

# Gender and Soil Knowledge: Linking Farmers' Perceptions of Soils with Fertility Analysis in the Philippines

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# Background

Degraded landscapes and unsustainable agricultural practices heighten food insecurity and poverty rates (FAO 2011). Smallholder farmers are especially vulnerable (Barrett 2002).



- Conservation Agriculture Production Systems (CAPS)
  - Minimum tillage
  - Year-round crop cover
  - Diverse crop rotations
- Benefits & Opportunities
  - Improved soil, yields
- Costs & Constraints
  - Increased inputs, labor

# Gender and CAPS



- CAPS can affect men's and women's time, resources, and labor differently
- *“Development efforts in the Philippines, have either neglected to include women or increased their workload”* (Sobritchea 2005).
- Understanding local, gendered knowledge is essential for the success of sustainable development programs.



# Research questions

- What are women and men smallholder farmers' local soil knowledge and perceptions?
- Are there correlations between their identification and descriptions of soils and a soil fertility analyses?

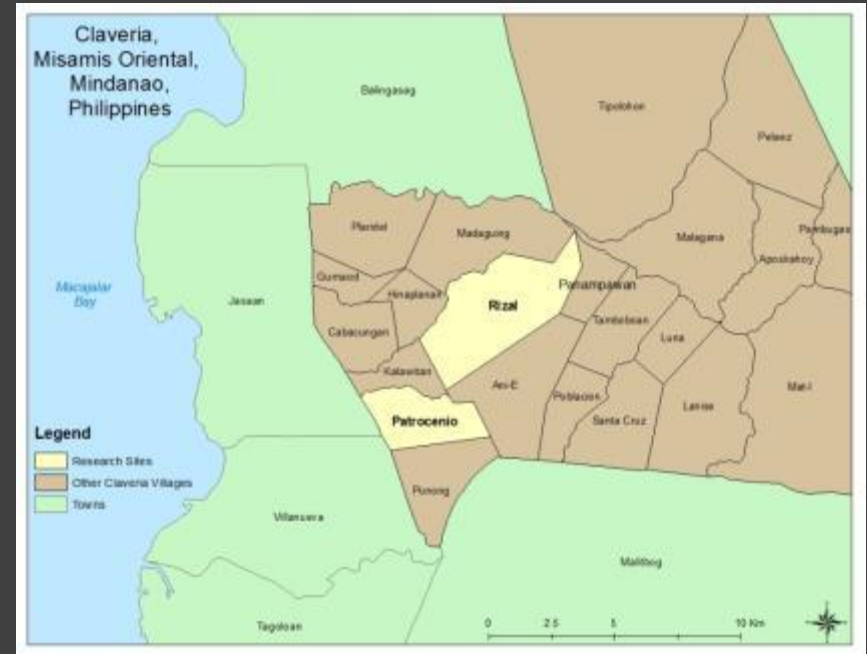
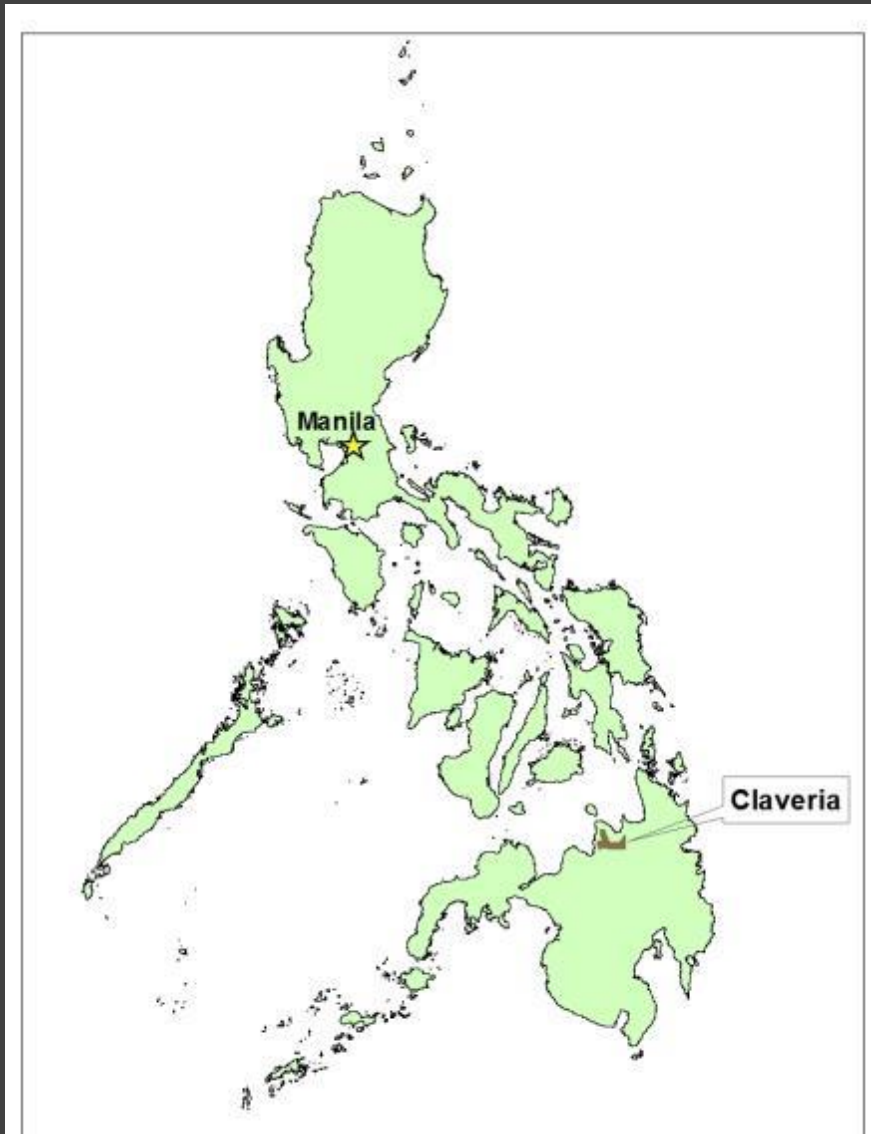


