

# Promoting Fertilizer Use in Africa: Current Issues and Empirical Evidence from Malawi, Zambia, and Kenya



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Halving Hunger and Poverty by 2015”  
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## Key challenges

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1. How to raise incentives (i.e., profitability) of using fertilizer in a *sustainable* way
  - How to reduce costs of acquiring fertilizer (marketing)?
  - How to improve the efficiency of farmers’ use of fertilizer?
  - How to achieve reasonable output market stability?
  - How to promote access to input credit?

## Key challenges (cont.)

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2. Recognizing that progress on the above requires major public investments in crop science, extension, infrastructure, and nurturing of private input supply channels, then:

***What is the appropriate balance between expenditures on these investments vs. input subsidies?***

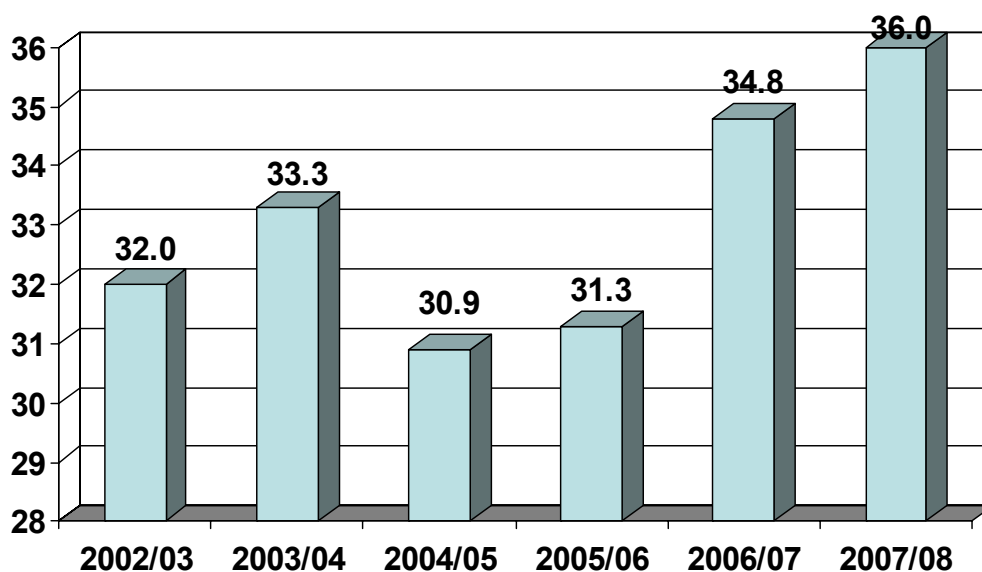
### Objectives of this presentation:

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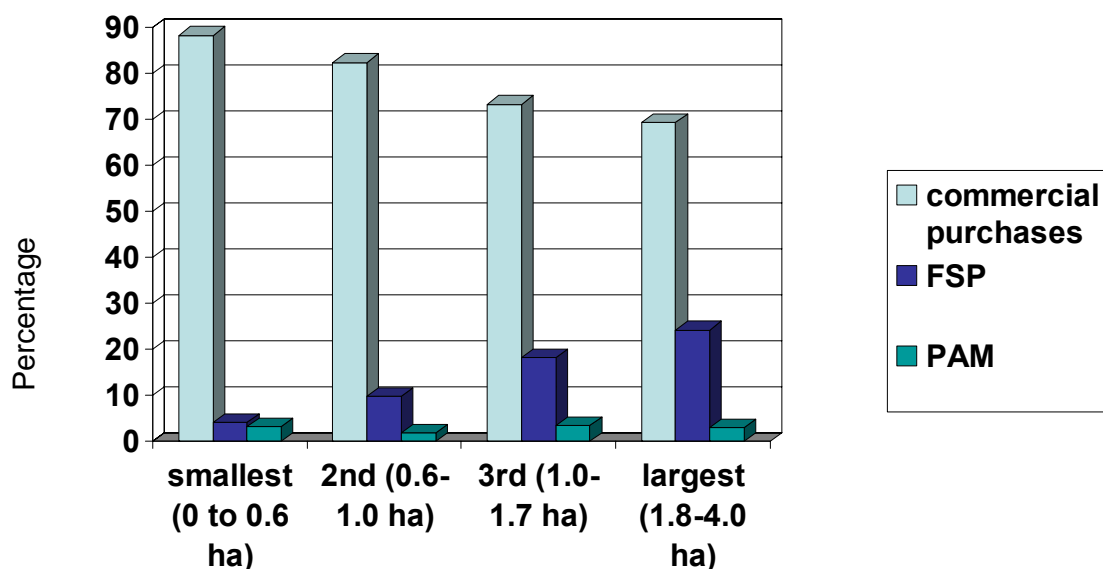
1. To highlight lessons from experience with fertilizer subsidies in Malawi and Zambia
2. To highlight lessons from Kenya's experience of rapid smallholder adoption of fertilizer without subsidies
3. To assess the implications of sharply higher world food and fertilizer prices in 2008
4. To provide guiding principles of a "smart" fertilizer subsidy program

