

# Smallholder Farmer Behavior and Agricultural Productivity in Eastern and Southern Africa:

## Implications for Regional Trade and Input Promotion Strategies



T.S Jayne

with colleagues at Michigan State University

Seminar at USAID/Washington

November 8, 2007

## Current thinking on “strategy”

---

- Strong consensus about need for greater investment in public goods (infrastructure, crop science) and certain policy reforms
- Major debate with regard to what constitutes the right “enabling environment”
  - Input subsidies
  - food price support/stabilization
  - the role of regional trade

- 
- Many of these debates can be informed by a solid empirical understanding of farmer behavior

## Organization of presentation:

---

1. Underappreciated “empirical regularities” of small farm agriculture in Africa
2. Discuss the implications of these findings for current policy debates on
  - input promotion / productivity strategies
  - regional trade

# Five underappreciated facts about African agriculture:

---

1. Farm sizes are declining → major land disparities → affects the % of farmers capable of producing a surplus and participating in markets
2. Most smallholder farmers are buyers of staple food → directly hurt by higher grain prices
3. Retail food prices are trending downward in most of the region
4. Countries adopting a relatively open approach to regional trade are experiencing lower price volatility and fewer food crises than those controlling prices and trade flows.
5. Targeting difficulties impede the potential of fertilizer subsidy programs to contribute to productivity and poverty reduction objectives

---

## Fact #1

---

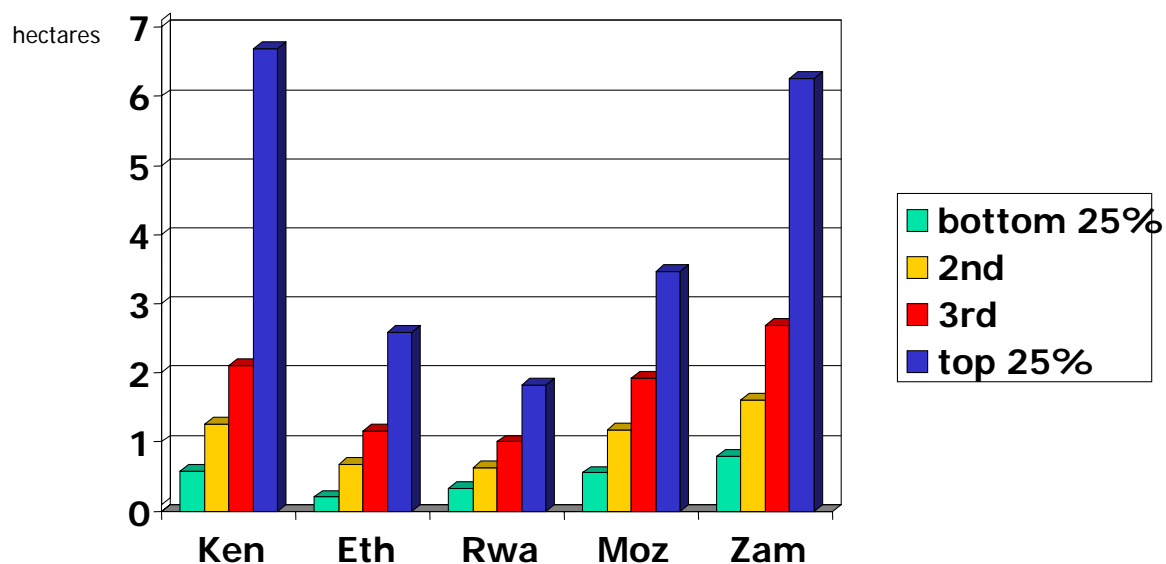
- Emerging land pressures are generating fundamental challenges for strategies to link farmers to markets and reduce poverty

## Cultivated land per agricultural person (hectares per capita)

	1960-69	1970-79	1980-89	1990-99
<b>Ethiopia</b>	0.508	0.450	0.363	0.252
<b>Kenya</b>	0.459	0.350	0.280	0.229
<b>Mozambique</b>	0.389	0.367	0.298	0.249
<b>Rwanda</b>	0.215	0.211	0.197	0.161
<b>Zambia</b>	1.367	1.073	0.896	0.779
<b>Zimbabwe</b>	0.726	0.664	0.583	0.525

