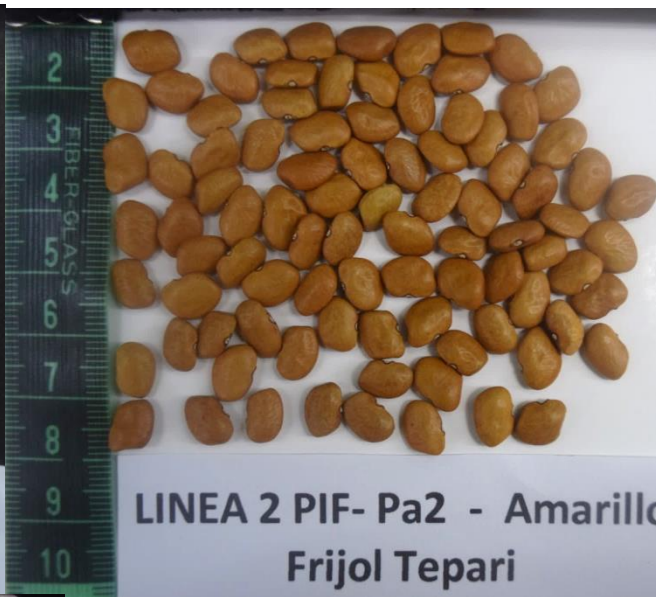
**Table 6. Best varieties chosen by the communities after 30 and 45 days of sowing**

<b>Community</b>	<b>No. of farmers reporting</b>	<b>Best variety</b>	<b>Worst variety</b>
<b>Las Cruces</b>	<b>3</b>	<b>Pa7-Negro*</b> <b>Pa8-Blanco</b> <b>Pa2-Amarillo</b>	<b>Pa5-Blanco</b> <b>Pa6-Negro</b> <b>Pa8-Blanco**</b>
<b>La Brea</b>	<b>4</b>	<b>Pa8-Blanco</b> <b>Pa2-Amarillo</b> <b>Pa3-Blanco</b>	<b>Pa6-Negro</b> <b>Pa8-blanco**</b> <b>Pa5-Blanco</b>
<b>Marimba</b>	<b>3</b>	<b>Pa4-Blanco</b>	<b>Pa7-Negro</b> <b>Pa8-Blanco**</b> <b>Pa2-Amarillo</b>
<b>Tesoro Abajo</b>	<b>4</b>	<b>Pa7-Negro*</b>	<b>Pa4-Blanco</b>
<b>Chaguitón</b> <b>Dos Quebradas</b>	<b>9</b>	<b>Pa6-Negro</b> <b>Pa7-Negro*</b> <b>Pa8-Blanco</b>	<b>Pa1-Blanco</b>
<b>Chantiago El Rodeo</b>	<b>9</b>	<b>Pa4-Blanco</b>	<b>Pa8-Blanco**</b> <b>Pa4-Blanco</b> <b>Pa1-Blanco</b>
<b>Cruz de Charmá</b>	<b>3</b>	<b>Pa4-Blanco</b> <b>Pa6-Negro</b> <b>Pa7-Negro*</b>	<b>Pa5-Blanco</b> <b>Pa7-Negro</b> <b>Pa1-Blanco</b>

\* Best variety mentioned in 4/7 communities

\*\*Worst variety mentioned in 4/7 communities

# TEPARY BEAN LINES DEVELOPED BY THE ZAMORANO BREEDING PROGRAM USED IN THE TRIALS



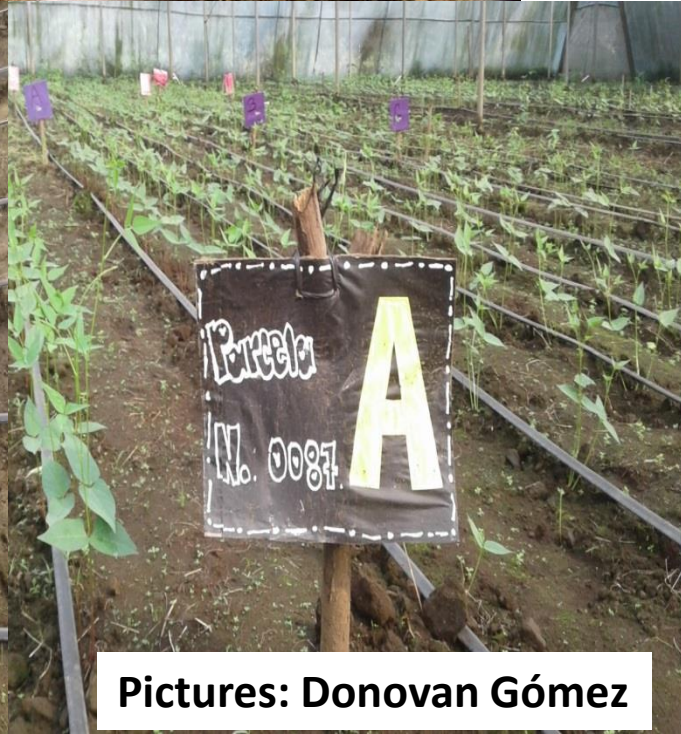
# TEPARY BEAN LINES DEVELOPED BY THE ZAMORANO BREEDING PROGRAM USED IN THE TRIALS