Intensity of fertilizer use (1996-2002)	% growth in fertilizer use intensity (kg/ha cultivated) (mean 1996-2002 / mean 1990-95)	
	< +30%	> +30%
< 25 kg/ha	DRC (0.5, -47%)	Uganda (0.6, +237%)
	Angola (0.7, -69%)	Rwanda (1.8, +89%)
	Niger (0.9, +5%)	Mozambique (3.2, +142%)
	Guinea (2.0, -4%)	Ghana (3.6, +68%)
	Burundi (2.3, -6%)	Chad (4.3, +93%)
	Madagascar (2.9, -8%)	Cameroon (5.9, +77%)
	Mauritania (4.0, -64%)	Togo (7.0, +30%)
	Tanzania (4.8, -47%)	Cote d'Ivoire (11.8, +53%)
	Gambia (5.2, +15%)	Botswana (11.8, +294%)
	Nigeria (5.6, -73%)	Senegal (13.2, +67%)
	Burkina Faso (5.9, -28%)	Ethiopia (14.4, +71%)
	Zambia (8.4, -34%)	Benin (17.6, +76%)
	Mali (9.0, +7%)	Lesotho (23.2, +35%)
	> 25 kg/ha	Swaziland (30.5, -40%) Malawi (30.8, +9%) Zimbabwe (48.3, +9%)

## Zambia: trend in % of smallholders using fertilizer nationwide



Zambia: Fertilizer acquisition sources among small-scale farmers using fertilizer on maize, 2003/04 and 2007/08\*\*



\*\* note: NGOs and other farmers account for less than 6% of primary fertilizer acquisition source by small-scale famers

Zambia	Total Income	Assets	Landholding size
Fertilizer source:	'000 kwacha per capita		ha per capita
<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

# Insight #1

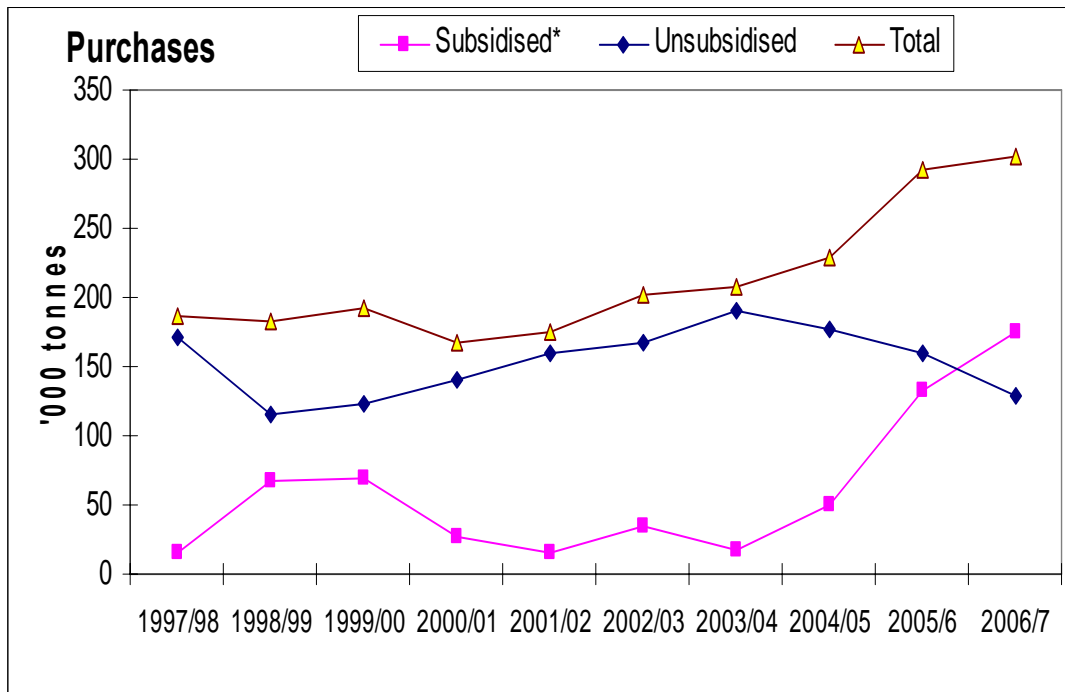
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*Benefits of fertilizer subsidy programs tend to be disproportionately captured by the better-off or non-poor farmers*

