

Trends and Patterns in Fertilizer Use by Smallholder Farmers in Kenya, 1997-2007: A Success Story?

By

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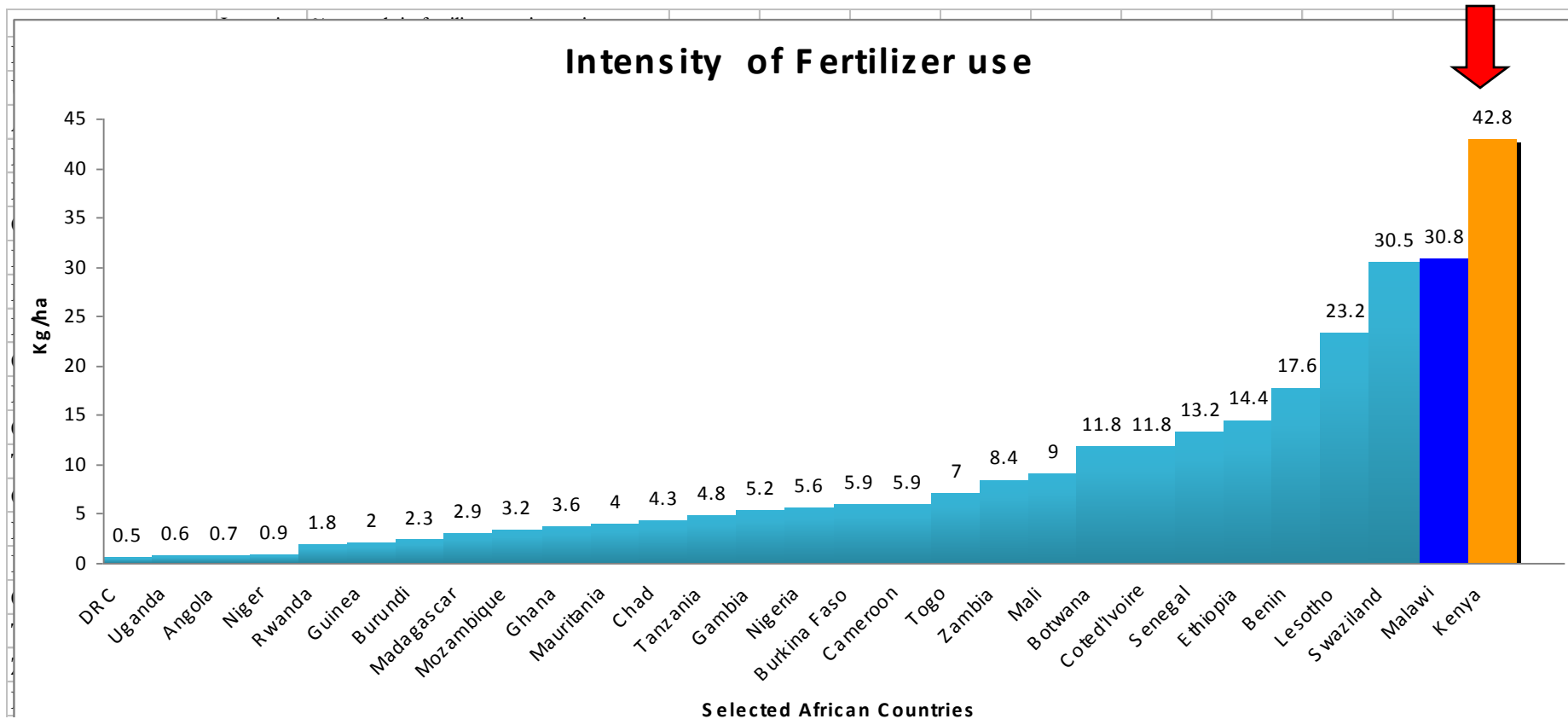


Use maize as a 'window' to:

- **Trends in fertilizer use, 1997-2007**
- **Factors driving the increase in fertilizer**
- **Impact of fertilizer use on maize yields**
- **Key findings**



