Trends and Patterns in Fertilizer Use by Smallholder Farmers in Kenya, 1997-2008

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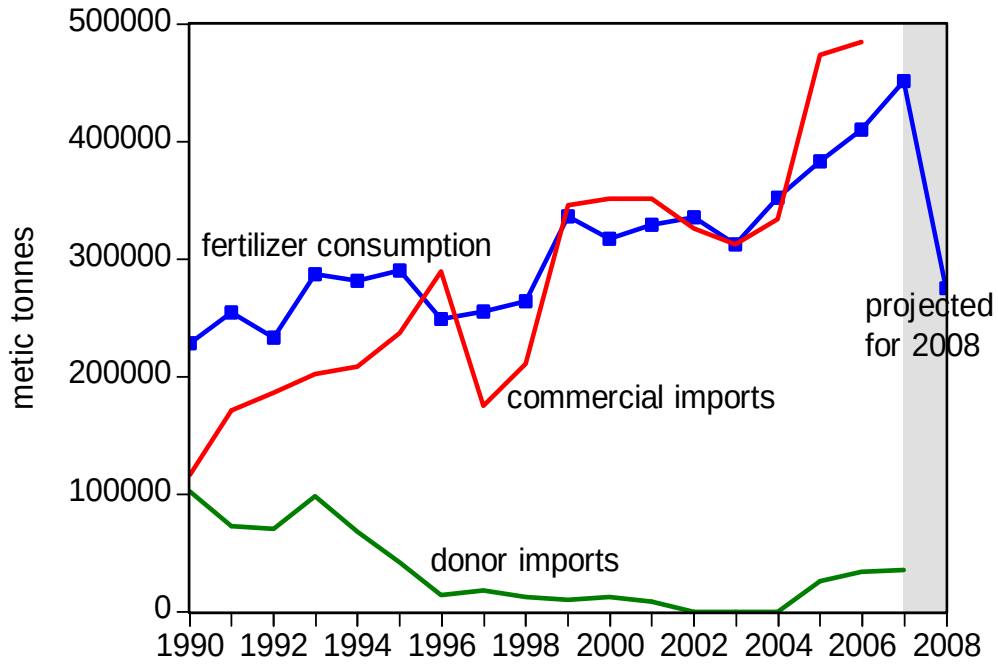
Intensity of fertilizer use (1996-2002)	**% growth in fertilizer use intensity (kg/ha cultivated) (mean 1996-2002 / mean 1990-95)**	
	< +30%	**> +30%**
< 25 kg/ha	DRC (0.5, -47%) Angola (0.7, -69%) Niger (0.9, +5%) Guinea (2.0, -4%) Burundi (2.3, -6%) Madagascar (2.9, -8%) Mauritania (4.0, -64%) Tanzania (4.8, -47%) Gambia (5.2, +15%) Nigeria (5.6, -73%) Burkina Faso (5.9, -28%) Zambia (8.4, -34%) Mali (9.0, +7%)	Uganda (0.6, +237%) Rwanda (1.8, +89%) Mozambique (3.2, +142%) Ghana (3.6, +68%) Chad (4.3, +93%) Cameroon (5.9, +77%) Togo (7.0, +30%) Cote d'Ivoire (11.8, +53%) Botswana (11.8, +294%) Senegal (13.2, +67%) Ethiopia (14.4, +71%) Benin (17.6, +76%) Lesotho (23.2, +35%)
> 25 kg/ha	Swaziland (30.5, -40%) Zimbabwe (48.3, +9%)	**Kenya (42.8, +67%) between 1997 and 2007** **Malawi (29.3, +45%) between 1997-2007**

Kenya fertilizer use, 1990-2008



Objectives:

1. Trends in fertilizer use on maize
2. Factors driving the increase in fertilizer use, 1997-2007
3. Household characteristics associated with fertilizer use
4. Impact on maize yields
5. Policy implications

Objective 1

Trends in Fertilizer Use on Maize

% 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
Total Sample	**56**	**58**	**64**	**66**	**70**

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
National sample	**56**	**55**	**60**	**59**

