

# DO FERTILIZER SUBSIDIES CROWD OUT ORGANIC MANURE? *CASE OF MALAWI*

By

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# Introduction

Subsidies a controversial issue in developing countries

- Inefficient resource use
- Pollution
- Government budgetary deficit
- Distorted prices and terms of trade

However fertilizer use = key to increasing productivity

# The soil fertility problem

## Two major causes

- Nutrient mining
- Soil erosion

## Inorganic fertilizer replace lost nutrient

- Mainly N, P, K

## Organic manure increase organic matters

- Improve soil moisture, CEC,

# The fertilizer subsidy

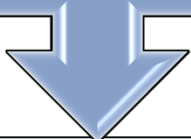
Fertilizer subsidy reduce the cost faced by farmer

Organic manure have huge labour costs

Hence cheap fertilizer can be used as a substitute for manure

# Research question

Is plot level probability of fertilizer application enhanced by access to subsidies?



How is the probability of fertilizer application correlated with probability of manure application

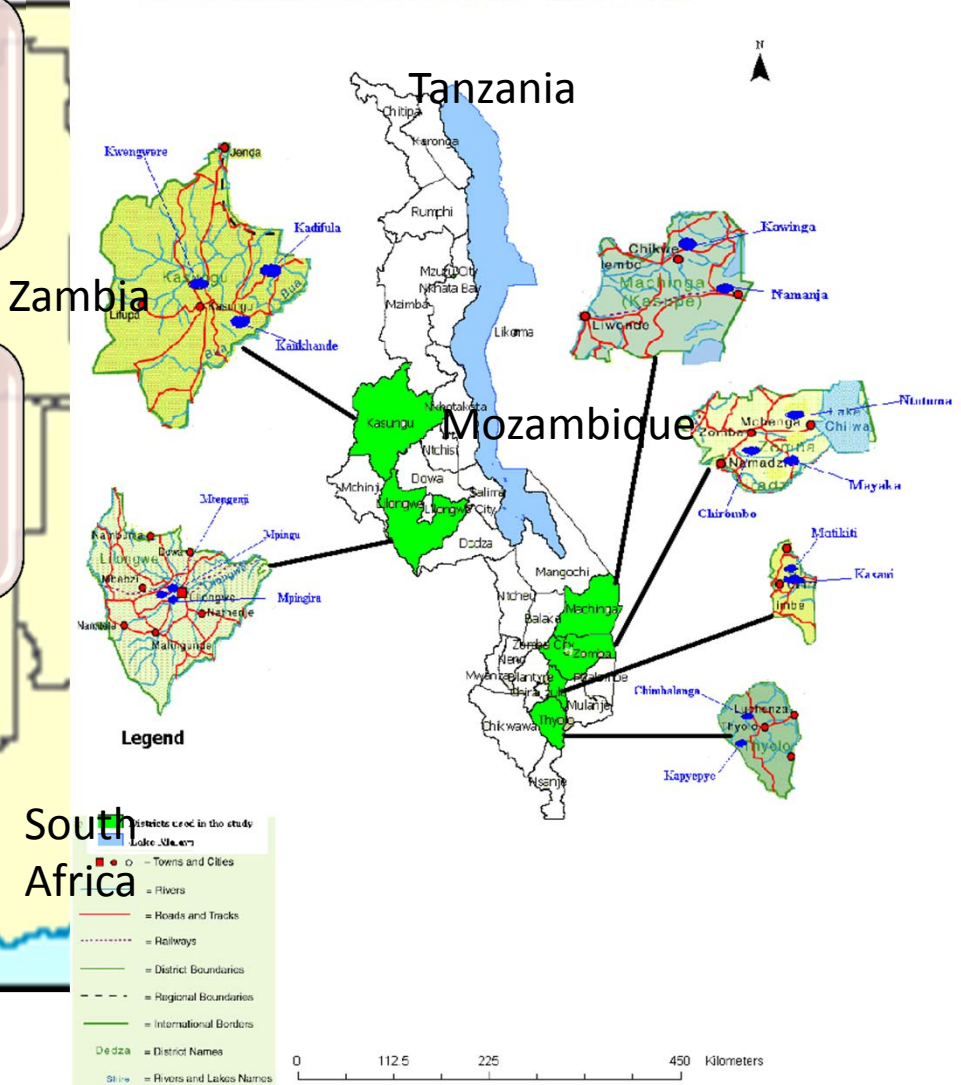


Does fertilizer application crowd in or crowd out manure application at farm plot level

# DATA SOURCE FOR THE STUDY

|                               |   |
|-------------------------------|---|
| <p><b>Central Region</b></p>  | <ul style="list-style-type: none"> <li>• Kasungu</li> <li>• Lilongwe</li> </ul>                                       |
| <p><b>Southern Region</b></p> | <ul style="list-style-type: none"> <li>• Thyolo</li> <li>• Zomba</li> <li>• Chiradzulu</li> <li>• Machinga</li> </ul> |
| <p><b>Total Sample</b></p>    | <ul style="list-style-type: none"> <li>• 2006</li> <li>• 2007</li> <li>• 2009</li> </ul>                              |

Figure 4: Map of Malawi showing districts and sites sampled for this study



# Methodology

## Probability of using fertilizer and manure

- Panel probit model
  - Assuming independent decisions to use
- Bi-variate probit models
  - Assuming simultaneous decision

## Intensity of using manure

- Tobit model

## Linear probability model to predict access to subsidy

- Predicted to access and access - **subsidy 11**
- Predicted to access but no access- **subsidy 01** (errors of exclusion)
- Predicted not to access but accessed – **subsidy 01** (errors of inclusion)
- Predicted not to access and did not access – **subsidy 00**

## Household farm plot level decision on fertilizer and manure use

| Variable         | Panel probit |           | Bi variate Probit |        |
|------------------|--------------|-----------|-------------------|--------|
|                  | Fertilizer   | Manure    | fertilizer        | Manure |
| Fertilizer dummy |              | 0.404**** |                   |        |
| Manure Dummy     | 0.408****    |           |                   |        |
| Subsidy 01       | -1.670****   | 0.054     | -1.419****        | -0.184 |
| Subsidy 00       | -1.607****   | 0.008     | -1.413****        | -0.152 |
| Subsidy 10       | 2.066        | -0.002    | 1.891             | 0.02   |



## Fertilizer and manure intensity – panel tobit model

| Variable             | Fertilizer     |                   | Manure         |                   |
|----------------------|----------------|-------------------|----------------|-------------------|
|                      | Actual subsidy | Predicted subsidy | Actual subsidy | Predicted subsidy |
| Log manure           | 0.091****      | 0.092****         |                |                   |
| Log fertilizer       |                |                   | 0.582****      | 0.541****         |
| Actual subsidy dummy | 5.186****      |                   | -0.044         |                   |
| Subsidy 01           |                | -4.030****        |                | 1.248             |
| Subsidy 00           |                | -3.960****        |                | -1.564*           |
| Subsidy 10           |                | 1.627****         |                | -1.051            |

# Conclusion

No negative effect from fertilizer subsidy on manure use

Manure use still limited to 50% of all maize plot

Manure use and fertilizer used as complements

Fertilizer subsidy does not crowd out manure use