# Tepary bean seed multiplicación in UVG's Campus Sur



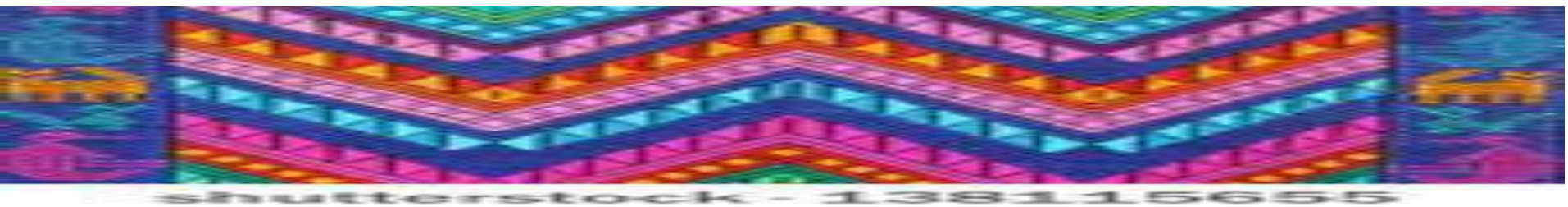
25 high school students that study with a scholarship in UVG Campus Sur received the ClimMob and EPM Training, they are participating in the multiplication of the tepary bean seed



Pictures: Donovan Gómez

**Tepary bean trial coordinators gathering Information to be uploaded to the ClimMob platform**





**Output 2: Strengthened market access for stress-tolerant and nutritious crops**

**Activity 3: Develop a consultation to establish a mechanism for value chain enhancement with target crops (tepany bean and chaya)**





**Facilities and support to conduct the value chain study with two species in Guatemala, has been provided by UVG to MSc. Nadezda Amaya, Bioversity consultant.**





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**Output 3: Enhanced capacities of farmers and other value chain actors in conserving and using agrobiodiversity sustainably**