Source: FAOStat website: Source: FAO Stat database: [www.faostat.fao.org/](http://www.faostat.fao.org/)

## Farm size distribution: Small farm sector



## Characteristics of smallholder farmers, Zambia 2003/04

	N=	Farm size (ha)	Asset values (US\$)	Gr. Rev., maize sales (US\$)	Gr. Rev., crop sales (US\$)	Total hh income (US\$)
Top 50% of maize sales	31,320 (2%)	4.3	1,132	720	1163	2,932
Rest of maize sellers	328,561 (26%)	1.6	316	88	193	634
Households not selling maize	907,255 (72%)	0.9	231	0	97	415

### Upshot

---

- New technology can help
- But given plausible assumptions about the extent to which technical innovation can raise grain yields, farm sizes are becoming too small for most smallholders to produce a grain surplus (and participate in markets)
- Hence, diversification into higher-return activities will be crucial
- This transition is already occurring

Role of maize in farm sales revenue is declining (share of gross sales revenue)

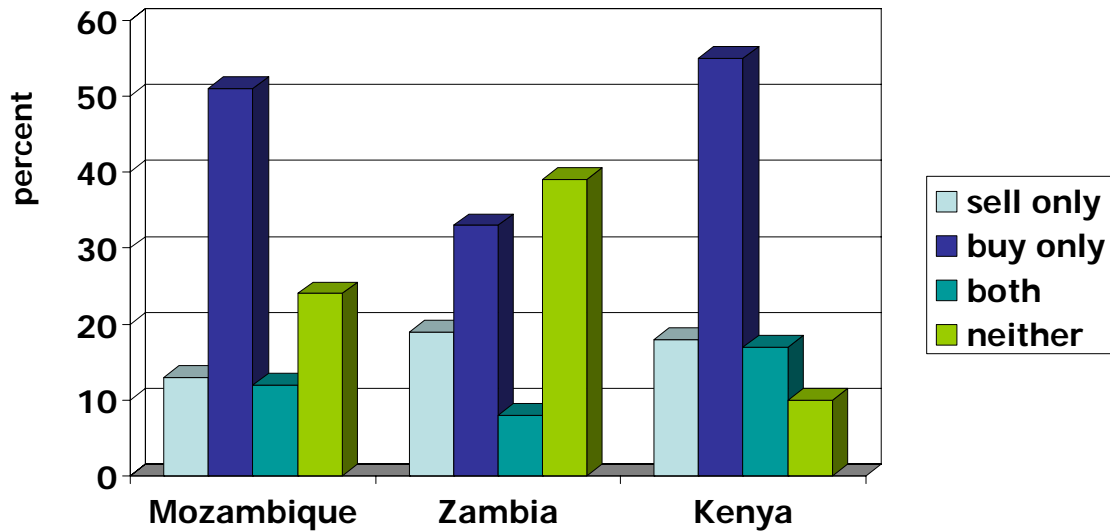
	Maize	Other grains/ beans/ oilseeds	Non-food cash crops	Fruits - veges	Animal products
Kenya	13.3	7.9	34.0	14.7	26.7
Malawi	32.3	11.8	44.9	na	na
Mozam	13.8	9.3	16.9	30.4	23.4
Zambia	28.2	7.7	16.7	27.5	14.7

## Fact #2

---

- Most rural farm households are buyers of maize (or net buyers)