Concept of incremental fertilizer use from a subsidy program

**How much fertilizer is added to the total fertilizer farmers use per ton of subsidized fertilizer distributed?**

## Farmer fertilizer purchases, Malawi



## Displacement of commercial sales by subsidized fertilizer

- Each additional ton of subsidized fertilizer reduced overall commercial purchase by
  - 0.48 tons in Malawi
  - 0.41 tons in Zambia
- Each additional ton of subsidized fertilizer
  - reduced commercial fertilizer purchase by 0.85 tons for non-poor farmers
  - reduced commercial fertilizer purchase by 0.28 tons for poor farmers

## Insight #2

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*Few poor households can afford to buy fertilizer – incremental fertilizer use from subsidies is high for them.*

## Insight #3

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*Relatively non-poor households tend to buy fertilizer if profitable. For them, incremental fertilizer use from subsidies is relatively low.*

## Upshot:

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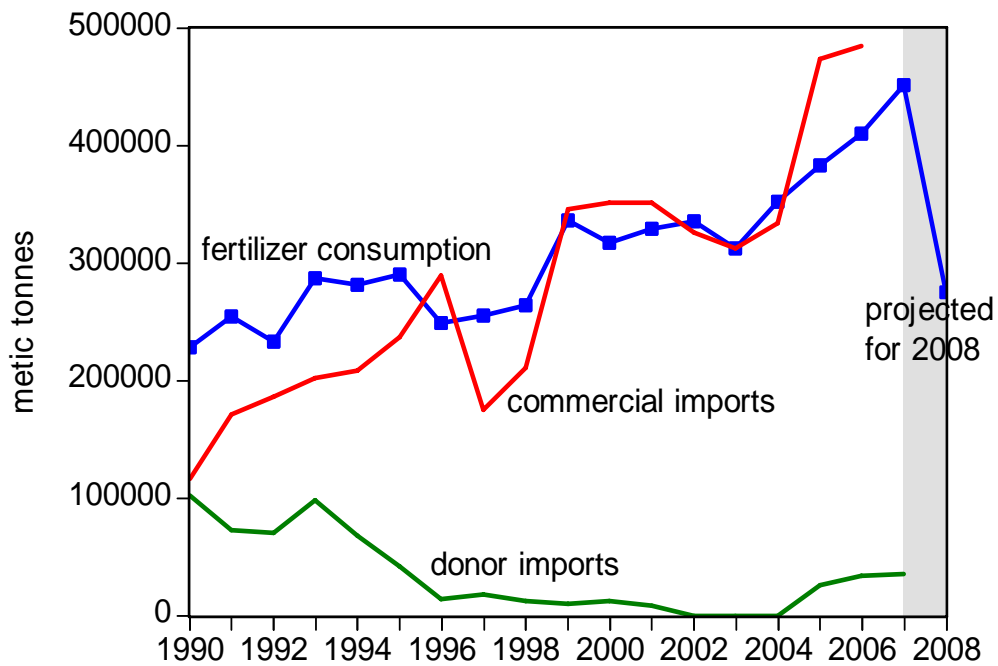
Targeting poorer households will simultaneously contribute to many government policy objectives:

1. Achieve more maize output per unit of subsidized fertilizer distributed
2. Contribute more to national food security
3. More effectively reduce hunger by allowing the poor to produce more for themselves
4. Promotes equity and reduces the widening rift between the “haves” and “have-nots”