# Theoretical framework

- Feminist Political Ecology
  - Gendered spaces of everyday life; gendered knowledge
  - (Rocheleau et al. 1996)
- Ethnopedology
  - Local knowledge of soils
  - (Barrera-Bassols et al. 2006)
- Gap: Linking gender with soils knowledge



# Study site



Claveria, Misamis  
Oriental, Mindanao,  
Philippines

# Qualitative methods

## Focus Group Discussions

- 47 people
  - 26 women
  - 21 men
- Sex-disaggregated groups
- Soil sample discussion
- Map community soils on satellite imagery
- Practices and participation chart
- Timeline activity

## Household Interviews

- 36 people
  - 18 men
  - 18 women
- Semi-structured—men and women interviewed separately
- Participatory Mapping
- GPS mapping of husband and wife's "best" and "worst" soil locations
- Restitution event

# Soil Sampling

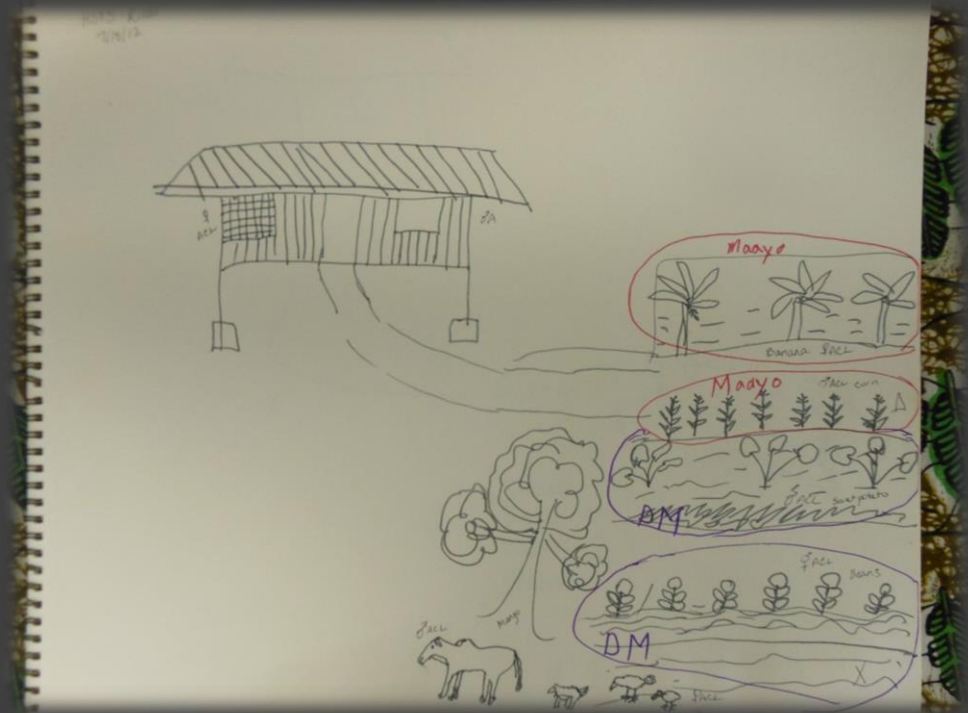
- 52 total samples
  - Soil fertility using Mehlich-1 Analysis
    - (Maguire and Heckendorn 2011)
  - Texture
  - Area
  - Slope
  - Aspect