## Smallholder Households' Position in the Maize Market



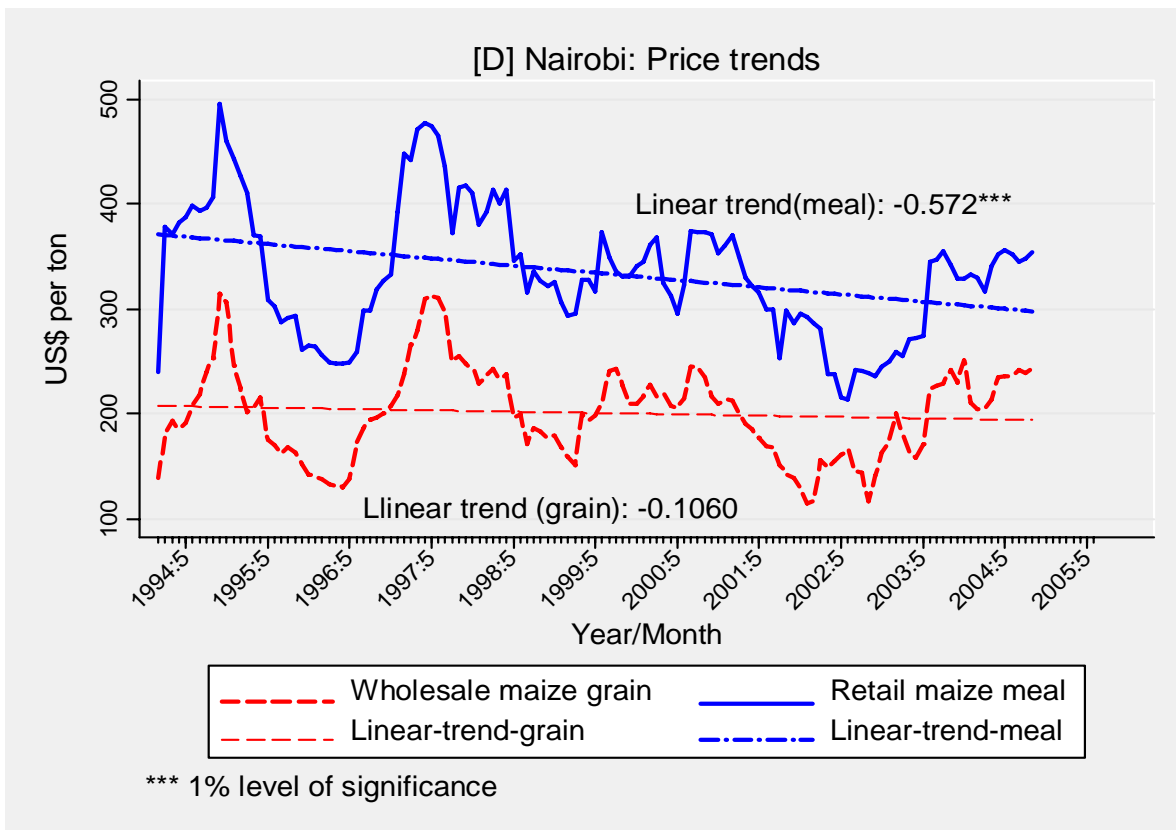
### Fact #2

---

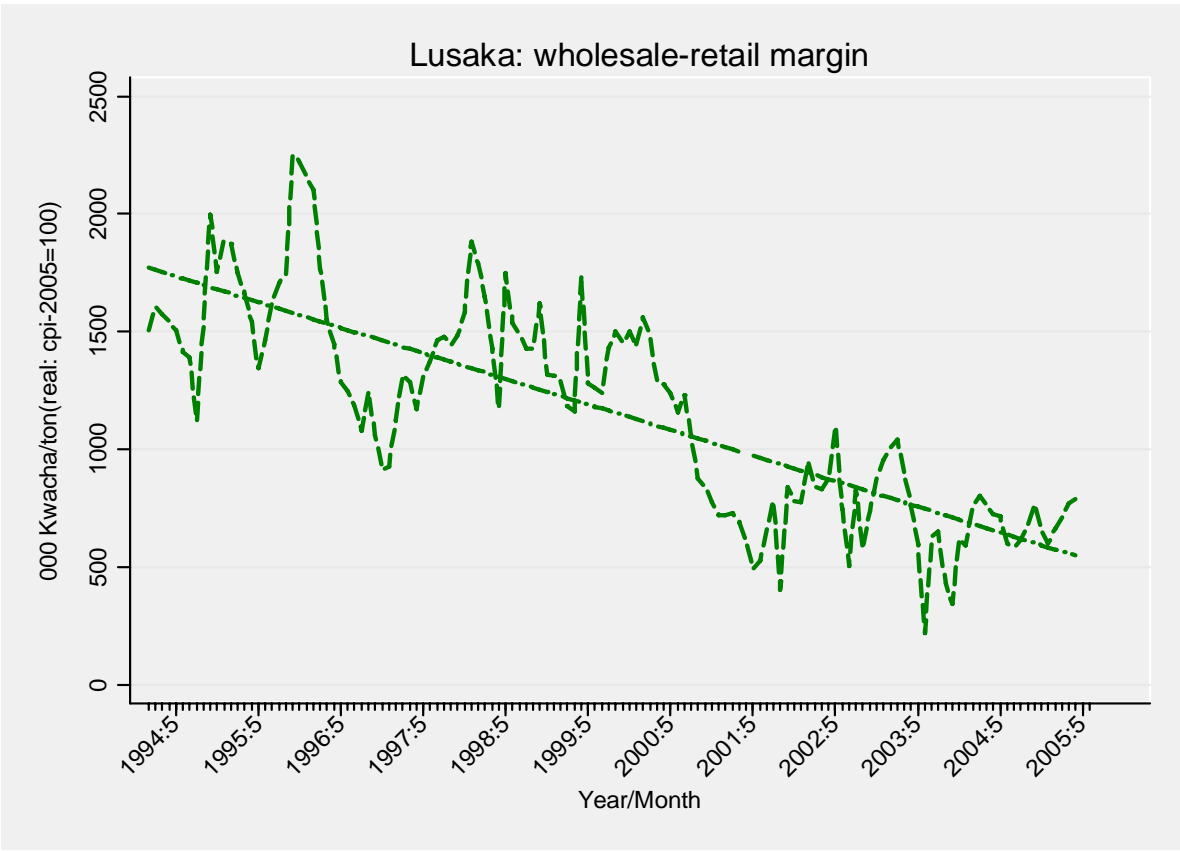
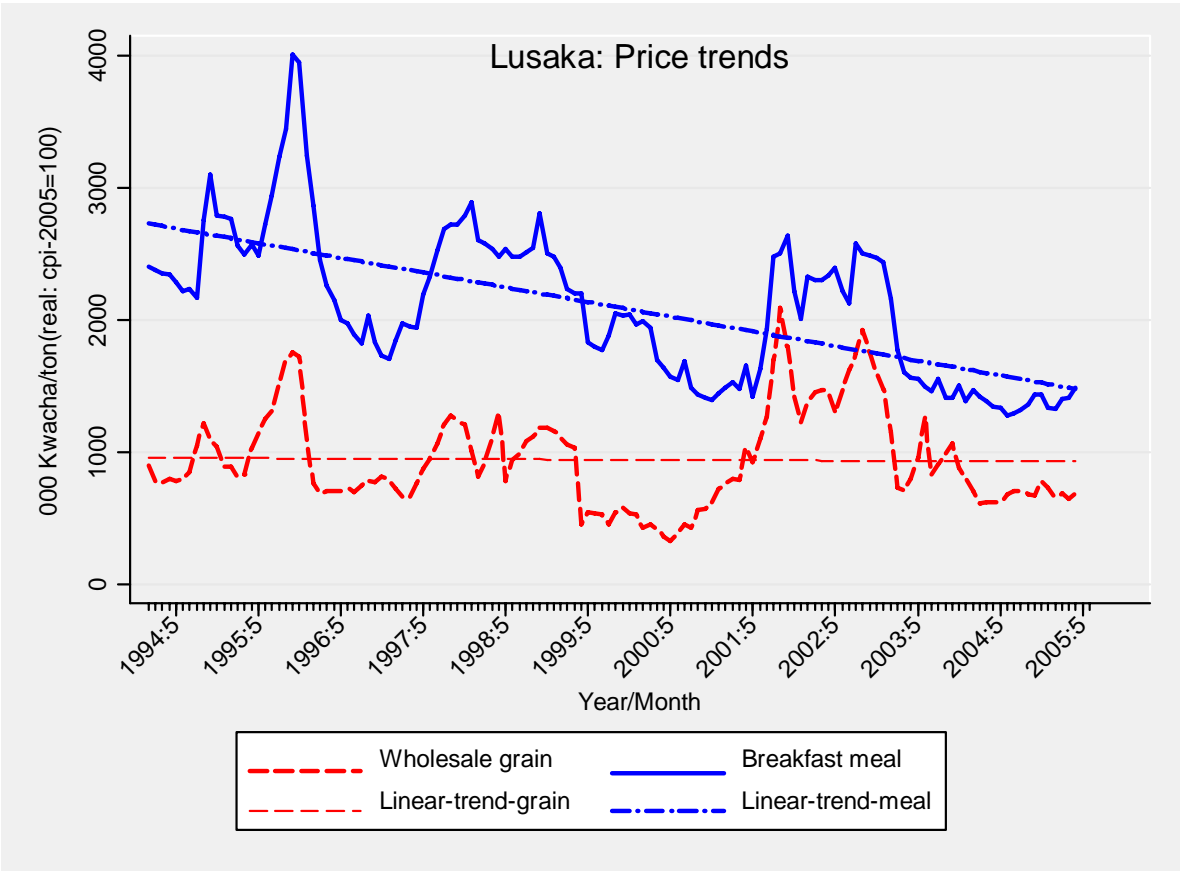
- Most rural farm households are buyers of maize (or net buyers)
- 2% of households account for 50% of marketed grain surplus
- Crop price supports:
  - highly concentrated benefits
  - anti-poor
  - Most likely impede small farm diversification into higher-valued activities

