

# An interdisciplinary assessment of integrated nematode-soil health management for smallholder potato farming systems in the Western Highlands of Guatemala

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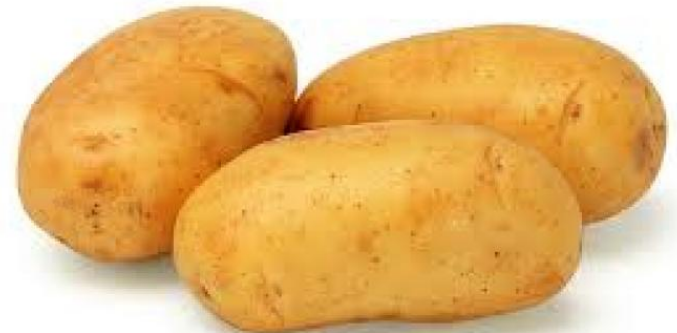


# Transdisciplinary Team

- Nematologists and Pathologists
- Soil Scientist
- Social Scientists
- Incorporating co-design of the experiments and co-analysis of the results

# Potatoes

- Cash crop
- 25% exported to El Salvador and Honduras
- 50% decline in yields over last 20 years



# Yield Loss

- Cyst nematodes
  - *Globodera*
  - *Punctodera*
  - *Meloidogyne*
- Over use of the soil





# Objective

- Integrated nematode-soil health management technologies will allow farmers to achieve sustainable yields
- To deliver information to growers effectively

# Production Systems with Conservation Agriculture: What is CAPS?

- Maintain to the extent possible a year-round soil cover
- Minimize soil disturbance by tillage
- Utilize crop rotations that include a principal staple crop of the region

# The Site

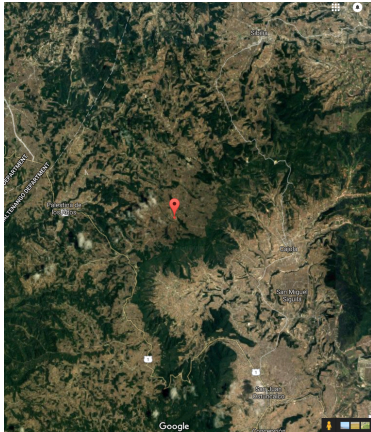
## USAID Feed the Future

- 70.5% rural
- 83.5% poverty (33.2% extreme poverty)

## Departments

- Huehuetenango
- Quetzaltenango (Xela)

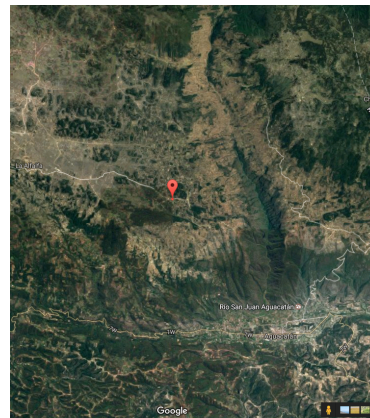




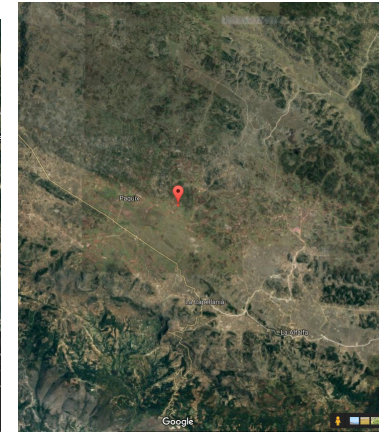
Palestina los Altos  
14° 55' 52" N 91° 39'  
2964 m



