



FERTILIZER TYPES, AVAILABILITY AND CONSUMPTION IN KENYA

Mary K. Mathenge

TEGEMEO INSTITUTE, EGERTON UNIVERSITY

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Introduction

- From Concept of agricultural transformation
 - Increased ag productivity key to food security & poverty redn
 - Stimulation/development of the non farm sector through growth of linkages
- However, agricultural productivity stagnating in developing countries especially SSA.

- Major impediments is lack of/low use of productivity-enhancing inputs e.g, chemical fertilizers, improved seed and pesticides due to:
 - Unavailability of liquid capital to finance such expenditure
 - Risk averse nature of small scale farmers
 - Low returns to input use
- Yet both credit and crop insurance markets are lacking/missing in most of SSA.



Introduction contd

- Most affected are food crops that lack the institutional support available for cash crops

- Research has documented low use of fertilizer in SSA compared to other regions e.g. in 2002/03:
 - SSA was using about 9 kg of fertilizer nutrients per Ha of cultivable land as compared to 100 in South Asia, and 73 in Latin America (Ariga et al. 2006)

- Nevertheless data shows that among these SSA countries, Kenya has shown dramatic growth in fertilizer use since the 1990s

Q Is this all a success story for Kenya and are there lessons to be learnt and improvements to be made?



Data

- Aggregate data from MOA, farm input division and other sources
- Farm household data from Tegemeo Institute:
 - Panel data 1997-2007 (4 waves)
 - About 1300 hhs
 - Across various agro-ecological zones
- Others - national statistics, private sector etc



Fertilizer Use in Kenya

National Data



Fertilizer Sources and Availability in Kenya

- Relies on world market for supply of fertilizer
- Fertilizer manufacturing locally minimal-10,000MT
- Blending of Fertilizer- 60,000MT annually
- Bulk of Imports by private sector
 - Govt agencies – KTDA and NCPB
- Major sources –USA, Europe, Middle East, Asia and South Africa.
 - New sources – China, India and Singapore
- No Duty or VAT charged on fertilizer



Fertilizer Distribution Networks

Participants in Fertilizer Marketing

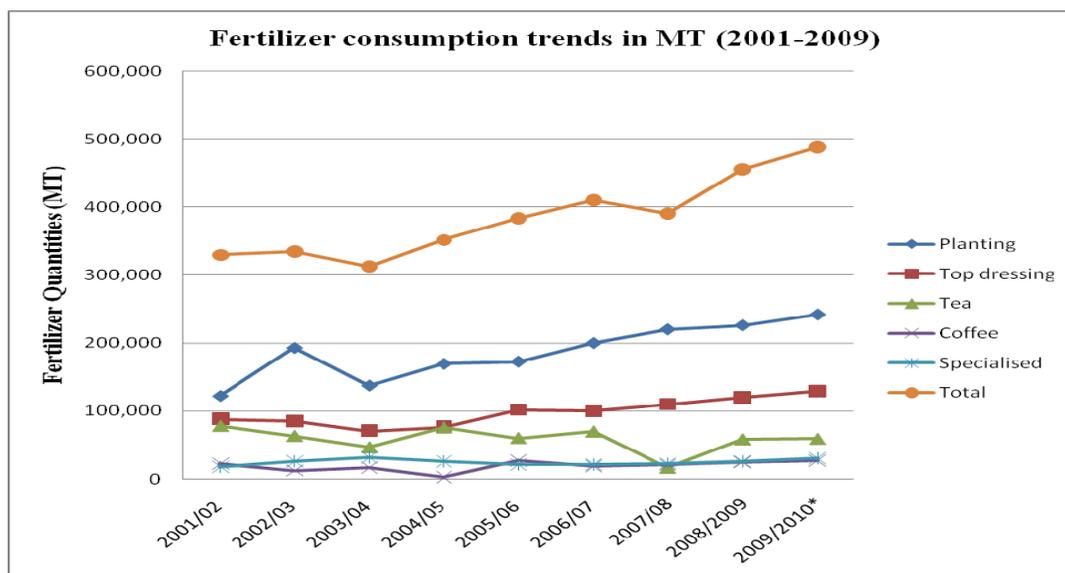
- Importers
 - Over 10 importers
 - 4 major firms controlling 85% of the market
- Wholesalers/distributors
 - Estimated at 500
- Retailers/agro dealers
 - Estimated at 8,000
 - Increasing importance through the Agro dealer program