Objective 2

Factors driving the increase in fertilizer use, 1997-2007

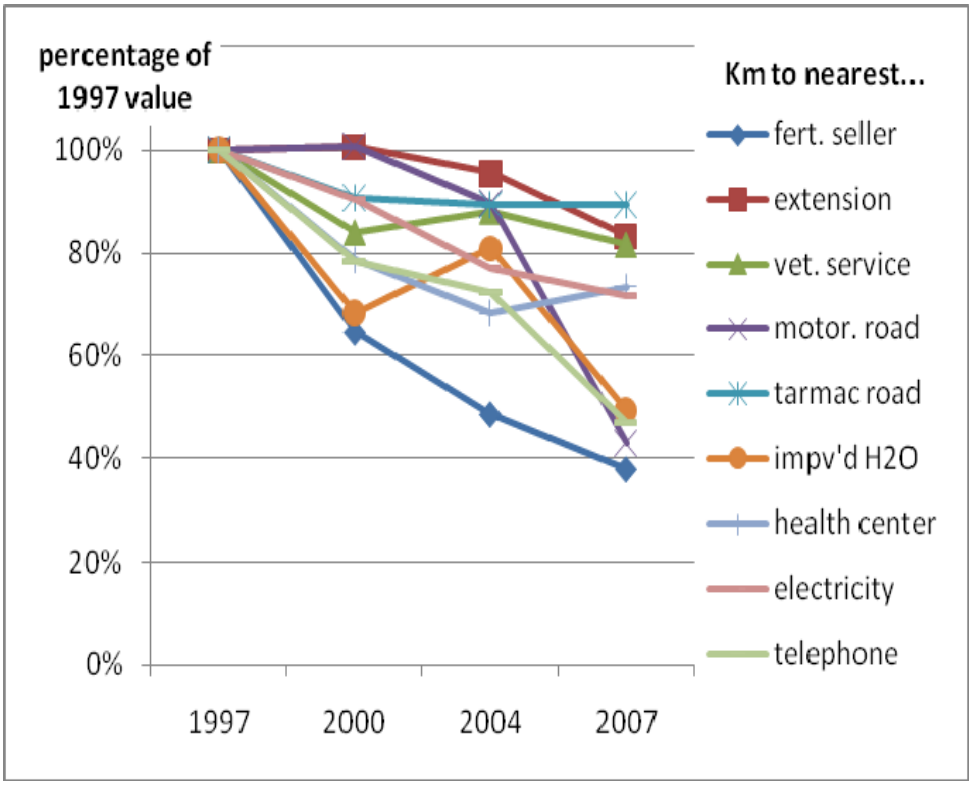
5 Reasons for the Upsurge in Fertilizer Use in Kenya

1. GoK has maintained a stable fertilizer policy stance since 1990
   - Eliminated import licensing quotas
   - Eliminated foreign exchange controls
   - Eliminated retail price controls
   - From 1990 to 2007, no market uncertainties introduced by large-scale subsidy programs

5 Reasons for the Upsurge in Fertilizer Use in Kenya

2. Public investments in infrastructure and services

Public goods investments and private sector response



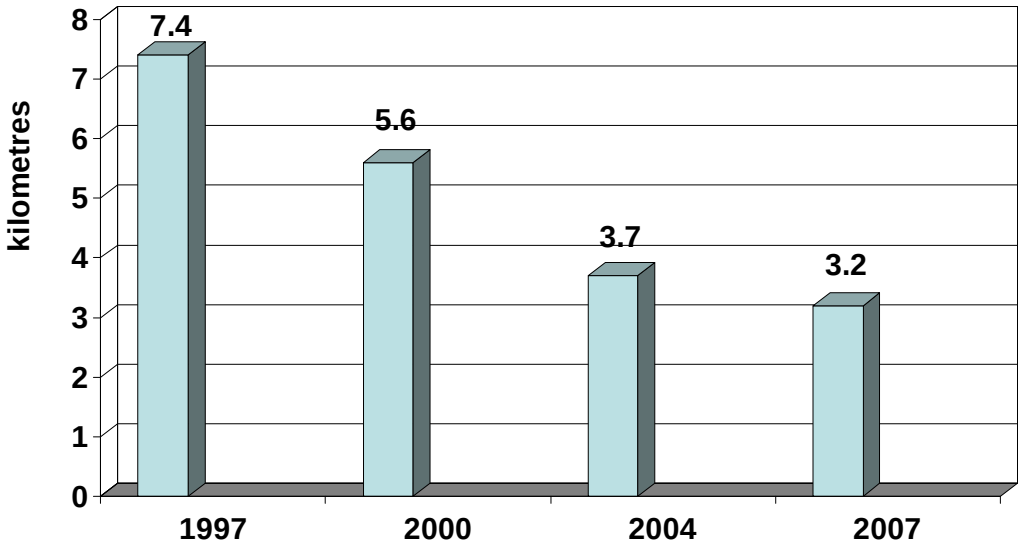
5 Reasons for the Upsurge in Fertilizer Use in Kenya