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## Insights from Kenya

## Kenya fertilizer use, 1990-2008

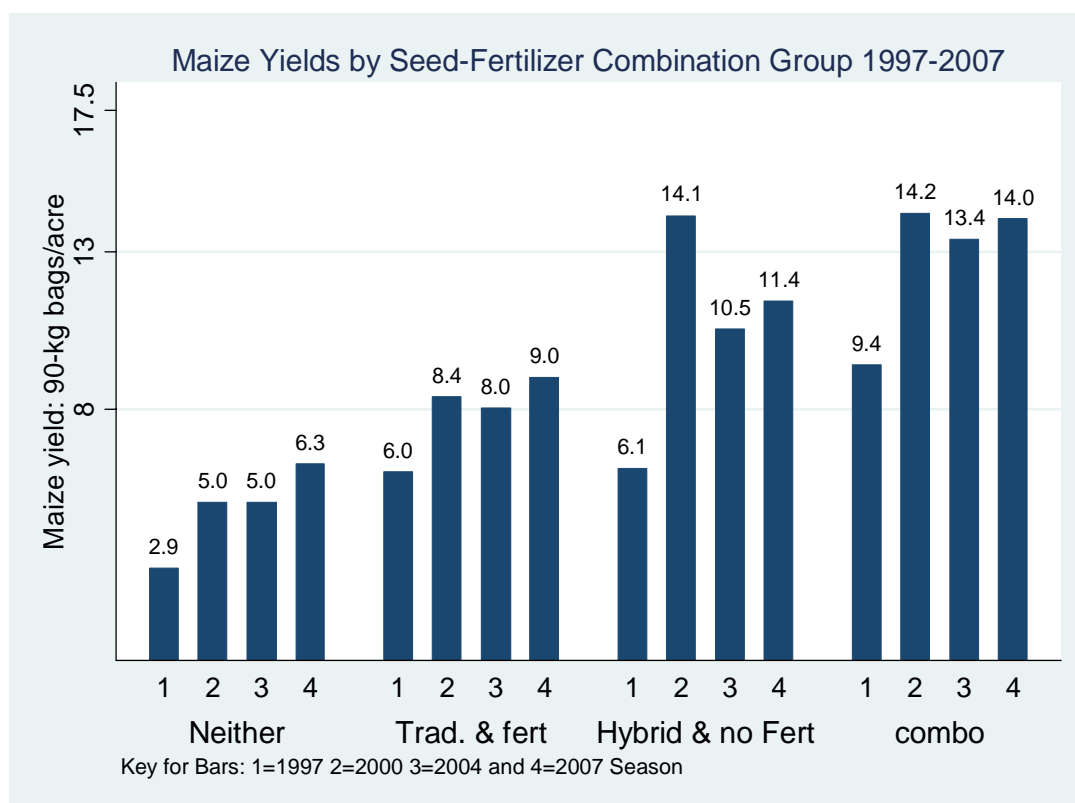


## % of Small-scale Farmers Using Fertilizer on Maize

Agro-regional zone	1996	1997	2000	2004	2007
% of households using fertilizer on maize					
Coastal Lowlands	0	0	3	4	14
Eastern Lowlands	21	27	25	47	43
Western Lowlands	2	1	5	5	13
Western Transitional	39	41	70	71	81
High-Pot. Maize Zone	85	84	90	87	91
Western Highlands	81	75	91	91	95
Central Highlands	88	90	90	91	93
Marginal Rain Shadow	6	6	12	11	16
<b>Total Sample</b>	<b>56</b>	<b>58</b>	<b>64</b>	<b>66</b>	<b>70</b>

## Fertilizer Dose Rate (kgs/acre) on maize

Agro-regional zone	1997	2000	2004	2007
Dose rate (kgs/acre) on fertilized maize fields				
Coastal Lowlands	11	5	3	7
Eastern Lowlands	10	18	15	16
Western Lowlands	24	14	10	12
Western Transitional	54	48	62	71
High-Pot. Maize Zone	65	67	74	75
Western Highlands	31	36	46	47
Central Highlands	68	64	64	58
Marginal Rain Shadow	12	15	43	43
<b>National sample</b>	<b>56</b>	<b>55</b>	<b>60</b>	<b>59</b>



Not counting other crops grown on intercropped maize fields

## Reasons for the Upsurge in Fertilizer Use in Kenya

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1. GoK has maintained a stable fertilizer policy stance since 1990
  - Eliminated import licensing quotas
  - Eliminated foreign exchange controls
  - Eliminated retail price controls

## Reasons for the Upsurge in Fertilizer Use in Kenya

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2. Private sector investment in fertilizer distribution has expanded rapidly
  - 10-11 importers
  - 500 wholesalers
  - 8,000 retailers

## 4 Reasons for the Upsurge in Fertilizer Use in Kenya

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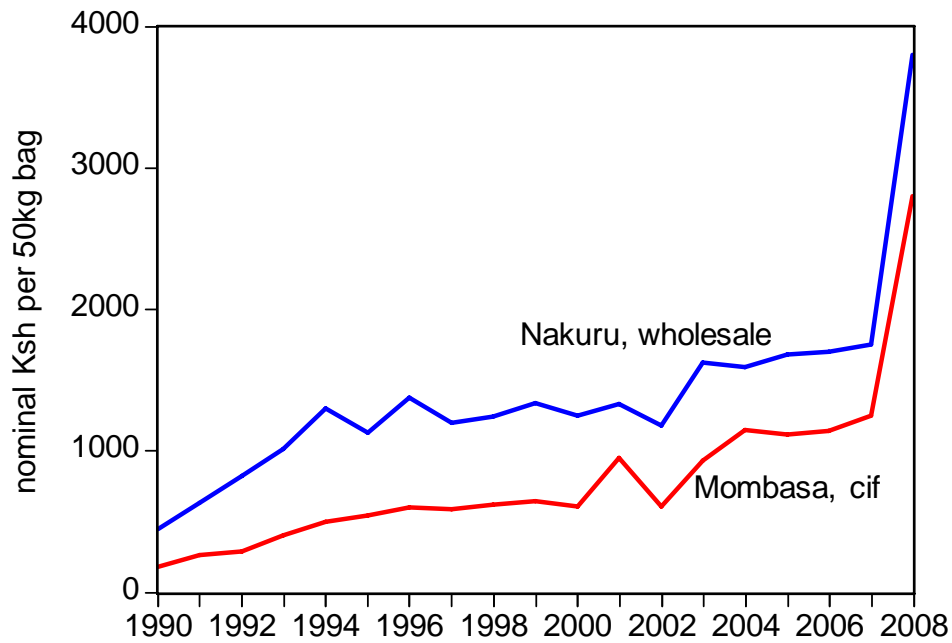
3. In response to expansion of input stockists, small farmers' are now much closer to fertilizer retailers
  - 1997: 7.4kms
  - 2000: 5.6kms
  - 2004: 3.7kms
  - 2007: 3.2kms