# Fact #3

- Retail maize meal prices are trending downward

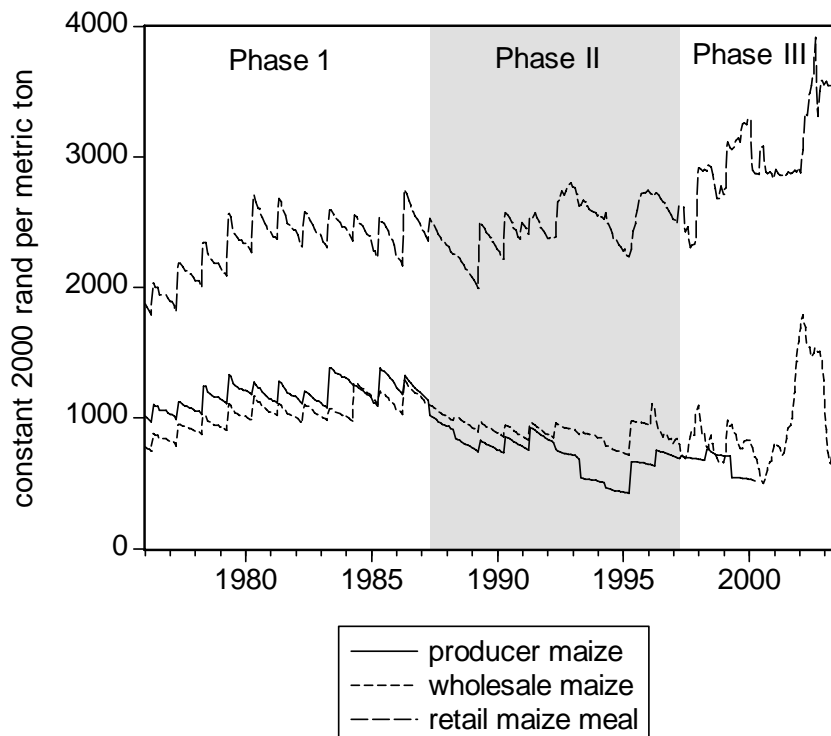






# Fact #3

- Retail maize meal prices are trending downward
- Why?
  - Food market reform has encouraged rapid investment in informal, small-scale milling and trading networks
  - The informal channel exerts competitive pressure on commercial millers/retailers
  - Exception: South Africa



## Fact #4

---

- Maize grain prices are generally *more unstable* in countries that restrict grain trade than in countries having open borders

- 
- Compute two measures
    - Unconditional CV: measure of price variability
    - Conditional CV: measure of price *unpredictability*
      - After accounting for available information on rainfall, normal seasonality, exchange rates, and last month's price.