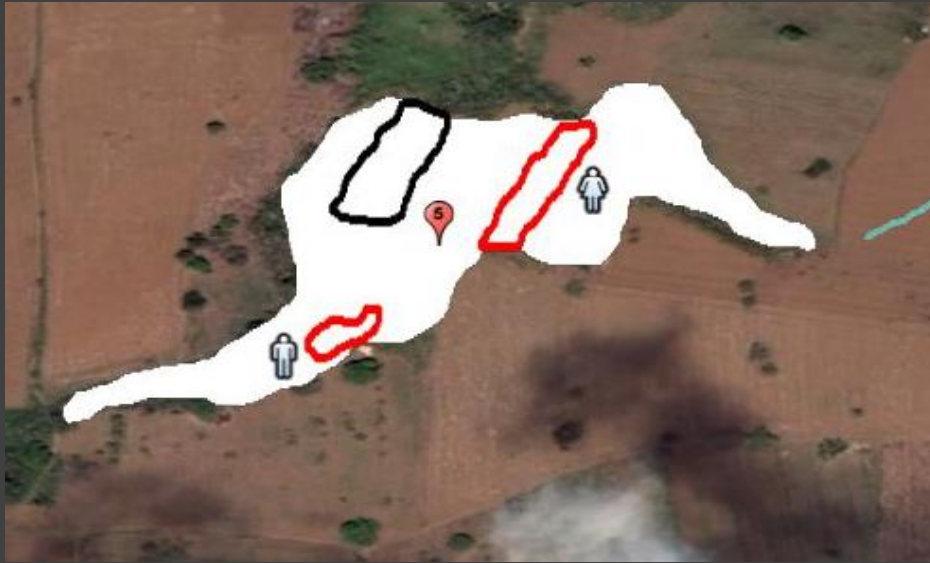




# Findings

- Both men and women distinguished best and worst soils using
  - Land use
    - Crops
    - House-lot
    - Pastureland
  - Physical characteristics
    - Color
    - Plant growth
    - Topography