**FI 3.1: 5-10 farmers' networks (including indigenous ones) strengthened per country**

**Activity 2: Strengthening of conservationist farmers and communal seed bank's networks**

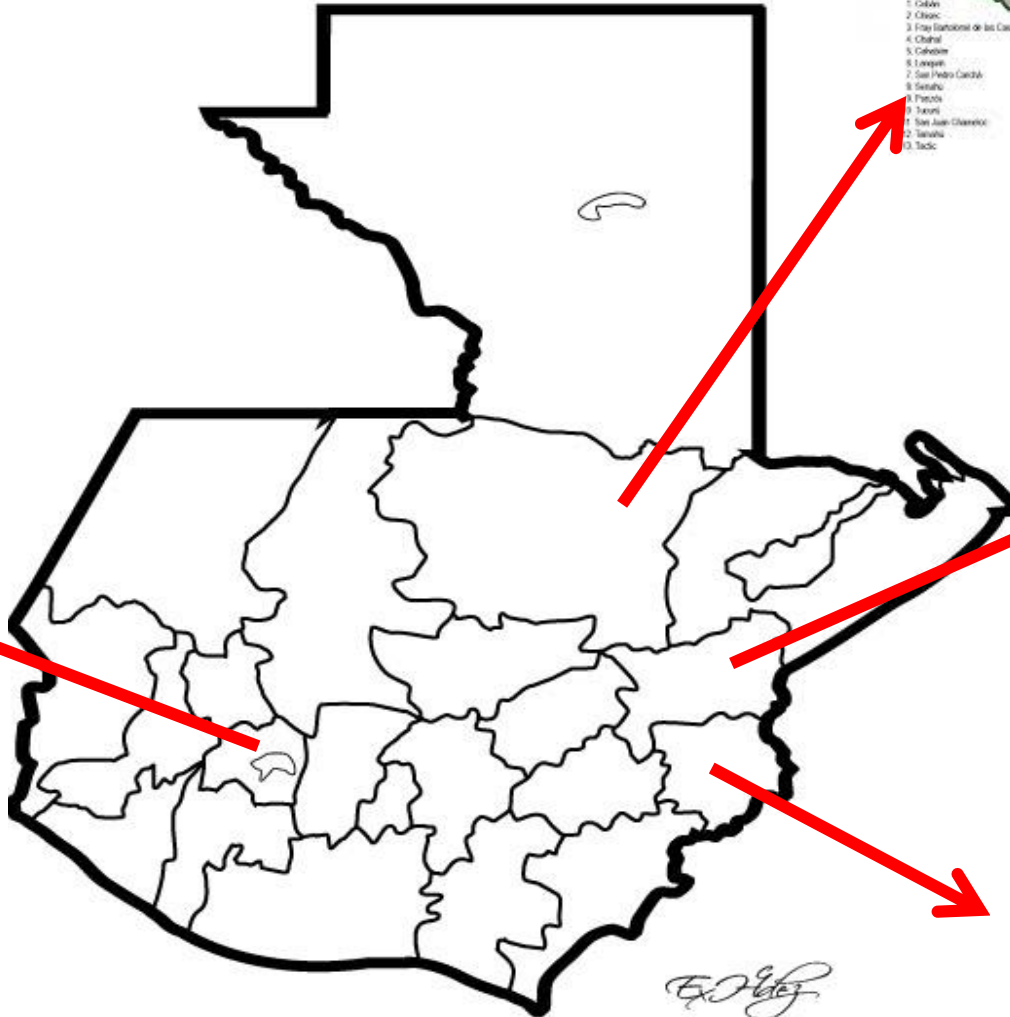




# Tratado internacional

SOBRE LOS RECURSOS FITOGENÉTICOS PARA LA ALIMENTACIÓN Y LA AGRICULTURA

# Guatemala



- 1. Cobán
- 2. Chocón
- 3. Frías Espartero de los Caneles
- 4. Chahal
- 5. Cahabón
- 6. Escuintla
- 7. San Pedro Carchá
- 8. Santiago
- 9. Petenitá
- 10. Xucunil
- 11. San Juan Chamelco
- 12. Sacubá
- 13. Tactic
- 14. Santa Cruz Verapaz
- 15. San Cristóbal Verapaz
- 16. Santa Coloma La Tinta, segregada oficialmente de Parajolá pero no se ha publicado sus límites territoriales.
- 17. Raxruhá, actualmente en formación por el decreto 15-2008 del Congreso de la República, se están estudiando sus límites territoriales.

## Zacapa



- 1. Guastán
- 2. La Unión
- 3. Zacapa
- 4. Río Hondo
- 5. Estanzuela
- 6. Teculután
- 7. Libramentán
- 8. Huab
- 9. Cabañas
- 10. San Diego

## Chiquimula



- 1. Chiquimula
- 2. Jocotán
- 3. Camotán
- 4. Esquipulas
- 5. Cincua
- 6. San Juan La Ermita
- 7. San José La Arada
- 8. San Jacinto
- 9. Izoila
- 10. Cuetzaltepique
- 11. Concepción Las Minas

## Sololá



- 1. Nebujá
- 2. Santa Clara La Laguna
- 3. Santa María Visitación
- 4. San Juan La Laguna
- 5. San Pedro La Laguna
- 6. Santiago Atitlán
- 7. San Lucas Tolimán
- 8. San Antonio Palopó
- 9. Santa Catarina Ixahuacán
- 10. San Andrés Semetabaj
- 11. Panajachel
- 12. Concepción
- 13. Sololá
- 14. Santa Cruz La Laguna
- 15. San Marcos La Laguna
- 16. San Pablo La Laguna
- 17. Santa Catarina Palopó
- 18. Santa Lucía Utatlán
- 19. San José Chacayá
- L. Lago de Atitlán

# Activity 2: Workshop I in Chiquimula and Zacapa

## Strengthening of conservationist farmers and communal seed bank's networks



**An assessment of Bank's functioning After two years Was carried out With Committees and Members of the five Banks established with The TIRFAA'S project**



# Activity 2. Workshop II. Identification of elements to strengthen their own banks to participate in a National Community Seed Bank's Network





**Identificación de elementos para conformar una Red Nacional de Bancos Comunitarios de Semillas y fortalecer el funcionamiento de los Bancos ya existentes**

*Proyecto: "Integrando la agrobiodiversidad a cadenas de valor para afrontar el cambio climático y el riesgo nutricional, en áreas vulnerables del corredor seco de Guatemala"*

**Dra. Silvana Maselli Conde**  
Unidad de Recursos Fitogenéticos  
Centro de Estudios Agrícolas y Alimentarios, CEAA  
Instituto de Investigaciones, Universidad del Valle de Guatemala

Guatemala, mayo del 2017

**Results obtained from Workshop I and II, lessons learned, conclusions and recommendations to establish a National Communal Seed Bank's Network were gathered in a document that is ready for printing.**



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**Output 3: Enhanced capacities of farmers and other value chain actors in conserving and using agrobiodiversity sustainably**

**Activity 4.2 : Feasibility study to establish a mechanism for the Payment of Agrobiodiversity Conservation Services, PACS, in Guatemala**