- 
- Both unconditional and conditional CVs:
    - Highest in Malawi and Zambia
    - Moderately high in Mozambique and Mali (maize)
    - Lowest in Mali (rice) and Kenya

---

Country	Market	Coefficient of Variation	
		Unconditional	Conditional
Malawi	Lilongwe	0.48	0.17
	Karonga	0.46	0.13
Zambia	Lusaka	0.40	0.10
	Kasama	0.36	0.12
Mozambique	Maputo	0.24	0.08
	Nampula	0.43	0.12
Kenya	Nairobi	0.24	0.05
	Kitale	0.33	0.09
Mali (Maize)	Koutiala	0.33	0.10
	Mpessoba	0.35	0.11
Mali (Rice)	Koutiala	0.08	0.03
	Loulouni	0.11	0.04

# Conclusions:

---

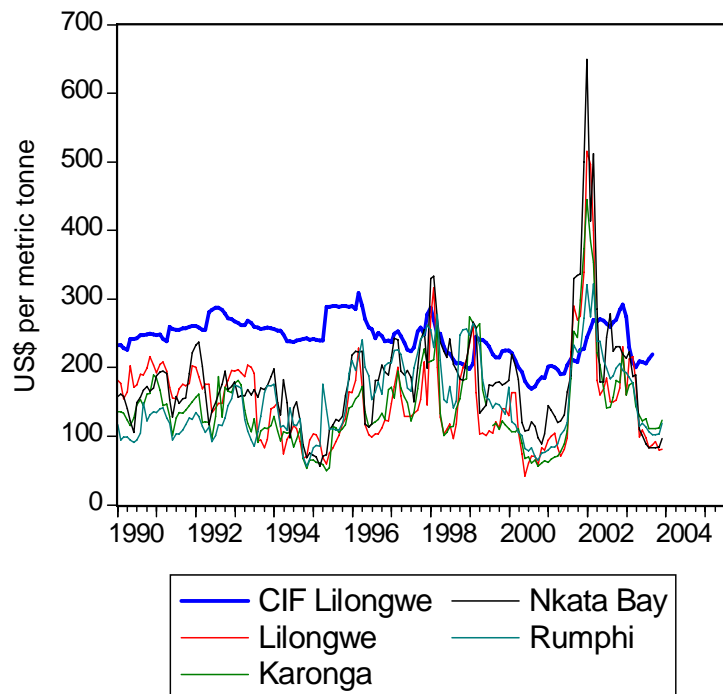
- Despite compelling rationale for price stabilization and controlling trade to stabilize food supplies, countries that rely on “maize without borders” generally have
  - **more stable prices**
  - **higher cereal production growth**than countries actively intervening to stabilize prices

## Why Does this Conclusion Hold?

---

1. Cutting off trade depresses the long-term development of commercial markets
2. Private trade and investment develop more slowly and more tentatively where government policy is unpredictable
3. “Self-fulfilling prophecies” – if governments intervenes too heavily, then markets will not develop
4. Many governments’ well-meaning attempts to stabilize prices actually destabilize them because they
  - cannot mobilize forex quickly enough
  - over-release supplies onto markets
  - buy too much from the market, etc.

## Example: the Malawi famine of 2002



---

**While private trading systems will always result in some price variation, they tend not to cause the frequent food crises due to policy mistakes and inaction that are commonly seen in the region**



## Fact #5

---

- Recent impact assessments of fertilizer subsidy programs (e.g., Zambia) are showing relatively limited impacts on agricultural productivity and poverty reduction
- Why?

