

Agricultural Input Subsidy Programs in Africa: A Review of Recent Evidence

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Objectives:

1. To review recent evidence on the impacts of input subsidy programs (ISPs) in Africa
2. To identify government actions that will increase the benefits of ISPs
 - Directly -- through ISP program design
 - Indirectly – through actions that enable farmers to use fertilizer more efficiently

Expenditures of Input Subsidy Programs

Country	Annual Program Cost (USD million)	% of Ag Budget
Malawi	152 to 275	47 to 71%
Tanzania	92 to 135	39 to 46%
Zambia	180 to 239	33 to 59%
Senegal	36 to 42	26 to 31%
Ghana	112 to 166	29 to 54%
Nigeria	167 to 800 (?)	26 to 78%
Kenya	61 to 89	9 to 26%

Part I: Summary of Evidence

Summary of evidence:

Conclusion #1:

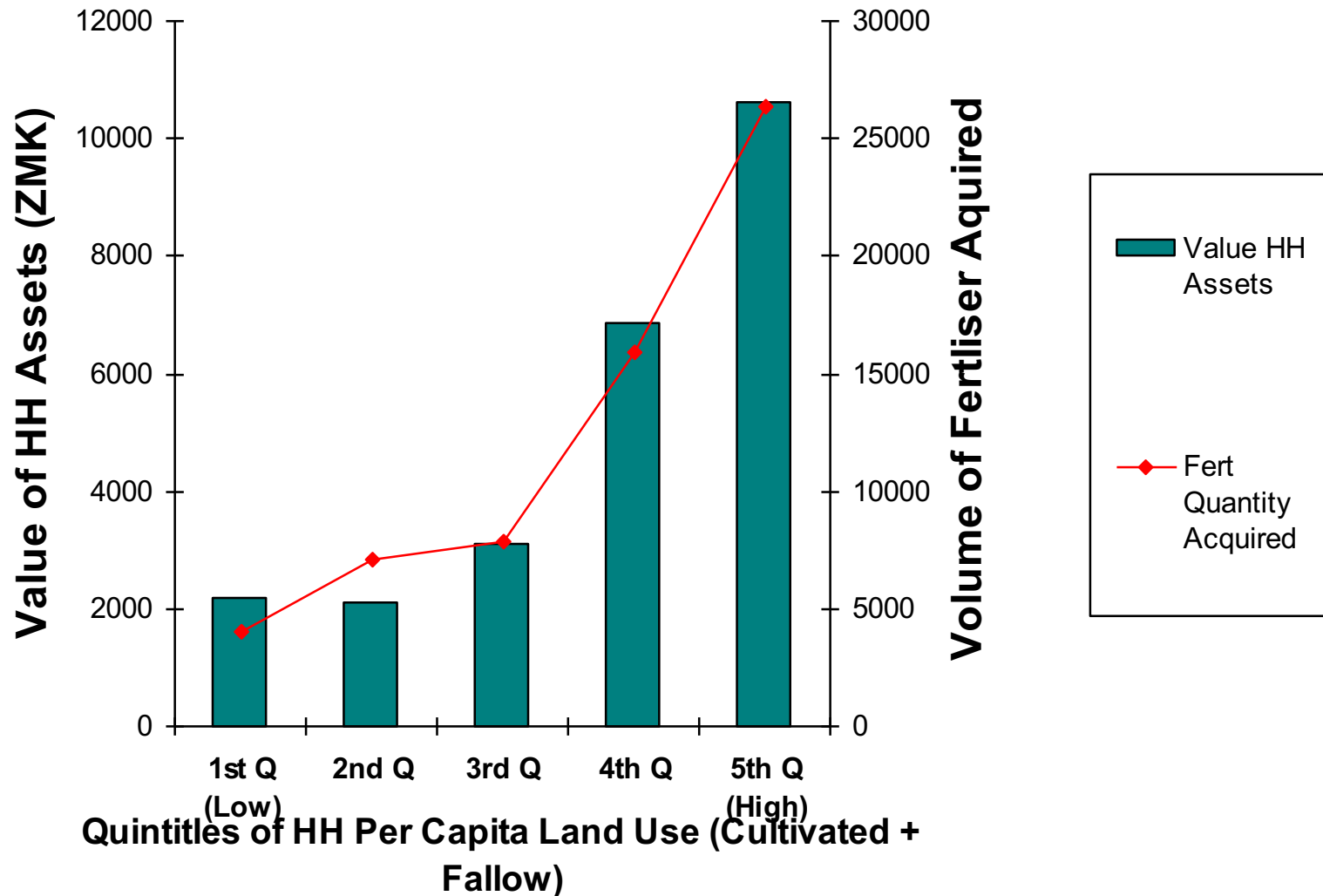
- Clear short-term contribution to food production

