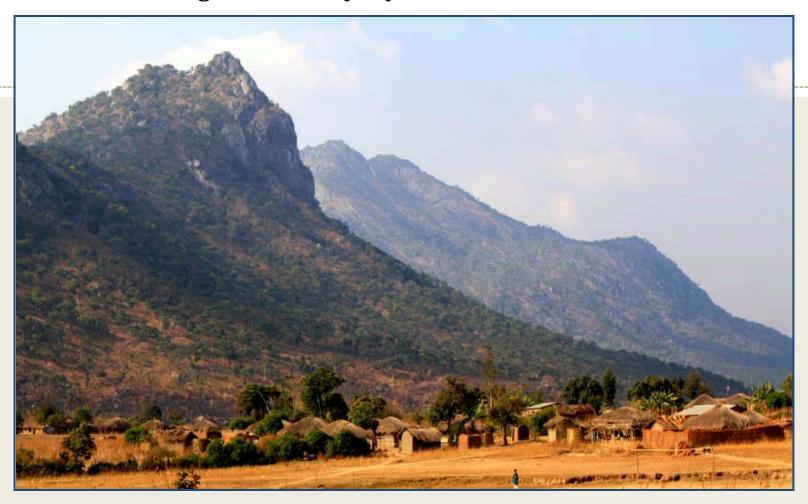
## Trees in the Field:

An Economic Assessment of Faidherbia albida-maize Agroforestry Systems in Malawi



Camp Resources 2013, Wilmington, NC

## **Project Status**

- Past
  - Research conducted for MS at NCSU
- Future
  - Preparing for publication
  - O How do I take this further and refine what I have?
    - Econometric modeling sophistication
    - **▼** New places to take the data
    - Climate change mitigation/adaptation



# **Project Basics**



Published on 18 Mar 2002

## Agroforestry

Crops + trees= increased crop yield

### Why Malawi?

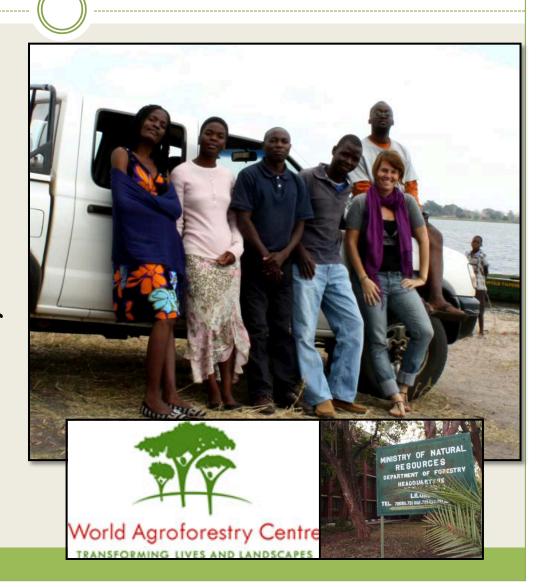
- Lack of access to food and cash for rural smallholders in SE Africa
- Fertilizer is extremely expensive in these settings and does not treat underlying soil fertility issues

## Why Faidherbia albida?

 Nitrogen fixing, indigenous, reverse leaf phenology

## Data

- Household survey of 391 farmers holding 497 fields
- Two districts, 30 days of field work
- Supported by ICRAF, Malawi Department of Forestry, NCSU
- Quantitative data and open-ended questions



# **Study Goals**

- Should farmers implement this technology? Are the incentives right?
  - Question 1: Can the intercropping system be associated with higher maize yields outside of an experimental setting?
  - Question 2: Is this system compatible with farmer resources and goals?
- Question 3: If this is a valid use of resources, how can adoption be expanded?

## The Models

Maize yield (kg/ha) = f(tree, farmer, crop management, physical land characteristics)

$$y = \beta_0 + \frac{1}{2}$$
  $\longrightarrow$   $\begin{array}{c} Tree - Varies \ by \ Model \\ \partial_1 presence \\ \gamma_1 count - \gamma_2 count^2 + \gamma_3 median DBH \end{array}$ 

### **Farmer**

 $+\beta_1$  wealth

 $-\beta_2$  f emalehead

 $-\beta_3$  age

### **Crop Management**

 $+\beta_4$  other agroforest rytree

 $+\beta_5$  chemical fert

 $+\beta_6 manure$ 

 $-\beta_7$  residburning

 $+\beta_8 residinc$ 

 $+\beta_9 hybridmaize$ 

### **Physical Land**

 $+\beta_{10}$  district

 $+\beta_{11}$  wetland

 $+\beta_{12}$  soilfertility

 $+\beta_{13}$  *soiltype* 

# **Regression Results**

Dep. Var: Maize yield per hectare, mean 1,418kg

	<b>J J I</b>	, O		
	Independent Variables	1	2	
Management Tree	Presence of trees	168.5***		Farmer
	Trees per ha		17.1***	
	Trees per ha, squared		-0.2**	
	Median DBH (CM)		2*	
	Age of head of household	-6.9***	-7***	
	Single female head of household	75	77.8	
	Iron roof (wealth)	200***	190***	
	Other agroforestry tree	96.8	116.1*	
	Chemical fertilizer	172.8**	205.4**	
	Farmyard manure	91.4	92.9	
	Residue burning	-158.2**	-165.9**	
	Residue incorporation	-328.6***	-317.4***	
	Hybrid maize	143.4**	120.1*	
	District	Insig.	88.4	
	Wetland	229.3***	230.8***	[2
	Soil Fertility	138.8***	124.1***	and
	Mkanda Soil	109.1*	101.1*	

**Significance: 1%** \*\*\*, **5%** \*\*, **10%** \*



### **Camp Resources XX & CEnREP**

NCSU (Fred Cubbage, Nils Peterson, Erin Sills, Laarman Grant, Natasha James, Darlene Casstevens, Melinda Morril), DOD MCI-East (Paul Friday, Mike Evers), ICRAF (Oluyede Ajayi, Frank Place, Dennis Garrity, Tracy Beedy, Innocent Phiri, Maurice Zimba), Ron Myers, USAID, Malawi's Department of Forestry, My extraordinary survey team (Martin, Alinafe, Brenda, Allen, Philmon)

# But what does it really mean?

- All tree variables are highly significant(<1%)</li>
- Magnitude of tree variables comparable or greater than other crop management practices
  - o <u>12-14% increase over average (1.4 tons/ha)</u>
  - 168.5 kg/ha for presence
  - o 206-211 kg per/ha for physical characteristic models

#### **Tree Presence Model**