## Two reasons for low returns to fertilizer subsidy programs:

---

### 1. Poor targeting

Zambia	Total Income	Assets	Landholding size
Fertilizer source:	'000 kwacha per capita		ha per capita
<i>Households not acquiring fertilizer:</i>	266	173	.15



Zambia	Total Income	Assets	Landholding size
	'000 kwacha per capita		ha per capita
<b>Fertilizer source:</b>			
<i>Households not acquiring fertilizer:</i>	266	173	.15
<i>Cash purchases from private retailers:</i>	774	342	.20

Source: Govereh et al, 2006

Zambia	Total Income	Assets	Landholding size
	'000 kwacha per capita		ha per capita
<b>Fertilizer source:</b>			
<i>Households not acquiring fertilizer:</i>	266	173	.15
<i>Cash purchases from private retailers:</i>	774	342	.20
<i>Government Fertilizer Support Program (50% subsidy)</i>	804	425	.23

Source: Govereh et al, 2006

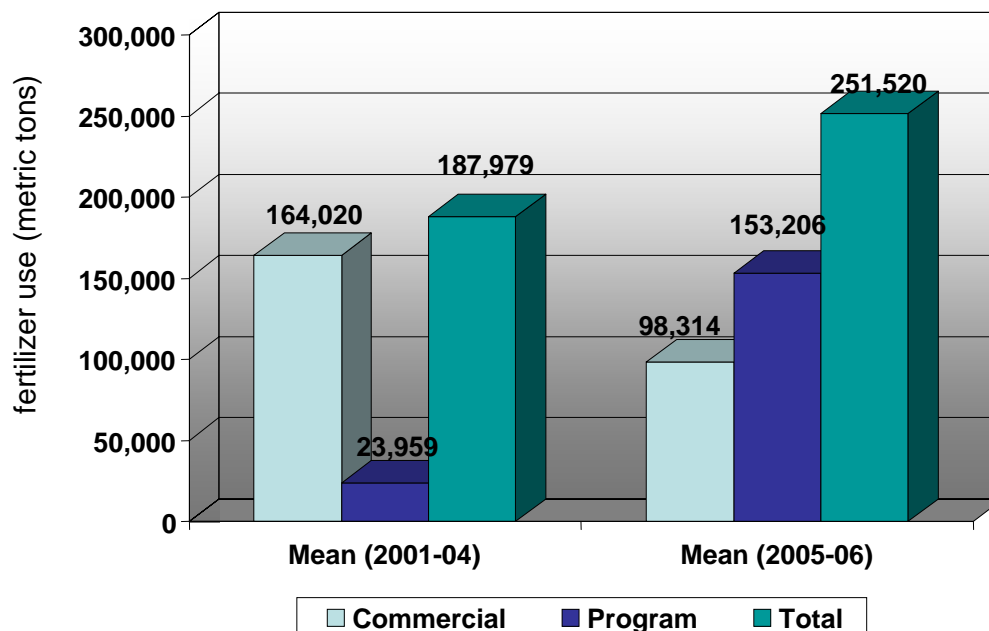
## Three reasons for low returns to fertilizer subsidy programs:

---

1. Poor targeting
2. crowding out of commercial sales → limited overall additional fertilizer use

### Malawi

\* The additional 129,247 mt subsidized fertilizer only raised total use by 63,541 mt  
note: preliminary figures subject to updating