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

5 Reasons for the Upsurge in Fertilizer Use in Kenya

4. 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

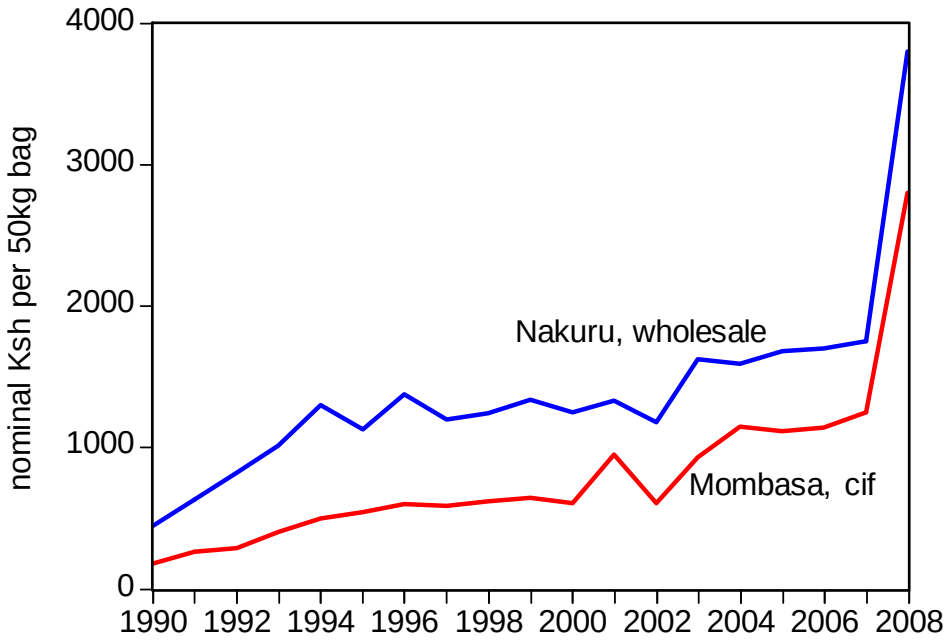
Mean distance from farm to nearest fertilizer retailer (kms)



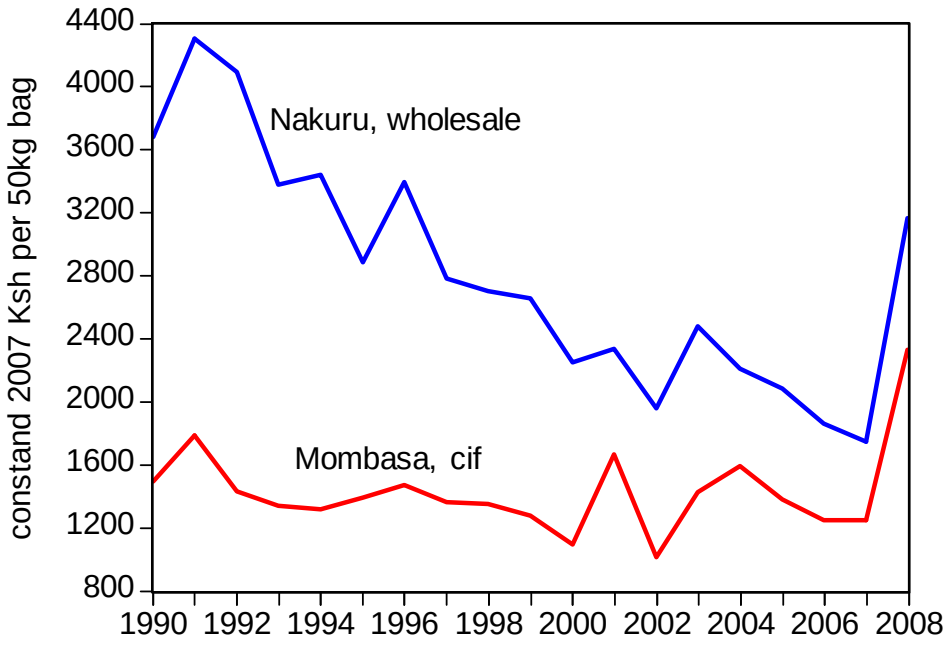
Reasons for the Upsurge in Fertilizer Use in Kenya

5. 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)