San Juan  
14° 53' 59" N 91° 40'  
2850 m



Joya Grande  
15° 23' 20" N 91° 21'  
2965 m



Paquix  
15° 26' 32" N 91° 26' 24" W  
3157 m

# Co-Design

## Three focus groups

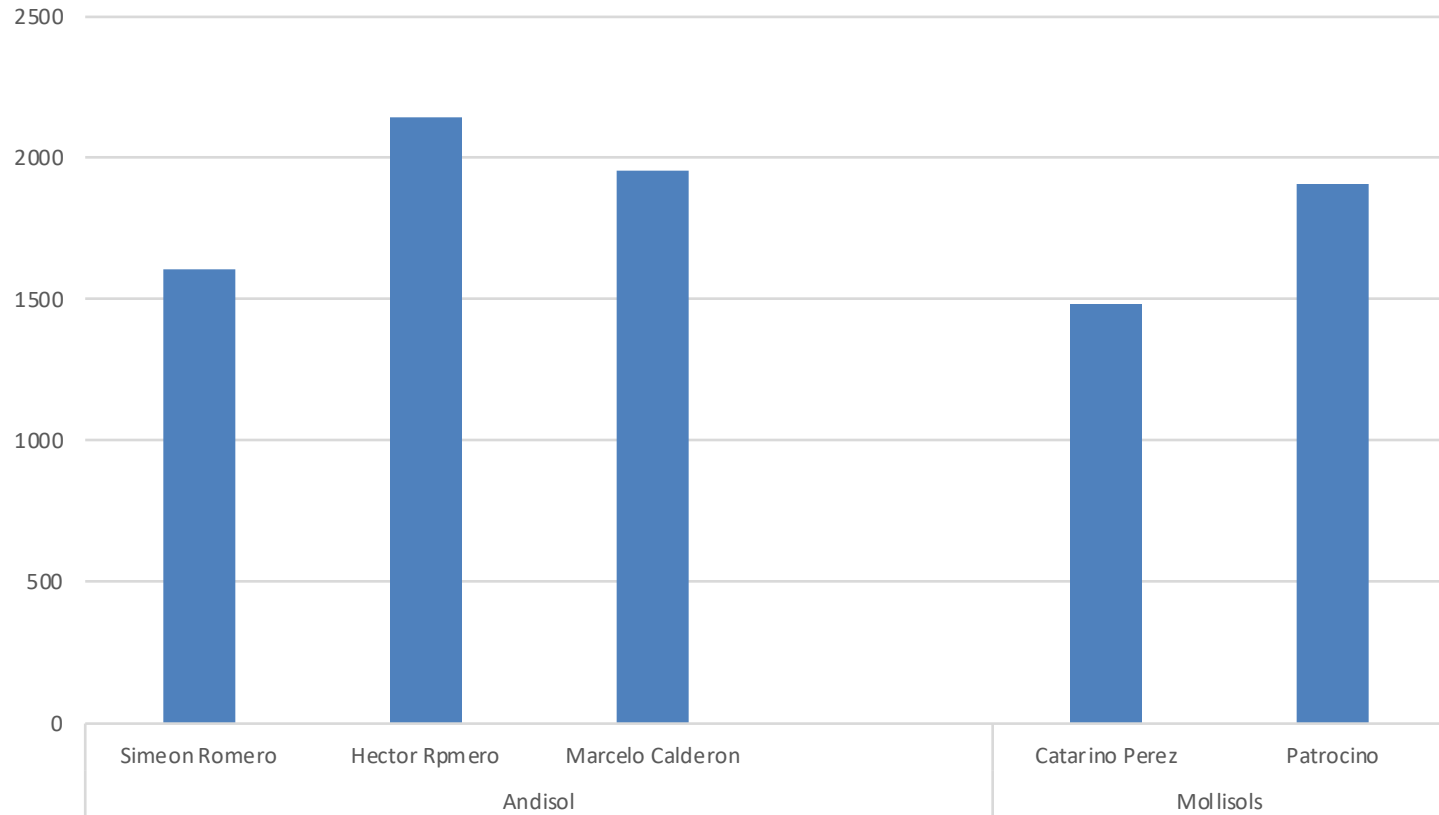
- Farm profiles
- Production, costs and marketing information
- 6-8 participants in each group

# Cropping System

- Men do most of the farming activities
  - Women plant and harvest
- Crop rotation
  - Potato and Maize
- No irrigation
- Limited intercropping
- Limited use of certified seeds
- Soil amendment
  - Chicken litter
  - Composted animal manure