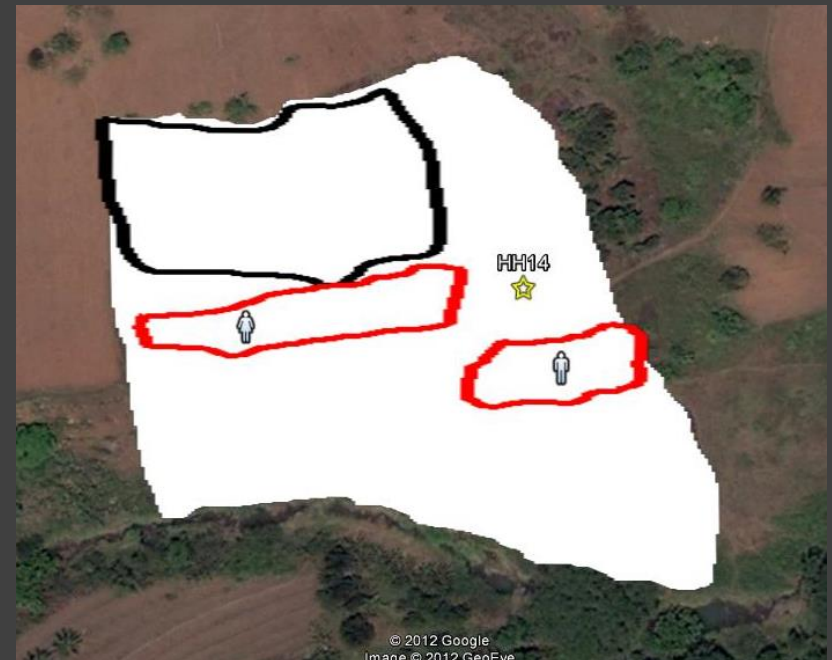




The majority of households picked the same best soils but different worst soils

“Men and women always base fertility [on] production, but women also consider the expenses of the farm.”  
(Male farmer)

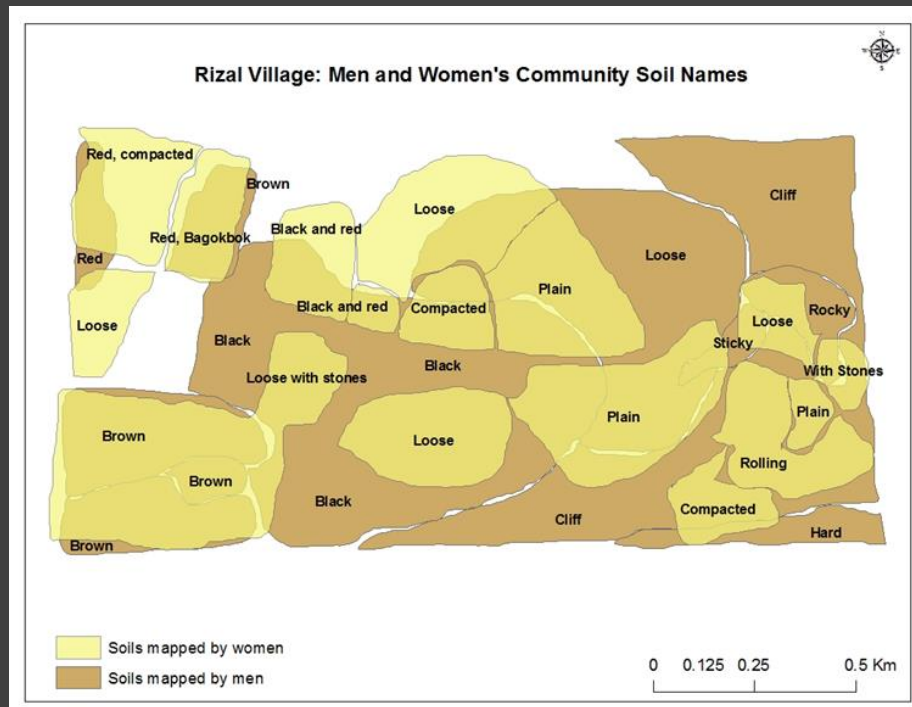
“...we answered differently [in identifying worst soils] maybe [because] we have different perceptions [of] the topography of our farms and the types of soils.” (Female farmer)



# Soil quality indicators: How do men and women decide if soils are good or bad?

	Men		Women	
	Best	Worst	Best	Worst
Plant growth	13	12	12	10
Color	4	3	3	3
Topography	6	5	0	5
Fertilizer use	2	2	3	2

“People used to look at color [to determine soil fertility] and if the color was black then it was good and if the color was red it was bad; but that doesn’t tell you enough. Plant growth can tell you more.” (Female farmer)



“Men are more capable to work in the slope [steep] area because it is hard for women and they might slide.” (Male farmer)

“[Women] are not strong enough physically to work in steep terrains and fears from falling.” (Woman farmer)

# Soil quality indicators ranked in FGD

Indicator	Ranking of Soil Quality Indicators			
	Women from Rizal	Women from Patro	Men from Rizal	Men from Patro
Land use	1	4		4
Topography	2	3	2	2
Fertility	3			
Color	4	2	1	1
Type of vegetation	5			
Plant growth	6	1		3
Distance to water			3	7
Organic matter			4	6
Presence of pests			5	
Presence of rocks			6	
Time spent cultivating				5