## Reasons for the Upsurge in Fertilizer Use in Kenya

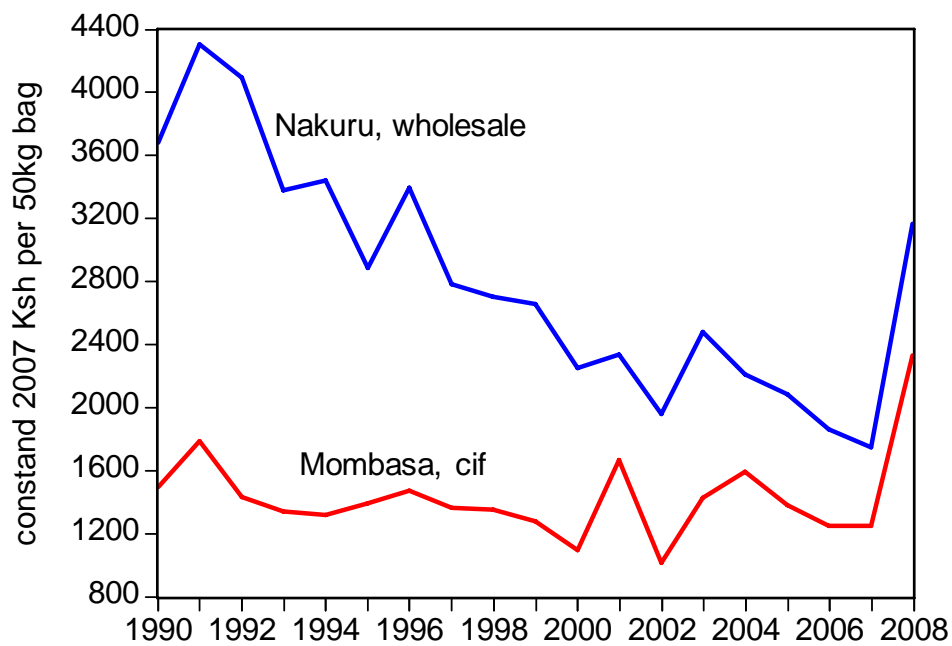
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4. Greater competition among importers and wholesalers has led to declining fertilizer marketing costs

### Price of DAP (Di-Ammonium Phosphate) in Mombasa and Nakuru (nominal Shillings per 50kg bag)



### Price of DAP (Di-Ammonium Phosphate) in Mombasa and Nakuru (constant 2007 Shillings per 50kg bag)



## How has the private sector been able to reduce fertilizer marketing margins?

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1. Greater competition has led to lower margins
2. Emergence of brokerage services for exploiting opportunities for cheaper backhaul transport, e.g., linking upcountry fertilizer supply with trucks transporting cargo from Rwanda and Congo to the port of Mombasa;
3. private importers are increasingly using international partners to source credit at lower interest and financing costs than are available in the domestic economy
4. mergers between local and international firms in which knowledge and economies of scope are being passed onto local firms to achieve cost savings in local distribution (e.g., Mea partnering with CONAGRA)

## How has the private sector been able to reduce fertilizer marketing margins?

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1. These cost reductions occur as a result of market development and a stable policy environment for private sector investment
2. These cost reductions directly benefit smallholder farmers

## Insight #4

*From 1990 to 2007, commitment to development of viable commercial input distribution systems was sustained.*