Main Fertilizer Types in Kenya

Type of fertilizer	Specific variety	% of national consumption (2002-2009)
Planting (basal)	DAP, MAP, TSP, SSP, NPK20:20:0, NKP23:23:0	48.56
Top-dressing	CAN, ASN, UREA, SA	25.36
Tea	NPK 25:5:5:5s, NPK 25:5:5:3.95s + 2.6MgO, NPK 22:21:17, NPK 22:6:12+5S	15.94
Coffee	NPK 18:4:12, NPK 20:10:10, NPK 17:17:17, NPK 16:16:16	4.90
Tobacco	NPK8:16:24+MgO+0.1%B	0.02
Specialized		6.48
Total		100.00

Source: Ministry of agriculture, Farm Inputs Division

Fertilizer Consumption Trends by Type



Source: Ministry of agriculture, Farm Inputs Division



Factors Contributing to Growth in Fertilizer Use in Kenya

- Stable fertilizer marketing policy
- Increased private sector participation
 - Increased competition & accruing benefits
- Availability of fertilizer closer to the rural areas – private sector invested in dense distribution networks
 - Reduction of distance to nearest fertilizer seller
- Institutional Innovations in fertilizer-seed technologies
 - Starter packs, credit guarantees and training by AGMARK, credit voucher scheme, mini-size packs
- Demand side
 - Improved information,
 - Training-technical infor
 - Food needs at hh level
 - Better access to markets for output



Fertilizer Use in Kenya

Farm Household Level Data

Proportion of Households using Fertilizer by Agro-regional Zone

Agro regional zone	1997	2000	2004	2007
Coastal Lowlands	2.7	6.8	8.0	12.3
Eastern Lowlands	35.2	48.3	56.6	56.6
Western Lowlands	5.9	11.8	15.0	30.5
Western Transitional	58.1	77.0	85.8	87.8
High Potential Maize Zone	86.1	90.5	90.5	93.6
Western Highlands	91.5	89.9	92.2	94.6
Central Highlands	99.2	99.6	97.1	97.9
Marginal Rain Shadow	27.0	35.1	32.4	54.1
Overall sample	63.9	69.9	71.9	76.3

Source: Tegemeo Panel Data



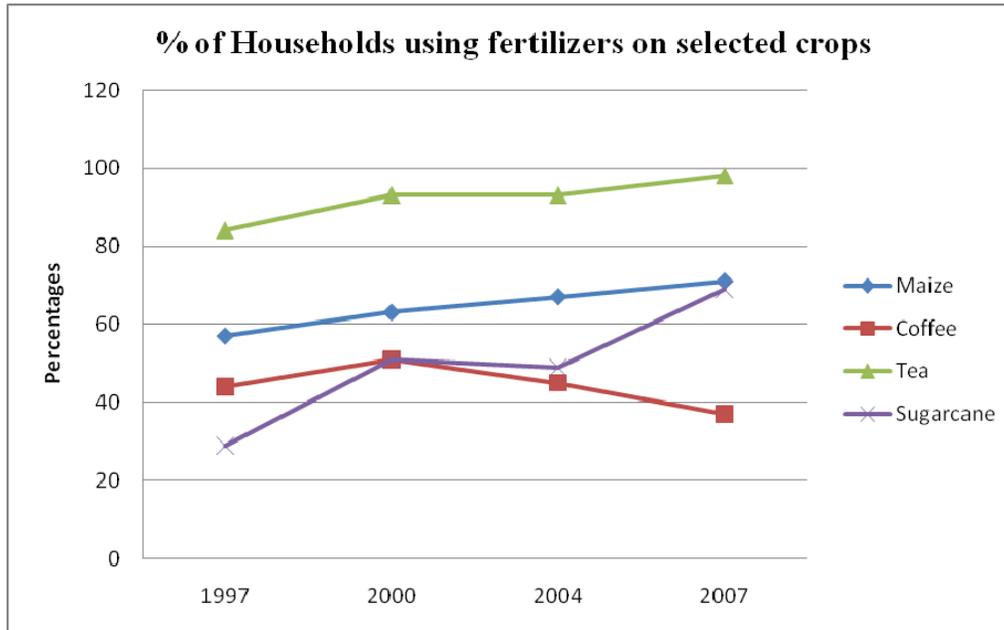
Fertilizer Dose Rate (Kgs/acre)