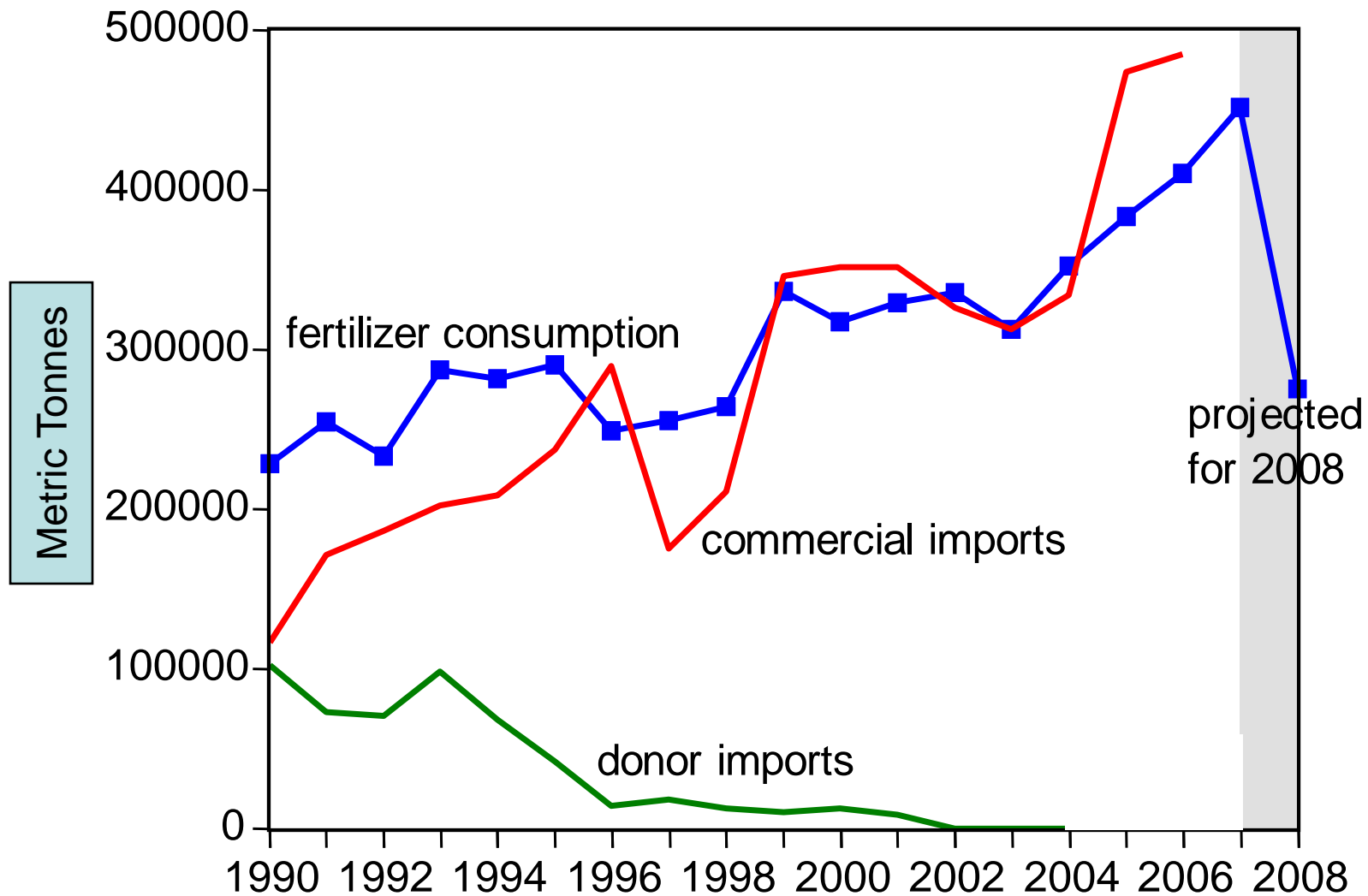
Fertilizer use in selected countries



Source: faostat website, 1996-2003



Kenya Fertilizer use, 1990-2008



Tegemeo Panel -Survey coverage-

Year	No: of Respondents
1997	1,540
2000	1,428
2004	1,324
2007	1,275

- Proportional Sampling based on 1989 population :
 - Population of all non urban divisions
 - Assigning the population to agro ecological zones
 - Within each AEZ representative divisions were chosen and grouped into 9 agro-ecological zones
- Divisions fell within 24 Districts out of the then 41 district
- Divisions were regrouped into 9 agro-regional zones – Hybrids of agro ecological and boundaries
- listed all locations, sub locations and villages each of which were randomly selected.



Overall attrition rate → 17.2%

% of Small-scale Farmers Using Fertilizer on Maize

Zone	1997	2000	2004	2007
Western Lowlands	1	5	5	13
Coastal Lowlands	0	3	4	14
Marginal Rain Shadow	6	12	11	16
Eastern Lowlands	27	25	47	43
Western Transitional	41	70	71	81
High-Pot. Maize Zone	84	90	87	91
Central Highlands	90	90	91	93
Western Highlands	75	91	91	95
Total Sample	58	64	66	70



Fertilizer Dose Rate (kgs/acre) maize - Fertilizer users only-

Agro-regional zone	1997	2000	2004	2007
Coastal Lowlands	11	5	3	7
Western Lowlands	24	14	10	12
Eastern Lowlands	10	18	15	16
Marginal Rain Shadow	12	15	43	43
Western Highlands	31	36	46	47
Central Highlands	68	64	64	58
Western Transitional	54	48	62	71
High-Pot. Maize Zone	65	67	74	75
Sample	56	55	60	59