*No market uncertainties introduced by large scale subsidy programs.*

*This stable policy environment fostered an impressive private sector response.*

## Insight # 6

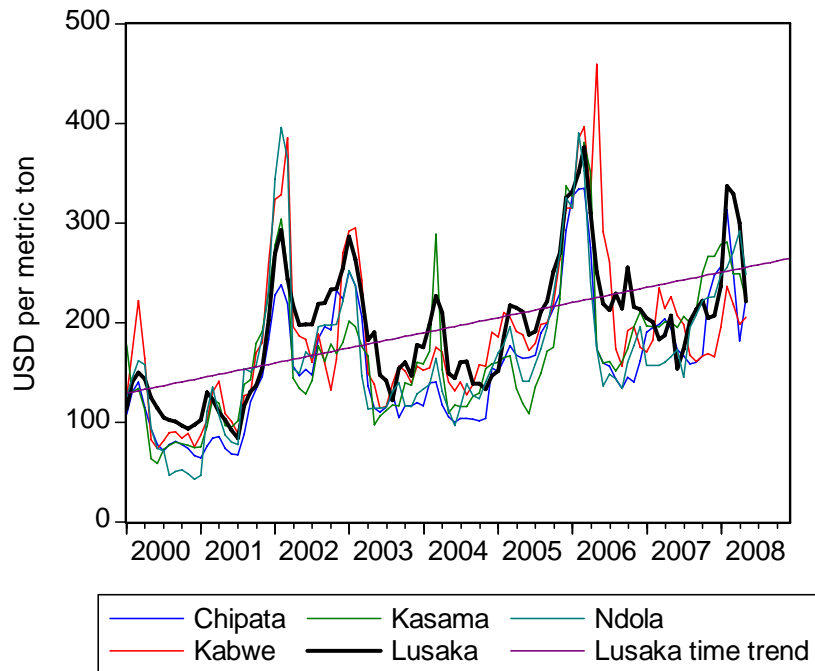
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*If subsidy programs are to be implemented, design them in ways that involve the full range of private importers, wholesalers, and retailers.*

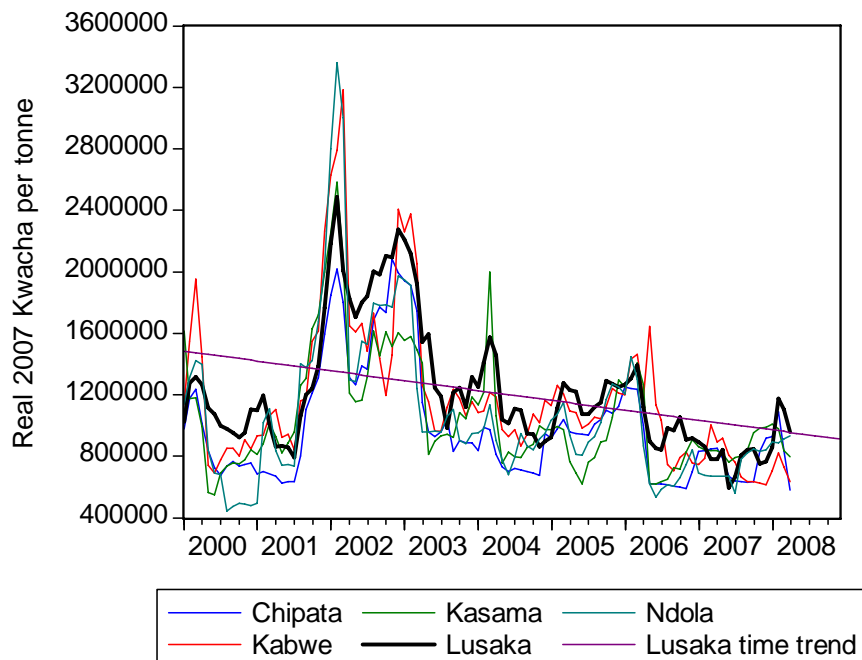
Providing tenders to only 2-3 firms can:

- entrench their position in the market
- cause other firms to cease making investments in the system or drop out altogether
- lead to a more concentrated input marketing system and restricted competition when the input subsidy program ends