Summary of evidence:

Conclusion #2:

- Highly variable achievement of targeting criteria

Attributes of Households Acquiring FSP Subsidized Fertiliser - Zambia



Diversion of fertilizer from FISP, Zambia

Planting year	Farmer claims	FSP/FISP distribution	
	-----Metric Tons-----		
2002	31,722		48,000
2003	33,372	——— 33% ———	60,000
2004	16,792		50,000
2005	23,595		50,000
2006	58,404		84,000
2007	43,596		50,000
2008	55,114		80,000
2009	69,103		106,000
2010	116,116		179,000
2002 - 10	447,814	——— 63% ———	707,000

Summary of evidence:

Conclusion #3: Subsidy fertilizer partially crowds out commercial sales:

- For every 1000kg of fertilizer distributed through ISPs, national fertilizer use rose only between 400 to 700kg (Zambia, Malawi, Kenya)
- In two cases, Nigeria and areas of Zambia where private firms did not operate, evidence of “crowding in”

Summary of evidence:

Conclusion #4:

- Positive effects on hh incomes in year that subsidy is received
- No significant increase in hh income in year after subsidy ends

Summary of evidence:

Conclusion #5:

- Little effect on food price levels
 - Malawi
 - Zambia
 - Nigeria

Ranking of Alternative Investments: Meta-Study Evidence from Asia and Africa

	The Economist	IFPRI study
Policies		
Infrastructure investment		
Agricultural R&D		
Agricultural extension services		
Credit subsidies		
Fertilizer subsidies		
Irrigation		

Ranking with respect to *agricultural growth*:
Evidence from Asia

	The Economist	IFPRI
Policies	1	
Infrastructure investment	3	1
Agricultural R&D	2	2
Agricultural extension services	5	
Credit subsidies	7	3
Fertilizer subsidies	6	4
Irrigation	4	5

Ranking with respect to *poverty reduction*:
Evidence from Asia

	The Economist	IFPRI
Policies	1	
Infrastructure investment	2	1
Agricultural R&D	3	2
Agricultural extension services	4	3
Credit subsidies	7	4
Fertilizer subsidies	5	6
Irrigation	5	5

Summary of evidence:

1. Significant short-term effect on food production
2. Highly variable achievement of targeting criteria
3. Crowding out -- a problem
4. Small / transitory effects on hh incomes
5. Little effect on food prices

Part II: What to do?

Proposals for raising the benefits of ISPs

Zambia's flexible e-voucher ISP

- Government **pilot program** in 13 of 108 districts in 2015/16; expanding to 39 districts in 2016/17
- Uses **pre-paid Visa card**; agro-dealers must have point of sale machines

- **E-voucher value (Ksh):**

Farmer contribution	40
Government contribution	170
TOTAL	210



- **Eligible inputs:**

Various fertilizers, seeds (any crop), crop protectants and sprayers, lime, livestock feed/drugs/dip chemicals, fish fingerlings

Intended benefits of Zambia's e-voucher vs. its traditional ISP

1. Give farmers **more choice**; encourage **agricultural diversification**
2. **Crowd-in the private sector** (traditional ISP excluded agrodealers)
3. **Cost-savings**: shift some of the costs of the subsidy program to the private sector
4. **Timely availability** of inputs to farmers (gov't distribution system had been plagued by late delivery)
5. **More transparency** (gov't distribution opaque, massive diversion and other rent-seeking behavior)

Lessons learned from Zambia's 2015/16 e-voucher pilot

- *A rigorous impact evaluation is still pending but preliminary findings suggest that the e-voucher:*
 1. **Crowded in private sector participation in input distribution** (e.g., more competition among agro-dealers; some even delivered inputs to villages from market towns → better access to inputs for farmers)
 2. May have **encouraged agrodealers to stock a wider variety of inputs** (i.e., beyond maize seed and fertilizer), potentially leading to **greater agric. diversification**