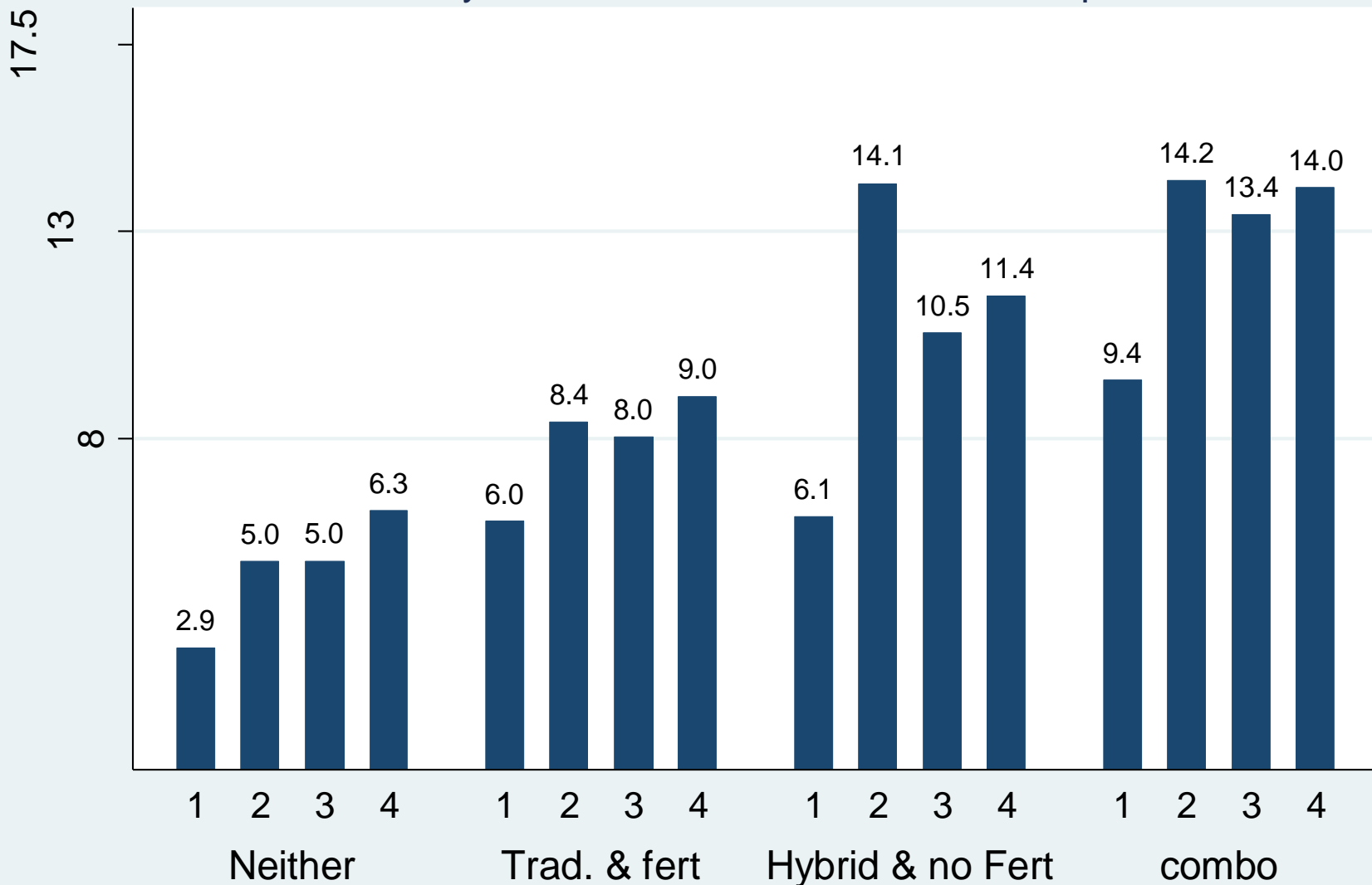
Maize Productivity (bags/acre) by Zone

Zone	1997	2000	2004	2007
Coastal Lowlands	2	4	2.4	4.2
Marginal Rain Shadow	2.1	0.9	4.2	4.6
Eastern Lowlands	2.3	3.7	3.6	4.7
Western Lowlands	3	2.6	2.6	5.6
Western Highlands	5.6	7.6	6.6	8.8
Central Highlands	7.0	8.8	9.2	10.3
Western Transitional	5.3	7.5	8.8	10.7
High Potential Maize Zone	11.5	10.4	13.8	13.3
Overall Sample	6.6	7.2	8.2	9.3

40% growth in a decade



Maize Yields by Seed-Fertilizer Combination Group 1997-2007



Key for Bars: 1=1997 2=2000 3=2004 and 4=2007 Season



Why has Fertilizer Adoption increased in Kenya? -some insights-



Relatively Stable Fertilizer Policy Stance since 1990

- Eliminated import licensing quotas, foreign exchange controls, retail price controls
- no market uncertainties introduced by large-scale subsidy programs

