

# Dis-incentivizing sustainable intensification? The case of Zambia's fertilizer subsidy program



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# Do fertilizer subsidies (dis)incentivize the use of other SFM practices?

- Nationally-representative panel data from Zambia
- Test and control for endogeneity of subsidized fertilizer receipt
- Robust literature on fertilizer subsidies in SSA but only 2 other peer-reviewed studies that focus on this dimension
  - Holden & Lunduka (2012)
  - Koppmair et al. (2016)
- Examine the extensive and intensive margins



# Data

2002/03 & 2006/07 Zambian Supplemental Survey (SS)

## SFM practices analyzed:

- Fallowing, intercropping, animal manure
- Maize monocropping, continuous maize

## Dependent Variable:

- Probability of use
- Area of use
- Share of land used



# Empirical Model (Linear FE and Nonlinear)

$$SFM_{it} = \beta_0 + \beta_1 FSP_{it} + A_{it}\beta_2 + L_{it}\beta_3 + p_{it}\beta_4 + z_{it}\beta_5 + m_{it}\beta_6 + g_{it}\beta_7 + d_t + c_i + \varepsilon_{it}$$

**SFM** = measure of use of the practice (binary, area, share)

**FSP** = kg of FSP

**A** = Size of landholding

**L** = Labor availability/ Household composition

**p** = Variable input and expected output prices

**z** = Household characteristics

**m** = Market characteristics and access to information

**g** = Land quality and agro ecological conditions

# Main findings

\*\*\*, \*\*, \* represent significance at the 1%, 5%, and 10% levels respectively

SFM Practice	Model	=1 if adopted	APE (200 kg of FSP)		Share of area
			Area (ha, if >0)	Area (ha)	
Fallowing	Linear FE	-0.029***	--	-0.156***	-0.018***
	CRE	-0.032***	-0.371***	-0.084***	-0.018***
Maize Monocrop.	Linear FE	0.007*	--	0.189***	0.023***
	CRE	0.066***	0.192***	0.086***	0.024***
Continuous Maize	Linear FE	0.015*	--	0.089*	0.009
	CRE	0.017*	0.024	0.019	0.008
Animal Manure	Linear FE	0.000	--	-0.041	-0.004
	CRE	0.000	-0.259***	-0.008	-0.002

We find no statistically significant effects of FSP receipt on maize-legume intercropping

# Conclusions & Policy Implications

- FSP appears to have incentivized
  - Less fallowing
  - More maize monocropping within a given year
  - Possibly more continuous maize cultivation on same plot
- While the program marginally raised maize yields, it may have incentivized unsustainable intensification
- Recent shift to less maize-centric; flexible e-voucher may help
  - Improving R&D and extension on SFM might ↓ these unintended consequences and ↑ returns to FSP



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