Globodera cysts/300 cc of soil



# Biological Controls

## Partner Commercial Firm

- *Trichoderma*
- *Purpureocillium lilacinum*
- *Bacillus subtilis*



# Co-Designed Treatments

Amendment (kg/ha)	Biological Control
0	No
0	Yes
700	No
700	Yes
1000	No
1000	Yes

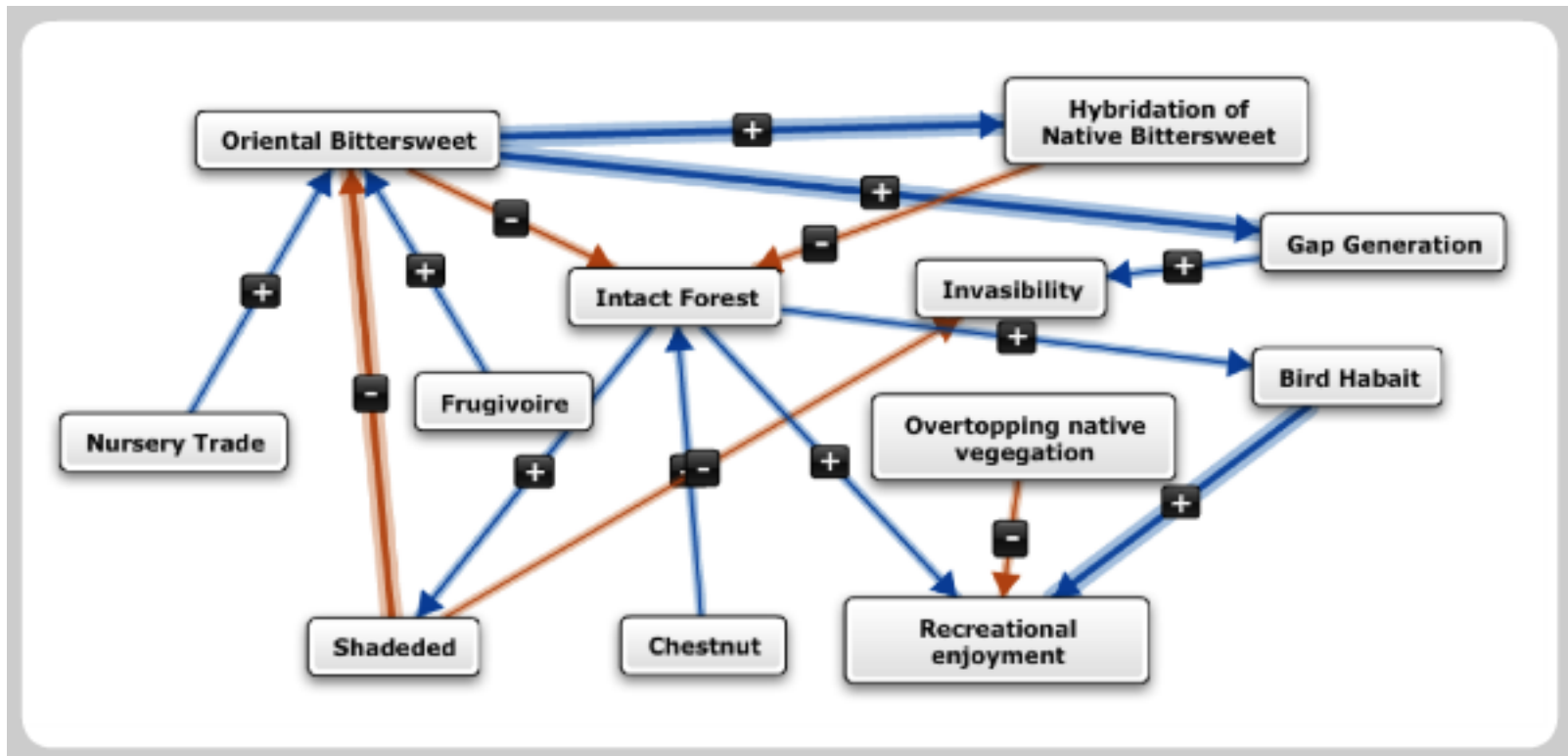
# Midseason



# Mental Modeling

- Soil health
- Potato nematodes
- Fertilizer
- Livelihood
- Scientist
- Farmers
- Policy makers

# Mental Model





# Thank you!

- The smallholder farmers
- Popoyan
- USAC Nematode Diagnostic Services
- USAC Students



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