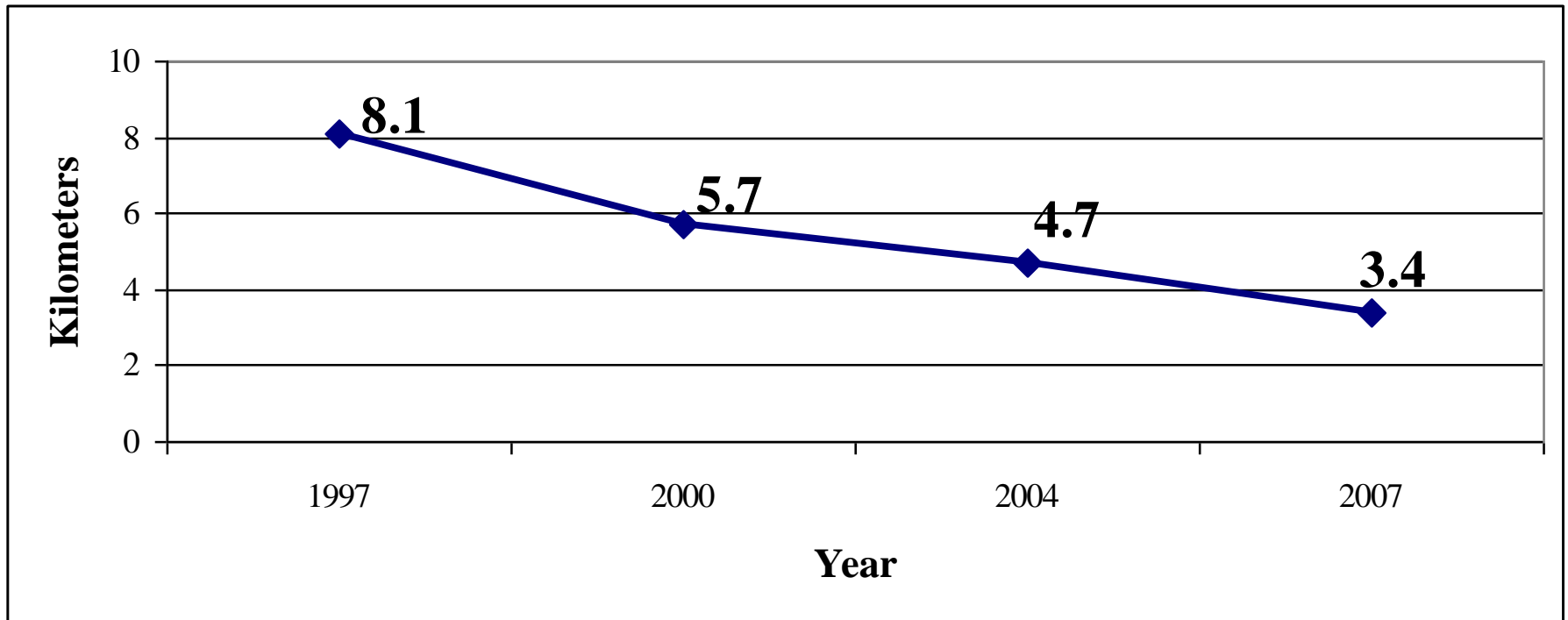


Private Sector Participation in the Fertilizer Market

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



Reduction in Distance to Fertilizer Sellers



Source: Tegemeo panel



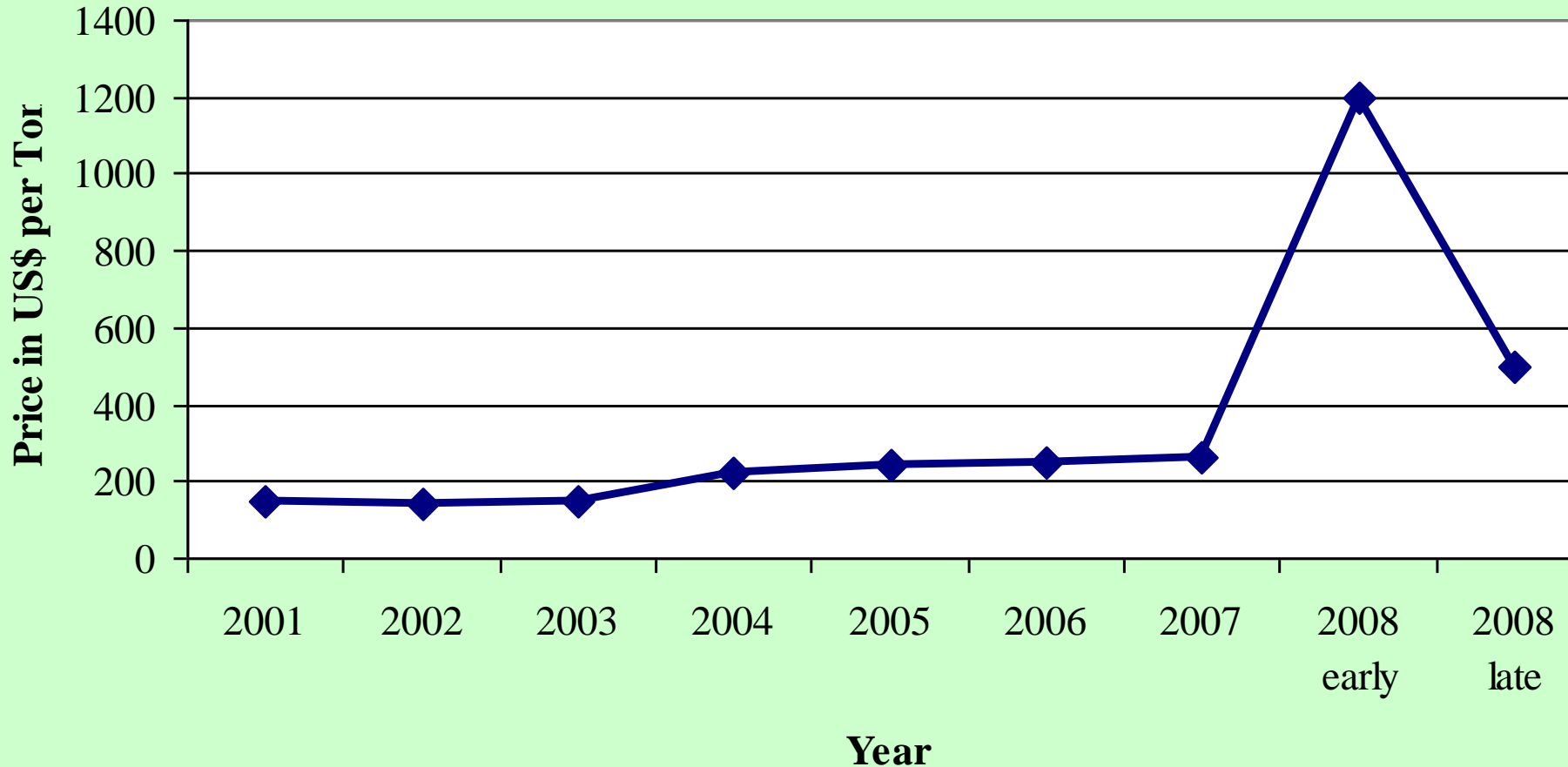
Institutional Innovations in Fertilizer - Seed Technologies in Kenya

- **Starter Packs**
 - 1kg starter packs+ 150gm of maize seed
 - Promoted by Fertilizer Input Promotion Africa Ltd (FIPS-Africa) ;MOA; Private fertilizer companies)
- **Training of Input Dealers and Credit Guarantee**
 - Initially by AGMARK in Western Kenya
 - Now upscale by CNFA through AGRA
- **Credit Voucher Scheme**
 - Microfinance institutions, AGMARK/MFI SAGA government etc
- **NAAIAP, KAPP, KMDP, Farmer Associations**