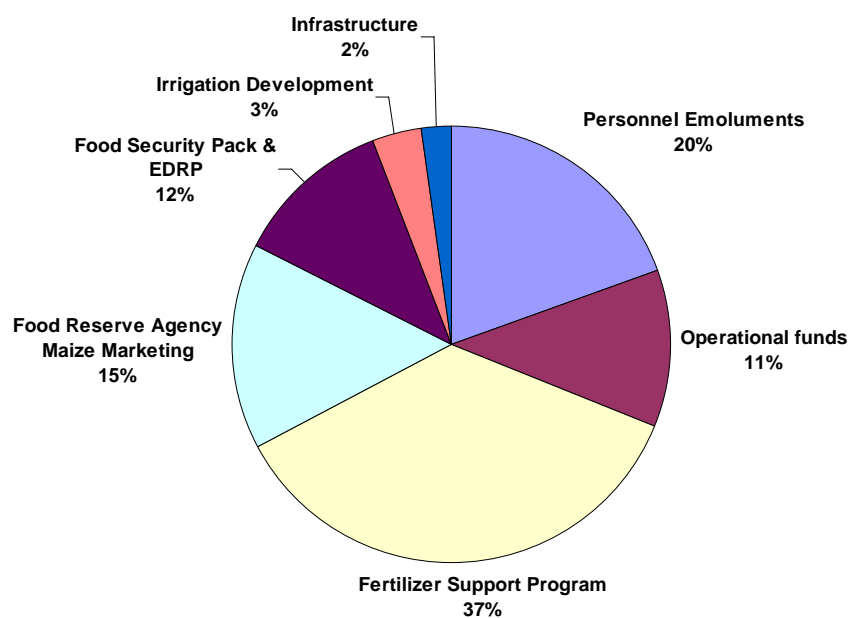


## IFPRI review of rate of return studies:

	Returns
Subsidies	Negative – 12%
Investments	
- research & extension	35% to 70%
- roads	20% to 30%
- education	15% to 25%
- communications	10% to 15%
- irrigation	10% to 15%

**If we believe these findings, they have major implications**

## Budget allocation to Agricultural Sector in Zambia: ZMK465 million in 2005



- 
- As massive as the poverty problems are now, they will be much greater unless budgets are re-allocated sooner or later to investments that will make the economy productive in the long-term:
    - Population growth w/o productivity growth → civil strife
    - Not a viable option to have more and more “fragile” or “failed” states

## Policy response (cont.)

---

- Lobby forcefully for more level playing field in international trade
  - OECD support for Africa: \$50 bill./yr
  - OECD ag. subsidies: \$350 bill./yr

# Summary of Policy Implications

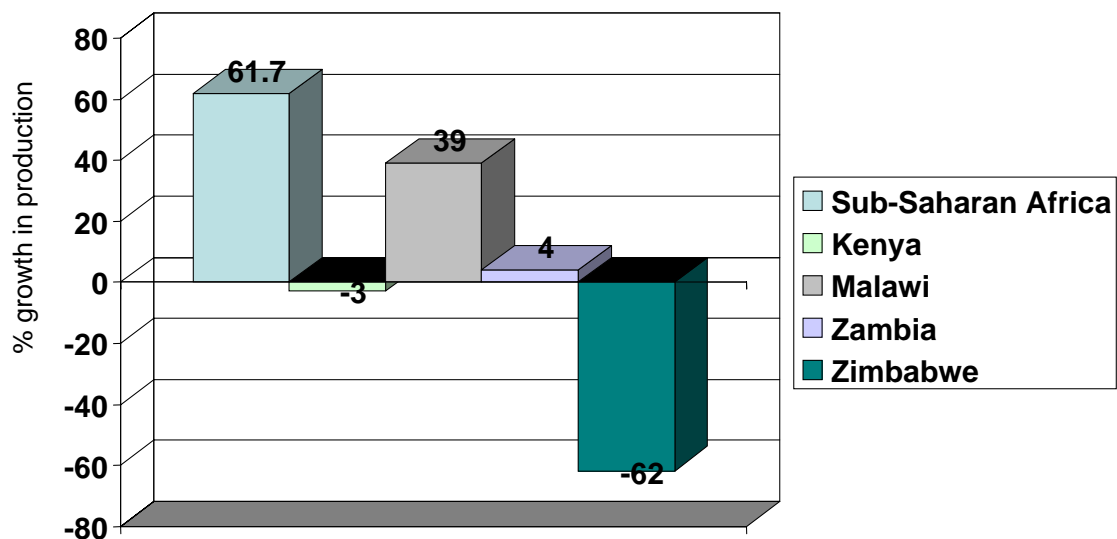
---

1. Incentives for government to reallocate expenditure patterns toward those that best contribute to *sustained* productivity and poverty reduction
2. More selective and more sustained donor support for growth-promoting investments – move away from budget support
3. Policy stability and predictability – don't constantly change trade policies and the nature of government participation in input and output markets.
4. Food self-reliance, not food self-sufficiency – adopt a more open borders approach to regional trade
5. Some protection from world markets may be justified
6. If input subsidies are to be used, do it in ways that don't undermine commercial markets – targeting!
7. Implicit in all the above are thorny political economy issues that must be addressed



thank you

## African Countries - % Growth in Cereal Production between 1985 and 2005



## African Countries - % Growth in Cereal Production between 1985 and 2005