# Workshop I

## Feasibility study to establish a mechanism for the Payment of Agrobiodiversity conservation services, PACS, in Guatemala

Coordinator: Dr. Adam Drucker  
Bioversity International

**LUGAR:** Universidad del Valle de Guatemala  
Edificio J. salón 101.

**FECHA:** 21 de septiembre, 2015

**PARQUEO:** Garita 9, entrada por 18 Ave.

**Experts, technicians, teachers and genetic resources students, discussing about Weitzman analysis results, varieties criteria, and conservation risks for *Phaseolus* varieties in Guatemala**





**Taller I**  
**Concurso de conservación de variedades criollas de frijol**  
**Programa de recompensas por servicios de conservación de la agrobiodiversidad**  
**(ReSCA) en Guatemala**

Turicentro Villa Sofia, Ipala, Chiquimula  
25 de Mayo, 2017

**PROGRAMA**



<u>Día 25 de mayo</u>		
<b>8:00 – 8:30</b>	<u>Registro de Participantes</u>	<b>UVG</b>
<b>8:40 – 9:00</b>	<ul style="list-style-type: none"> <li>Palabras de Bienvenida</li> <li>Presentación de participantes</li> </ul>	Ing. Israel Gálvez <b>Gerente Asociación de Desarrollo Comunitario, Granero de Oriente, ADEGO</b>
<b>9:00 – 9:30</b>	<ul style="list-style-type: none"> <li>Presentación del proyecto y del Programa de incentivos para la conservación de la <u>agrobiodiversidad, ReSCA</u></li> </ul>	Dr. Adam Drucker <b><u>Bioversity International, Roma</u></b>
<b>9:30 – 10:00</b>	<ul style="list-style-type: none"> <li><b>CAFÉ-EJERCICIO</b></li> <li>Identificación y validación de variedades de frijol en peligro de perderse</li> </ul>	<b>Todos los participantes</b>
<b>10:00 – 11:00</b>	<ul style="list-style-type: none"> <li>Modalidad de participación de las comunidades campesinas en el Programa <u>ReSCA</u> para frijol criollo</li> <li>Dinámica de concursos competitivos</li> </ul>	Dr. Adam Drucker <b><u>Bioversity International</u></b>
	<ul style="list-style-type: none"> <li>Preguntas de los representantes de las comunidades</li> </ul>	Dr. Adam Drucker <b><u>Bioversity International</u></b>

**Payment of Agrobiodiversity conservation services, PACS, in Guatemala**

**Workshop I, with representatives of 15 communities from chiquimula will be held next week**



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**Output 4: Proof of evidence of role of agrobiodiversity in nutrition, income and adaptation to climate change provided along with recommendations for supportive policies for its enhanced use**

**FI 4.2: 10-20 policy recommendations to decision makers promoting the greater use of local diversity, at national and international levels**

**Activity 4.1: Policy development enhancement for the conservation, sustainable use and nutritional value of agrobiodiversity in Guatemala**



## Observatorio Económico Sostenible

Guatemala, 10 de mayo de 2017

Dra.  
Silvana Maselli  
Directora Recursos Fitogenéticos  
CEAA - UVG  
Presente

Estimada señora Maselli:

Reciba un cordial saludo de parte del Observatorio Económico Sostenible, deseándole éxitos al frente de sus actividades. En seguimiento al proceso de construcción de la agenda temática del Observatorio Económico Sostenible -OES-, tenemos el agrado de extenderle una cordial invitación para participar en un *Grupo focal referente al análisis de políticas públicas que el consultor presentará en el tópico de Seguridad Alimentaria y Nutricional*. Su valiosa participación nos permitirá retroalimentar el análisis elaborado y priorizar estrategias de trabajo del OES en el tópico de referencia. Esta actividad se llevará a cabo en:

Lugar: Hotel Radisson 1ª. Avenida 12-46 zona 10, Ciudad, Salón Colibrí 2o. Nivel.

Fecha: miércoles 17 de mayo de 2017

Horario: 7:30 a 10:30 horas (incluye desayuno)

Agradeciendo su amable confirmación al correo: [oes@uvg.edu.gt](mailto:oes@uvg.edu.gt) o al tel. 2364-0336/40 ext. 21709 con la Srita. Madeline Ayala.

Atentamente,

Sigfrido Lee

**USAID and UVG are conducting a project to establish a national Economic Sustainable Observatory, OES. The review of national policy related to nutrition and food security are part of the OES.**

**As part of project's activities we are participating in key stakeholders meetings and promoting the recognition of agrobiodiversity's value for nutrition and climate change**

**THANKS FOR YOUR ATTENTION**

**PICTURE TAKEN FROM LA BREA, CAMOTAN CHIQUIMULA**