Agro ecological zone	1997	2000	2004	2007
Coastal Lowlands	18.1	2.3	4.5	5.6
Eastern Lowlands	27.5	13.8	11.0	16.5
Western Lowlands	59.3	42.5	9.8	18.7
Western Transitional	37.4	69.8	51.6	54.4
High Potential Maize Zone	63.4	62.8	66.9	70.9
Western Highlands	30.4	44.5	51.1	46.7
Central Highlands	105.9	121.4	103.2	96.1
Marginal Rain Shadow	26.1	31.7	33.4	28.6
Overall sample	64.8	72.1	64.8	63.2

Source: Tegemeo Panel Data

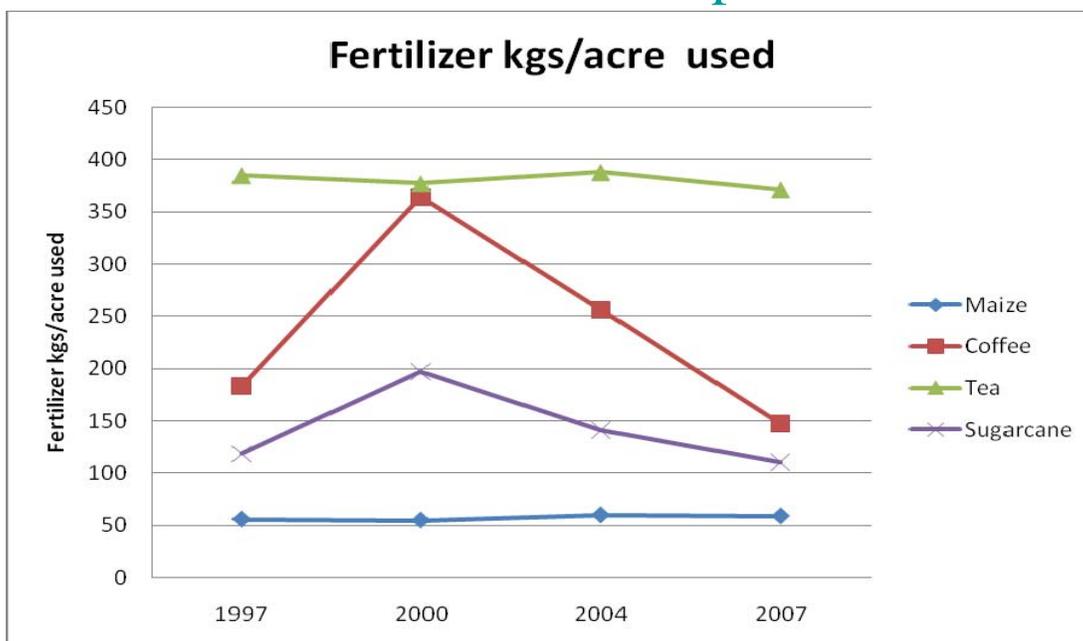


Proportion of Households using Fertilizer on Selected Crops



Source: Tegemeo Panel Data

Fertilizer Application Rates (Kgs/Acre) on Selected Crops



Source: Tegemeo Panel Data

Percent of Households using Fertilizer by Cultivated Land Size

Cultivated land size	1997	2000	2004	2007
Less than 1 acre	53.9	63.8	63.1	71.8
1-3 acres	63.4	66.4	73.6	73.6
Above 3 acres	70.0	75.1	75.0	81.5
Overall sample	63.9	69.9	71.9	76.3