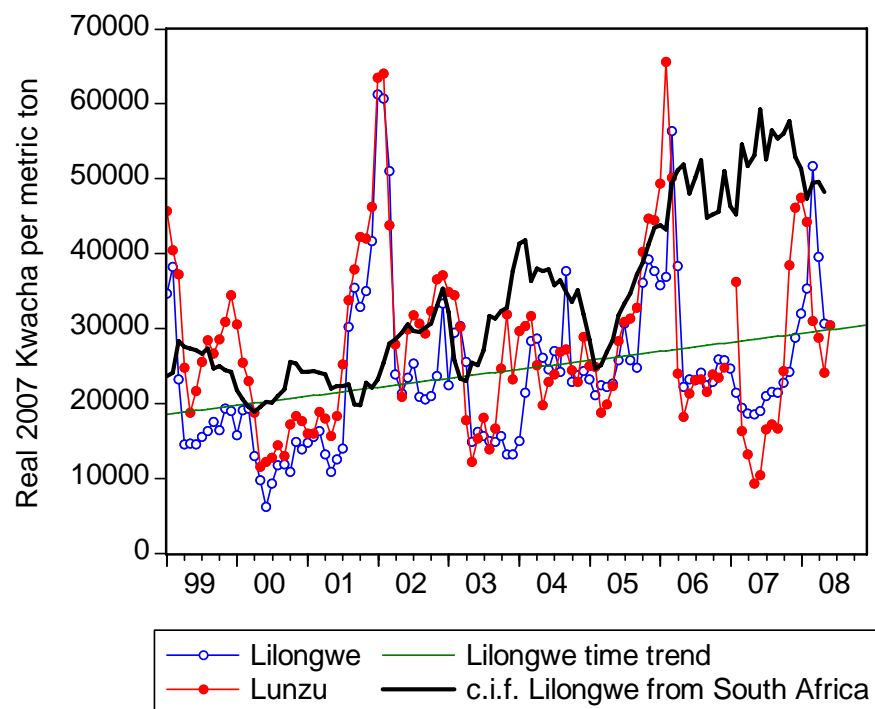
## Zambia: maize prices in USD per ton



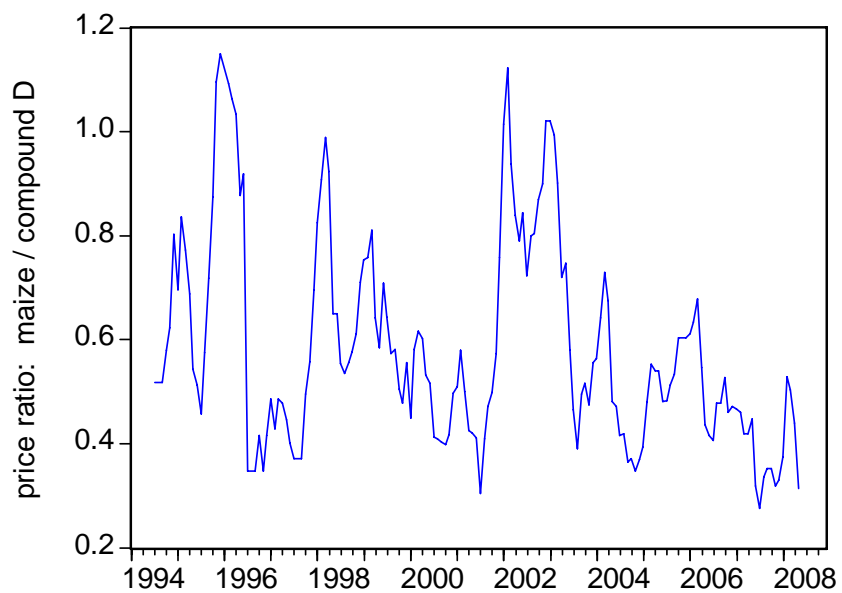
## Zambia: maize prices in real kwacha per ton