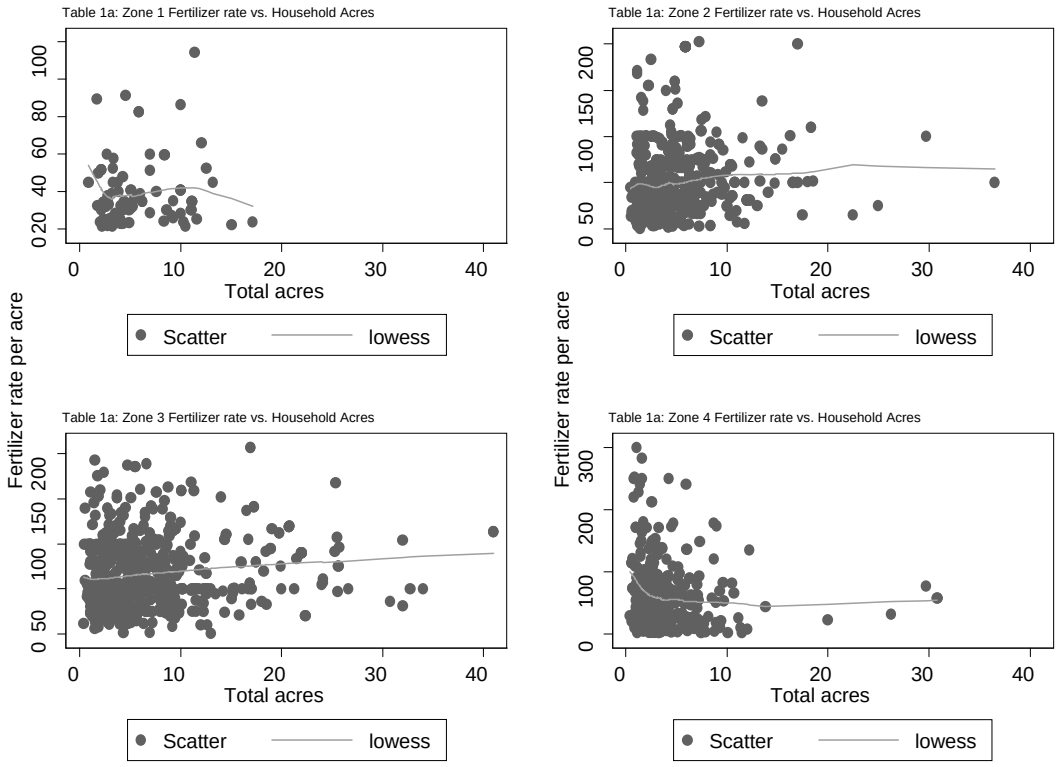
Why have real fertilizer marketing margins declined in Kenya?

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)