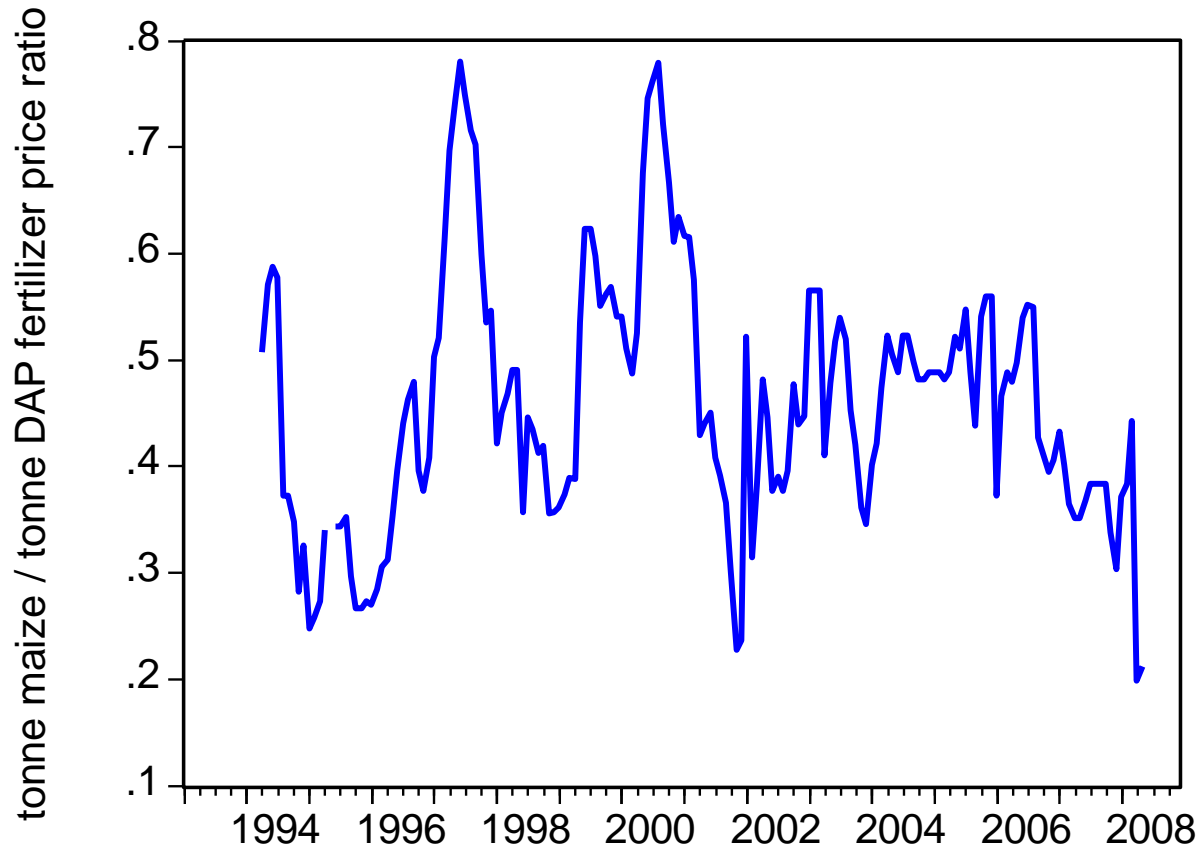


Global Trends of DAP Fertilizers

Price in US \$ per ton



Rising Fertilizer prices reduced the Maize Fertilizer Price Ratio



Doubling of the cost of maize production



Distribution of consistent non-users of fertilizer across income quintile

Income quintile	Percent of households				
	1997	2000	2004	2007	
Lowest (0.45\$/day)	29	43	38	37	} Over 70% of non users in low income quintiles
2 (0.76\$/day)	25	28	22	29	
3(1.04\$/day)	19	14	17	15	
4 (1.74\$/day)	18	8	13	11	
Highest(3.81\$/day)	9	7	10	8	



45% fail to use inorganic fertilizer because they cannot afford

Is Fertilizer alone Enough?

- Need for other services
 - Irrigation to mitigate against impacts of climate change
 - Improved access to financing
 - Functioning output markets
 - Well coordinated policies
 - Extension services



Summary of Key Findings

- Kenya has achieved **high adoption rates without much government intervention.**
- **Adoption rate of fertilizer not homogenous**, there are wide variations across the agro regional zones- location specific
- Fertilizer dose rates on **maize has stagnated** at below 60Kg/acre
- Increased network of fertilizer traders has **reduced distance to fertilizer seller** from 8.4km to 3.2km.



Some Thoughts

Is the Kenyan Case a Success Story ?

**With the fertilizer prices nose-diving,
does the fertilizer system need to be
fixed?**

**How can the private sector be involved
under the Private Public Partnership?**



Resources

- Betty Kibaara, Ariga, J., Olwande, J. and Jayne, T.S. (2008), *Trends in Agricultural Productivity in Kenya: 1997 – 2007*, Tegemeo Institute Working Paper 31/2008
- 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
- James Nyoro, Wilfred Mwangi, Milton Ayieko, and Milu Muyanga, *Seed-Fertilizer Technology in Kenya: Recent Institutional Innovations and Policy Lessons*. Paper presented during the IAAE meeting in Austria, 2006