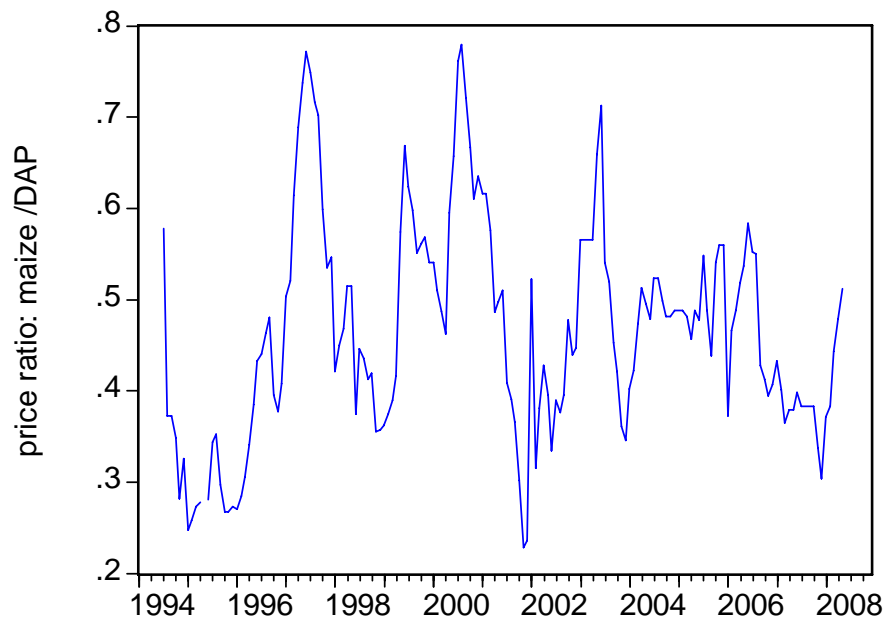
# Malawi: maize price trends



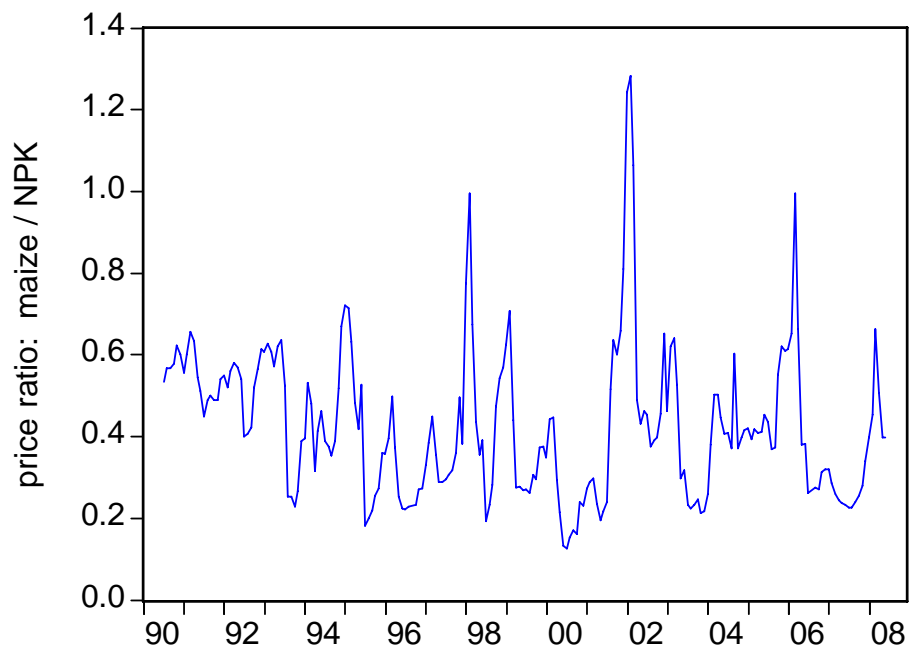
# Zambia: maize to comp.D price ratios



## Kenya: maize to DAP price ratios



## Malawi: maize to NPK price ratios



## Insight #5:

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*Maize-fertilizer price ratios are relatively low in 2008, but not abnormally low when compared to the past 10 years.*

## Profitability of using fertilizer

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$$\frac{\text{Farm-gate Maize Price}}{\text{Farm-gate Fertilizer Price}} * \frac{\Delta\text{kg maize}}{\Delta\text{kg fert}}$$

## Factors that could promote fertilizer use more generally

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1. Prioritize R&D to generate improved fertilizer- responsive seeds
2. Open regional trade (especially in good harvest years) will raise and stabilize the price of maize → improve profitability of using fertilizer on maize
3. Invest in physical infrastructure, especially between countries in the region, to help stabilize output prices



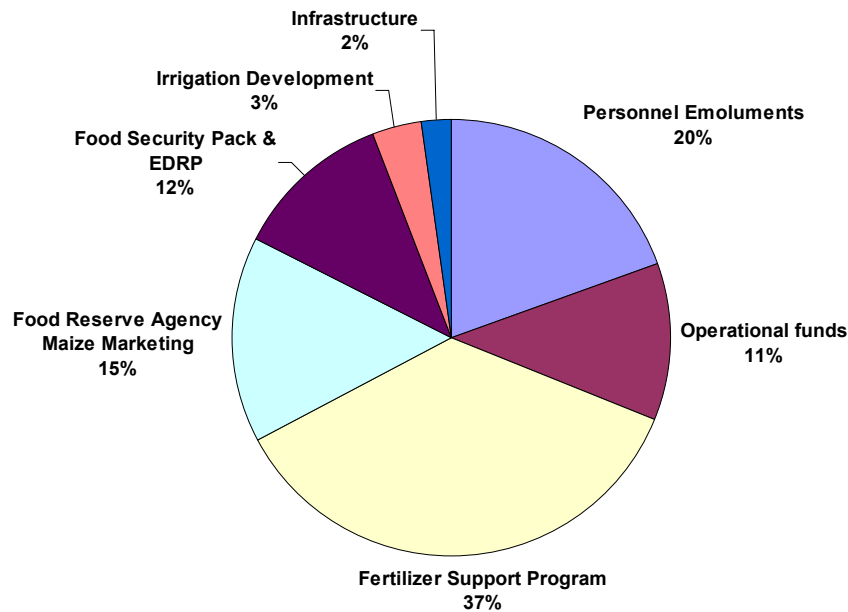
Thank you

<http://www.aec.msu.edu/fs2/>

- Supplementary slides

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> 25 kg/ha	Swaziland (30.5, -40%) Malawi (30.8, +9%) Zimbabwe (48.3, +9%)	<b>Kenya (31.8, +33%)</b>

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



## Summary of research evidence about fertilizer subsidies in Africa:

- ❑ can help to raise production, but little sustained benefit after subsidies are withdrawn
  - Examples of snuffed-out maize revolutions (Zimbabwe, Zambia, Kenya, Malawi)
- ❑ Benefits tend to be disproportionately captured by better-off farmers, unless near universal coverage
- ❑ often captured by first-beneficiaries, not farmers → questionable effect on total input use
- ❑ Costly – foregone payoffs from alternative public investments
- ❑ Inhibits development of private sector capacity