Source: Tegemeo Panel Data



Classification of Households by Fertilizer Use Patterns

- Consistent users – Used at least one type of fertilizer in 4 waves
- Non-consistent users – On and off
- Consistent non-users – Never used fertilizer at all

Distribution of Fertilizer Users by Agro-Regional Zone

Zone	Consistent users	Non-consistent users	Consistent non-users	Total
Coastal Lowlands	-	21.3	78.7	100.0
Eastern Lowlands	26.2	44.1	29.7	100.0
Western Lowlands	2.6	37.9	59.5	100.0
Western Transitional	56.1	38.5	5.4	100.0
High Potential Maize Zone	82.1	15.6	2.3	100.0
Western Highlands	80.6	18.6	0.8	100.0
Central Highlands	95.0	5.0	-	100.0
Marginal Rain Shadow	8.1	64.9	27.0	100.0
Total	58.5	24.2	17.3	100.0

Source: Tegemeo Panel data

Fertilizer Use Patterns by Selected Household Characteristics

Type of household	Age of head	Years of education	% belong to a group	% female headed
Consistent users	58.9	7.1	80.0	18.5
Non-consistent users	58.2	6.0	69.6	27.8
Consistent non-users	58.6	4.8	65.5	34.5
Total	58.7	6.5	75.0	23.5

Source: Tegemeo Panel data

Fertilizer Use Patterns by Selected Economic Indicators

Type of household	Household income (Kshs)	Crop income (Kshs)	Off-farm income (Kshs)
Consistent users	215,232.4	95,890.3	83,403.3
Non-consistent users	166,062.8	56,147.8	79,249.2
Consistent non-users	116,275.7	33,840.1	72,705.7
Total	186,241.1	75,551.9	80,550.6

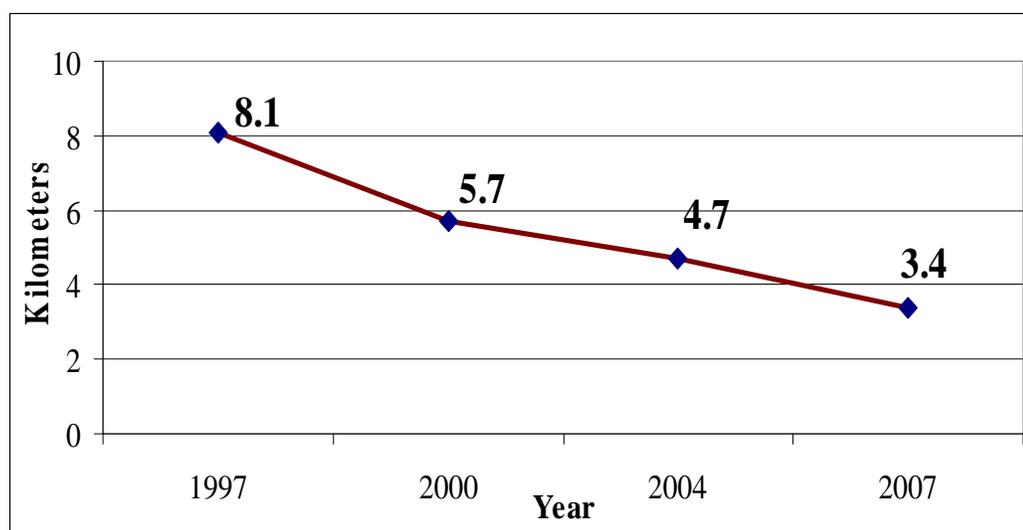
Source: Tegemeo Panel Data

Fertilizer Use Patterns by Selected Market Access Indicators

Type of household	Distance to fertilizer seller	Distance to extension agent	Distance to motorable road	Distance to tarmac road
Consistent users	2.5	3.9	0.4	6.5
Non-consistent users	3.6	4.8	0.7	7.4
Consistent non-users	5.9	6.4	0.8	11.7
Total	3.4	4.6	0.5	7.6