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Presence of rocks			6	
Time spent cultivating				5

# Land use information of BW soils



	Male	Female	Total
<b>Best Soil</b>			
Maize	16	11	27
Vegetables	0	4	4
Fruit	0	1	1
Rubber trees	1	1	2
Rice	0	1	1
Pastureland	2	0	2
<b>Totals</b>	<b>19</b>	<b>18</b>	<b>37</b>

<b>Worst Soil</b>			
Maize	4	5	9
Vegetables	4	6	10
Fruit	1	2	3
Rubber trees	0	0	0
Rice	2	2	4
Pastureland	2	3	5
Peanuts	0	1	1
House			
lot	3	0	3
<b>Totals</b>	<b>16</b>	<b>19</b>	<b>35</b>

# Soil descriptions ranked by frequency of use

## Men

1. Topography
2. Fertility
3. Color
4. Quality



## Women

1. Fertility
2. Quality
3. Color
4. Topography



# Access to resources & agricultural practices

- Men work primarily on the farm.
- They do not have access to opportunities outside of farming such as education or businesses.
- Women work primarily in the house.
- They do not have the same access to land or trainings as men.





# “Women do not have as much soil knowledge as men”

- “The worst soil [chosen by] the wife is not the same as the husband’s because *the wife is not always [on] the farm.*” (Male farmer)
- “The men’s [soil] map is more accurate.” (Women farmers)