Diversion of fertilizer from FISP, Zambia

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Source: Mason, 2011

Other government actions to raise benefits of ISPs

I. Public investments to raise crop response to fertilizer

Demand and profitability of using fertilizer

$$\text{VCR} = \frac{P_o}{P_f} * \frac{\Delta Q}{\Delta F}$$

Farm-gate commodity price

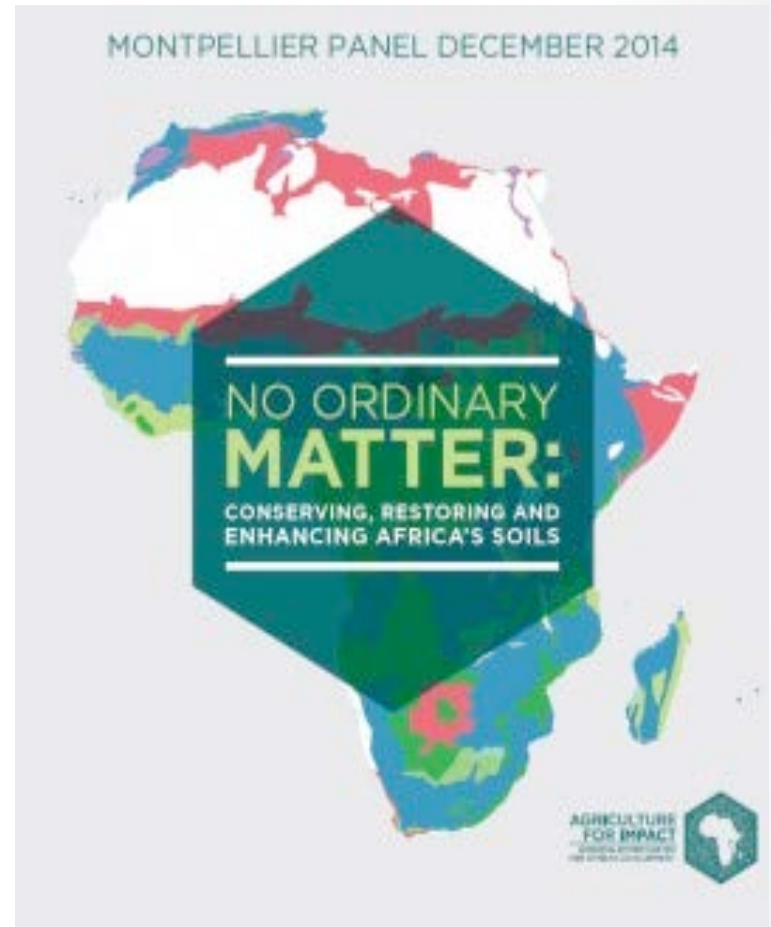
Crop response rate

Farm-gate fertiliser price

Review of maize-fertilizer response rates on farmer-managed fields

Study	country	Agronomic response rate (kgs maize per kg N)
Morris et al (2007)	W/E/S Africa	10-14
Sheahan et al (2013)	Kenya	14-21
Marenja and Barrett (2009)	Kenya	17.6
Liverpool-Tasie (2015)	Nigeria	8.0
Burke (2012)	Zambia	9.6
Snapp et al (2013)	Malawi	7.1 to 11.0
Holden and Lunduka (2011)	Malawi	11.3
Minten et al (2013)	Ethiopia	11.7
Pan and Christiaensen (2012)	Tanzania	11.8
Mather et al (2015)	Tanzania	5.7 to 7.8