Source: Tegemeo Panel data

Reduction in Distance to Fertilizer Seller



Source: Tegemeo panel data

Distribution of Consistent non-users of Fertilizer across Income Groups

Income quintile	Percent of households			
	1997	2000	2004	2007
Lowest	29.0	43.4	37.6	37.1
2	24.9	27.6	22.2	29.0
3	19.5	14.5	17.2	14.9
4	17.6	7.7	13.1	10.9
Highest	9.0	6.8	10.0	8.1
Total	100.0	100.0	100.0	100.0

Source: Tegemeo panel data

Distribution of Fertilizers Users by Income Quintiles in 2007

Income quintile	Consistent users	Non-consistent users	Consistent non-users
Lowest	12.6	26.2	36.4
2	17.4	23.0	24.5
3	20.2	20.4	18.6
4	24.1	15.9	11.8
Highest	25.6	14.6	8.6
Total	100.0	100.0	100.0

Source: Tegemeo Panel Data

Summary of Key Findings

- SSA has the lowest fertilizer use in the world
- Kenya is among countries with high fertilizer use rates within SSA
- Fertilizer use in Kenya been increasing since 1990s
- Key factors determining use are:
 - Availability
 - Affordability
 - Cash, credit
 - Resource endowments-human capital, land
 - Returns to use- input: output ratio (low ag potential)
 - Information w.r.t. use, benefits, recommended rates (Extension)
- Consistent non-users are disadvantaged in terms of physical access, affordability, returns to input use, access to credit, resource endowments etc



Policy Implications

- Tremendous gains achieved in the fertilizer industry through increased participation by private sector
 - Some hhs cannot be reached through this mode at least in the short term
- Although affordability is key, promotion of fertilizer use should emphasize more on non-pricing policies
 - Use of pricing policy ?
- Non pricing policy measures provide long-term solutions
 - Increasing productivity through R & D
 - Extension service
 - Credit to relieve cash constraints
 - Cost-reducing strategies –improved infrastructure, bulk buying
 - Encouraging entry to avoid potential oligopolistic tendencies
 - capital
 - Use of complementary inputs – water, improved seed etc
 - Local fertilizer manufacturing firm



Policy Implications contn

- In the short-term, support for the disadvantaged groups remains the role of government. **Yet** this must allow the forces of supply and demand dictate market prices for the rest.

Any such support must:

- Well targeted
- Maintain gains achieved in private sector participation since the 1990s
- Provide a predictable environment for both private sector and producers
- Involve the private sector through PPP

Overall holistic approach to increasing fertilizer use is going to be key!



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- Joshua Ariga, T.S. Jayne, Betty Kibaara and J.K Nyoro (2008), *Trends and Patterns in Fertilizer use by Smallholder Farmers in Kenya, 1997-2007*, Tegemeo Institute Working Paper 28/2008
- Mathenge, M. and D. Tschirley. 2008. “Off-farm work and Farm Production Decisions: Evidence from Maize-Producing Households in Rural Kenya.” Tegemeo Working Paper series, Tegemeo Institute/Egerton University, Nairobi, Kenya.
- Ariga, J. Jayne, T, Nyoro, J. 2006. *Factors Driving Fertilizer growth in Kenya, 1990-1995: Sustaining the Momentum and Lessons for Broader Replicability in Sub-Saharan Africa*. Working Paper 24, Tegemeo Institute, Egerton University



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Thank you