# Farmers believe their soil is degrading

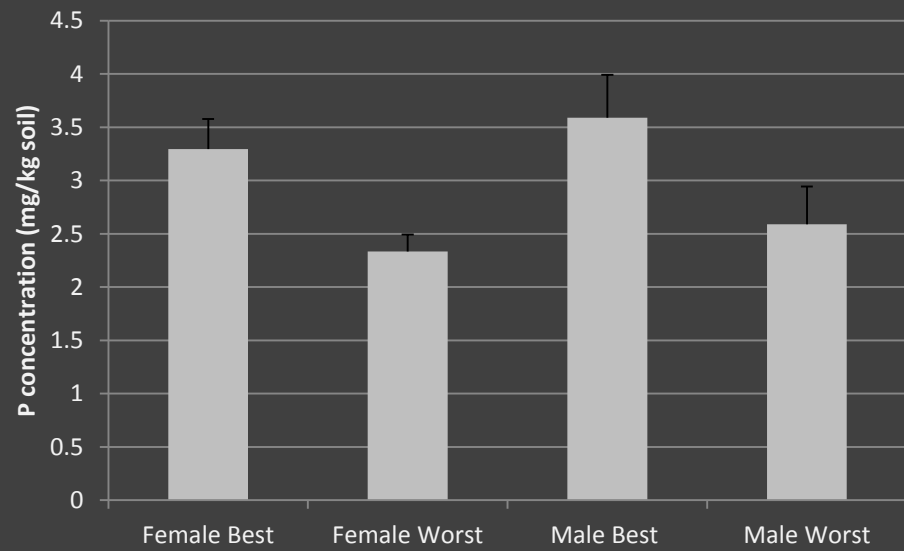
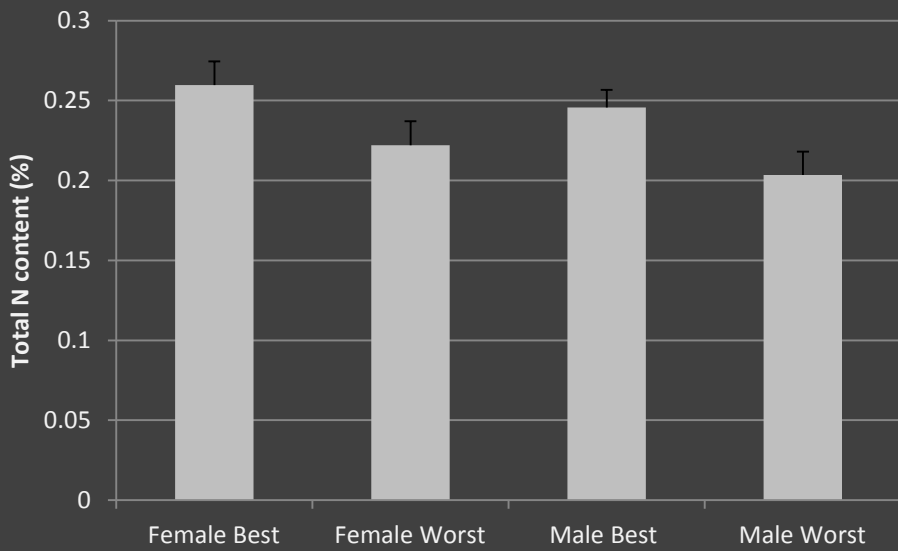
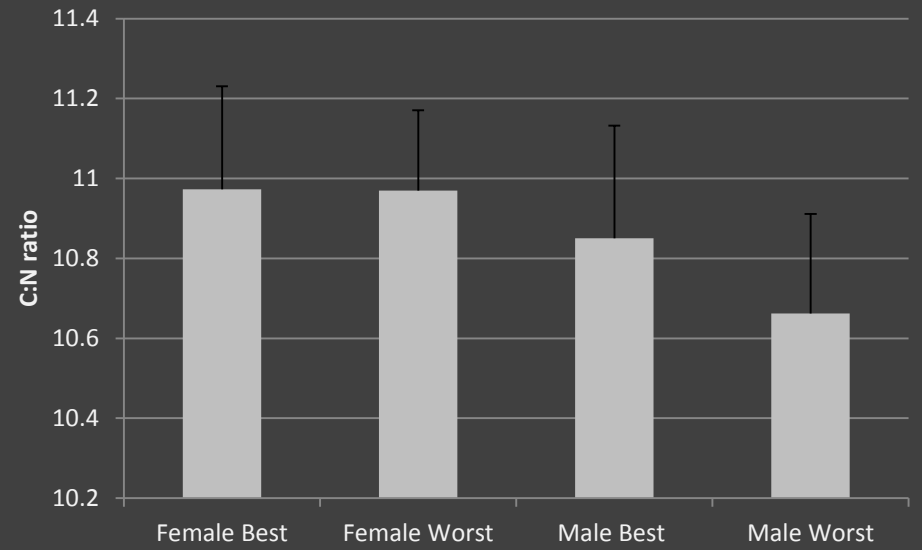
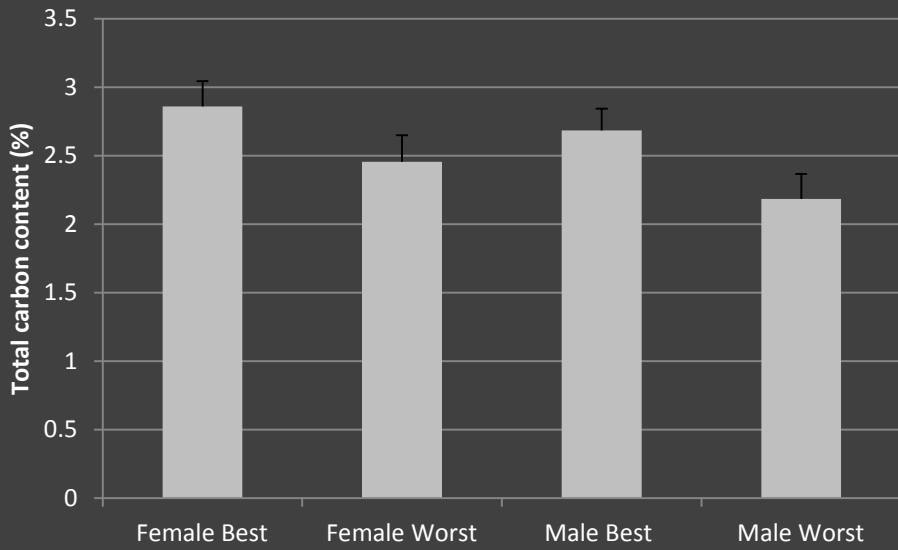
- “The soil now is acidic, so many are eroded...before there were none.”  
(Female farmer)
- “The soil now needs fertilizer unlike before because we constantly cultivate.” (Male farmer)
- “Yes there is a difference [in soils], if you do not use fertilizer, [crops] will not grow.” (Male farmer)