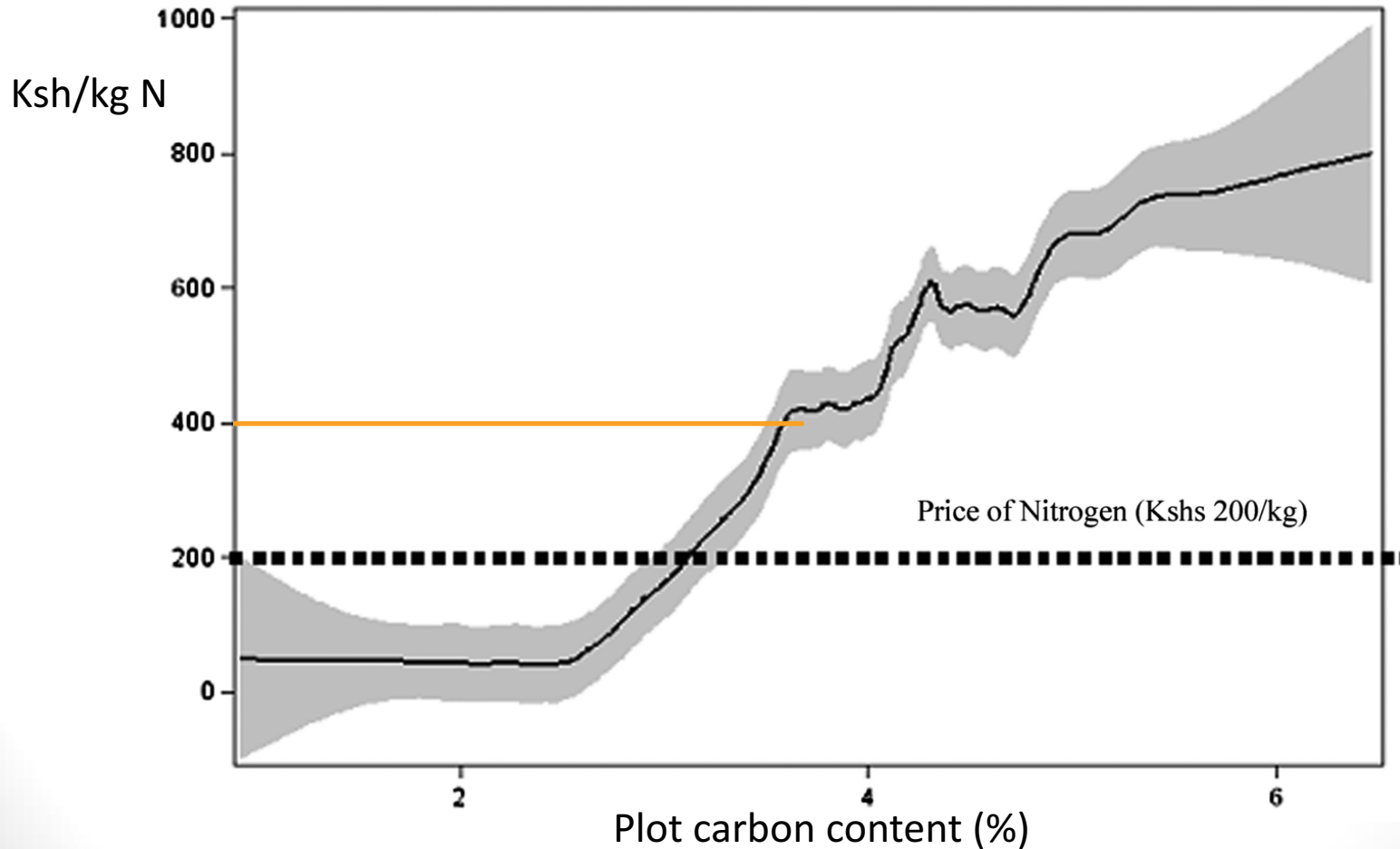
- Soil and land degradation a huge concern
 - Major conclusion of Montpellier Panel report
 - Extent of already damaged land:
 - 65% of arable land
 - 30% of grazing land
 - 20% of forests
 - Burden disproportionately carried by smallholders



Factors depressing NUE of inorganic fertilizer use:

1. Low soil organic matter
 - significant decline in SOM over past 20 years in many countries (Mpeketula and Snapp)

Estimated marginal value product of nitrogen fertilizer conditional on plot soil carbon content



Factors depressing NUE of inorganic fertilizer use:

1. Low soil organic matter

- significant decline in SOM over past 20 years in Malawi (Mpeketula and Snapp)

2. Acidification

From Larson and Oldham,
Mississippi State University Extension Service, 2008.

4.3

5.3

Source: Burke, 2012

Factors depressing NUE of inorganic fertilizer use:

1. Low soil organic matter
 - significant decline in SOM over past 20 years in Malawi (Mpeketula and Snapp)
2. Acidification
- 3. Late delivery**



Photo courtesy of Dingi Banda,
Lusaka Province, Zambia

Elements of a holistic strategy:

1. R&D (national ag research systems)
2. Extension programs / soil testing
3. Programs to help farmers restore soil quality
4. Physical infrastructure
5. Reducing costs in input supply chains
6. More appropriate fertilizer use recommendations

Conclusions

Conclusions

1. ISPs are a powerful tool to quickly raise food production....
2. But if they account for too large a share of agricultural spending, they can crowd out other public investments required for sustainable development
3. Spending a large share of the ag budget on ISPs may not be the most effective way to promote the welfare of its citizens, but it is a highly demonstrable way to do so.

Conclusions

4. ISPs would be more effective if adequate resources were allocated to complementary public investments
5. More balanced public expenditure patterns could more effectively promote national policy objectives
6. There are concrete steps for improving ISP effectiveness – related to
 - governance and political commitment to target effectively and reduce diversion
 - More holistic approach to sustainable intensification



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