Objective 3

Household characteristics associated with fertilizer use

Relationship between fertilizer use per acre and wealth

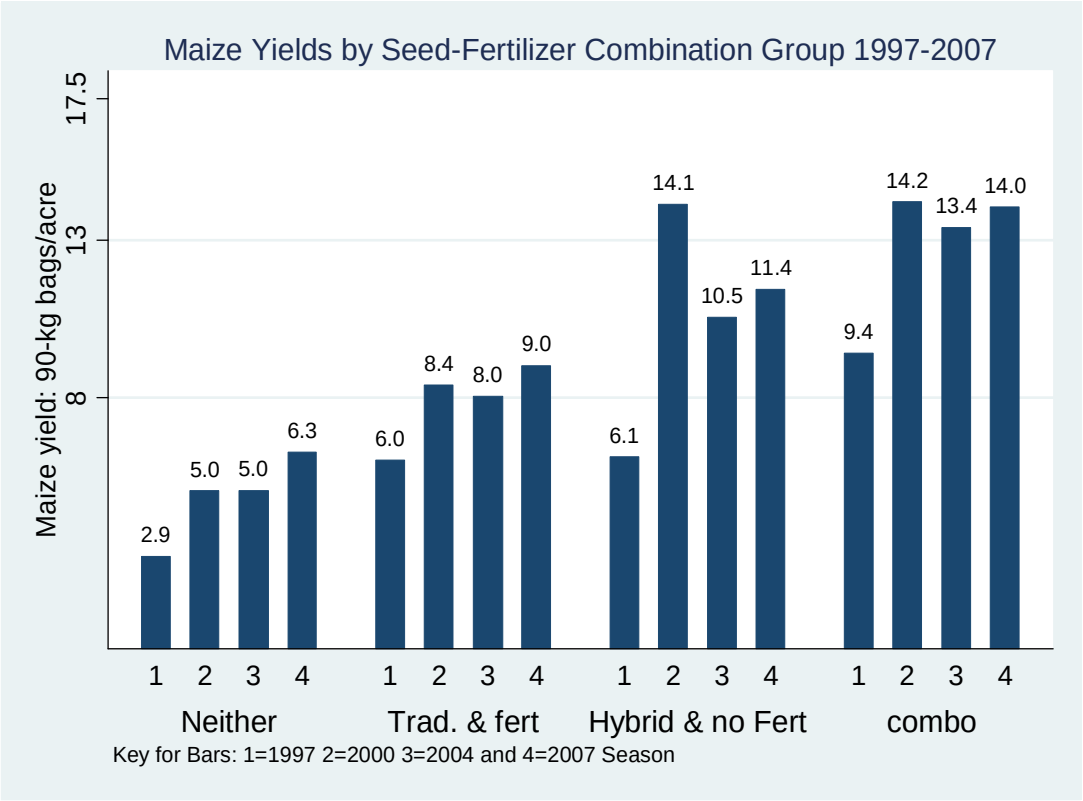


Relationship between household wealth and fertilizer use

	Household Wealth Quartiles			
	1 (poorest)	2	3	4 (Highest)
Assets (Kenya Shillings)	2,982	12,106	25,633	166,919
Dose Rate (kgs/acre) users only	59	60	66	68
Application Rate (kgs/acre) all plots	31	38	42	42
Total Household Area Cropped (acres)	3.91	4.47	5.60	6.45

Objective 4

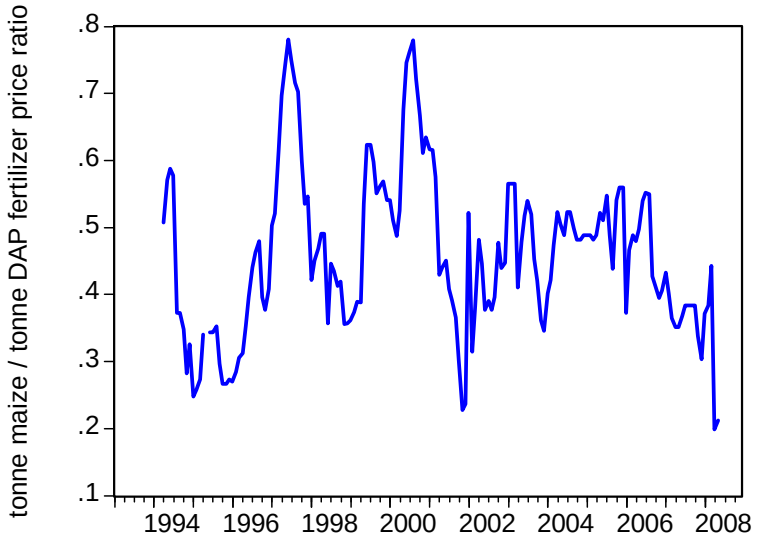
Impact on maize yields



Not counting other crops grown on intercropped maize fields

Objective 5

Implications for policy under current world price conditions



Strategies to vigorously pursue:

1. Reduce costs of supplying fertilizer to farm gate
   - Port costs at Mombasa
   - Improve rail / road infrastructure
2. Promote viable farm extension / service provision to raise efficiency of fertilizer use
3. Target subsidies to areas where fertilizer use can be profitable but use rates are currently low

Summary of Main Findings

1. nationwide, the % of farmers using fertilizer on maize has increased from 56% in 1996 to 70% in 2007
2. Fertilizer dose rates on maize (maize fields receiving fertilizer) have increased only slightly, from 56kg/acre in 1997 to 59kg/acre in 2007
3. Fertilizer use has increased especially rapidly on the intercropped fields, and less so on monocropped fields
4. The dominant factor influencing smallholder households' decisions to use fertilizer on maize is location:
   - Over 90% of smallholders use fertilizer on maize in three of the zones surveyed: the High Potential Maize Zone; Western Highlands, and Central Highlands.
   - Less than 30% use fertilizer on maize in Coastal Lowlands, Marginal Rain Shadow.

Summary of Main Findings

5. Total area under maize has remained largely constant over the decade
6. maize yields increased by 20% between 1997-2007 period, which is correlated with the rise in fertilizer use.
7. Paying attention to the different types of maize production technologies and maize cultivation techniques is important to carefully control for confounding factors when examining trends in maize yields in Kenya

Thank you

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