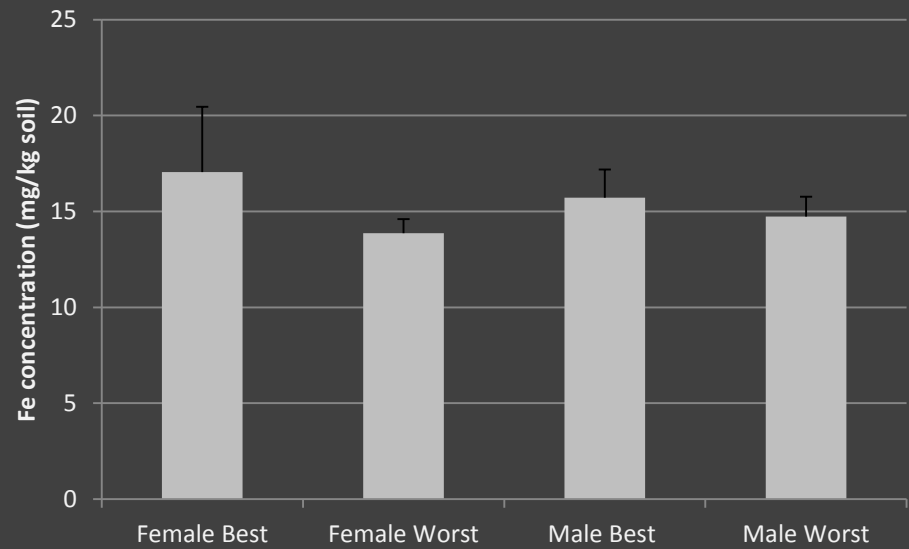
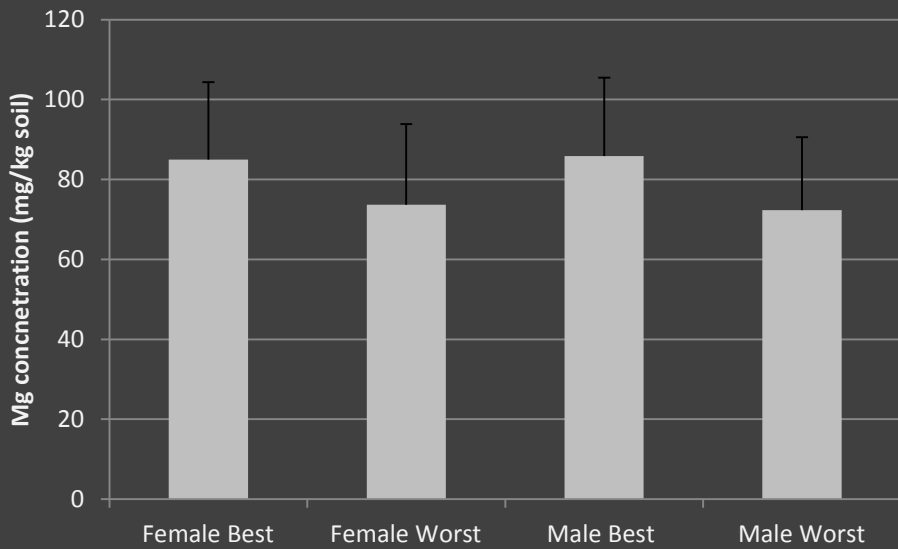
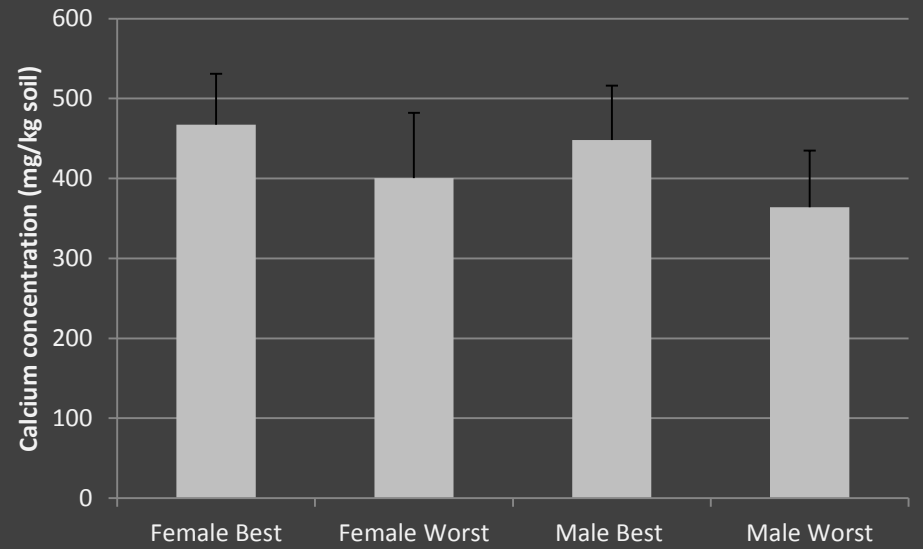
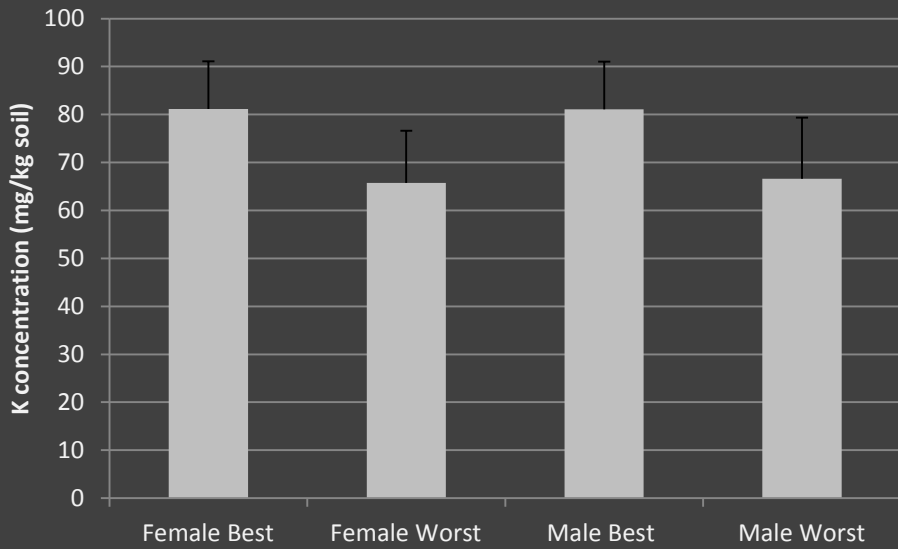


# Laboratory analysis results support farmers' knowledge

- Plant-available P concentrations were extremely low.
- Chemical fertility of women's best soils was not significantly different from that of men's best soils; likewise, the fertility of women's worst soils was not significantly different from that of men's worst soils.
- There were significant differences in fertility between the best and worst soils regardless of gender.

Soil sample	pH
Women's best	5.07
Women's worst	5.09
Men's best	4.96
Men's worst	5.04
<b>Overall Average</b>	<b>5.04</b>





# Discussion and conclusions

Local soil knowledge is beyond “digging in the dirt.”

Women’s knowledge can come through indirect contact with the soil.



Their soil knowledge and perceptions are informed by their gendered practices such as fertilizer application, harvesting, post-harvest, and marketing.

# Discussion and conclusions

- The combination of methods permitted a complementary analysis for gender and soils research.
  - Did they choose fertile or non-fertile soils?
  - Do they have different soil knowledge?
  - How do context and location inform conceptual ideas of soil?



# Discussion and conclusions

- Soil scientists and extension agents need to alter their approaches, messages, and programs based on gendered knowledge and perceptions of farmers in their specific sites.
  - Plant growth & topography—not just soil.
  - “Soils change.”
  - Disconnect between the ethnographic methods and the soils science methods



# Conclusion

- If the soil practices that indirectly affect soil management or quality are excluded from soil research, then we might omit women's knowledge and practices and limit soil conservation adoption or success.
- Both men and women should be included in soil conservation trainings that have adapted the messages to the farmers' experiences.



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# Questions?



