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ASSESSMENT OF KENYA'S DOMESTIC HORTICULTURAL PRODUCTION AND MARKETING SYSTEMS AND LESSONS FOR THE FUTURE

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Abstract

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After reviewing trends in the production and marketing of fresh produce for the domestic market in Kenya since 1997, this paper presents detailed information on the structure of the flow of this produce from rural areas to wholesale markets in Nairobi and from those wholesale markets to assorted retail markets. Market shares are estimated by product for geographic areas supplying Nairobi, and for each important wholesale and retail market in the city. It is found that horticultural production for the domestic market is keeping up with rural population growth but not with the much faster urban population growth. The urban wholesaling and retailing system has decentralized dramatically and with little planning over the past two decades in response to lack of investment in public market places. In the current system, all participants are subjected to high costs and poor quality, and many traders, especially but not only those in kiosks, are subject to theft and even bodily injury. Collaborative planning for new investment between city officials and farmer- and trader organizations is badly needed; positive signs of movement in this direction include a more constructive approach to kiosks and joint public/private planning for a new wholesale market outside Nairobi. As new approaches to wholesaling and retailing are considered in response to Vision 2030, the continuing importance of existing market places means that complementary improvements in these markets, at the same time that investments in new markets are being made, will have major positive effects on farmers and consumers.

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1.0 Introduction

Kenya, like nearly every country in the developing world, faces a dramatic shift in the balance between its urban and rural populations over the next two decades. This shift, the broad outlines of which are nearly unavoidable due to the nature of demographic change, hold major implications for a wide range of policy and investment decisions. Decisions the country makes now, and actions it takes now and over the next two decades to meet these challenges, will have major impacts on its macro-economy, on the level and distribution of income growth in rural and urban areas, on rural-urban migration, and through these on the economic, social, and political dynamics of the country for many years to come.

Over the 25 year period to 2030, urban population in Kenya is expected to nearly triple, while rural populations will rise by only 50%.[1]. The urban share of population during that time will rise from 21% to 33%. Several implications follow. For one, farm productivity will need to increase dramatically. Today, 10 farming households have to feed about 2.5 non-farming households; in 25 years' time, those same 10 farming households will have to feed about five non-farming households. To achieve this, marketed food production per rural household will have to grow by nearly 3% per year, a major challenge even under the best of circumstances. A second implication of these demographic trends is that marketing infrastructure in urban areas, and that linking rural and urban areas, will have to be dramatically improved. Over the past two decades, this infrastructure has received very little investment and in many cases has deteriorated. We will see in this report that urban marketing activities have, as a result, spread widely into unplanned – and unserviced – informal markets, with major negative effects for farmers, consumers, and urban residents. This undesirable situation is well recognized in Kenya's Vision 2030 documents, which accord a high priority to improving food marketing infrastructure and rural-urban marketing links.

The purpose of this paper is to bring together a broad array of information that will be helpful in moving forward to refine and begin implementing food (and especially fresh produce) marketing investments under Vision 2030. Specific objectives include to:

[1] United Nations (2007).

- Quantify trends and patterns in fresh produce production in the country;
- Quantify the role of fresh produce in urban consumer expenditure patterns and anticipate how these might change;
- Document the structure and elements of the performance of the fresh produce production and marketing system serving Nairobi, including (a) geographical origin of the produce, (b) how it flows to wholesale markets in the city and the market share of each of those markets, (c) how the produce flows from wholesale to retail markets and the market share of major retail markets, and (d) key behavior and performance indicators at retail level;
- Draw implications for policy and programmatic actions that need to be considered under the aegis of Vision 2030.

The paper quantifies the market share of both the "modern" (supermarket chains) and "traditional" (open air markets, kiosks, street vendors, and others) retail sectors, but then focuses on the "traditional" system, as it continues to carry the vast majority of fresh produce in the city and is frequented by the huge numbers of medium- and low income urban households (see Tschirley, Mutuku and Weber (2004) for a detailed review of market shares of different types of retail outlets). It is also the sector that would most directly benefit from increased public investment in market infrastructure.

The next chapter discusses the data used in the paper. Chapter three provides information on the role of fresh produce in rural and urban areas: basic trends in production and sales for rural households, and for urban households, the share of total expenditure that they devote to fresh produce, compared to other food categories. Chapter four then traces the flow of fresh produce out of rural areas in Kenya, into wholesale markets of Nairobi, and on to traditional retail outlets of the city (Chapter Two). Chapter five focuses on this traditional retail sector, specifically on open air markets and kiosks, examining its size (employment, product volume, value), general characteristics of business owners, operating characteristics of the retail businesses (procurement practices, costs, margins, and income generated), and key problems and priorities for investment as identified by the trader. We close in Chapter Six with a brief review of findings, link these to Vision 2030, and consider key strategic issues that need to be taken into account as actions begin to be taken under Vision 2030's wholesale and retail markets portfolio.

2.0 Data

Data for this study come from five sources. First, Tegemeo Institute in October 2003 surveyed 542 households in Nairobi's urban areas and environs, using a statistically designed sample based on the CBS urban sampling frame. The survey gathered information on household incomes and quantified their purchases of 41 different food items (including 14 FFV items) during the previous 30 days. Data from this survey are used to compute the share of fresh produce in total urban household expenditure in section 3. They also allowed us to determine the market share of the various types of retail outlets present in Nairobi, and to examine these by income level of the household. Second, we use data from Tegemeo's rural household panel survey to examine trends in horticultural production and sales.

Third, for two weeks in December 2004, and again during two weeks in February/March 2005, Tegemeo institute monitored every vehicle entering the wholesale areas of Wakulima, Gikomba, Kangemi, and Kibera markets[2]. The purpose of the monitoring during two different periods was to control for seasonality in flows. Data recorded included the type and size of the vehicle, product(s) on board and quantities of each, district and location where the product was purchased, levies paid along the way, and cess paid in the market. These data provide the backbone for understanding fresh produce flows in Nairobi's marketing system, both the origin of fresh produce coming into the city and the relative size of each wholesale market. Fourth, in May 2004, Tegemeo surveyed 44 retail stall owners and 100 kiosk owners in Nairobi, focusing on characteristics of the traders and their business, including procurement practices. This survey was complemented in December 2005 by the fifth and final data source, a survey of 126 stall owners in retail areas of Gikomba, Kibera, Korogocho, Kangemi, and City Market, along with a count of the number of fresh produce traders in all major and many smaller markets in the city[3] These data provided a better basis for estimates of volume moving through Nairobi's various retail markets, and of trader margins and earnings.

[2] We did not monitor Korogocho due to security concerns, given that data collection needed to start between 04:00 and 05:00 each day.

[3] Sample sizes were 20 in Kangemi and Korogocho, 16 in City Market, 30 in Kibera, and 40 in Gikomba. See Annex A for statistical confidence intervals on the size of each market, and of the overall market.

3.0 Trends in FFV Production, Sales and Consumption

This section presents background information, first on the role of fresh produce in expenditures made by urban households and second on these foods' role in rural household livelihoods. Among urban households, fresh produce is a major expenditure item, second as a group only to food staples; and as argued in the introduction, demand for fresh produce is likely to grow rapidly as the country continues to urbanize and as income growth picks up. We review rural production and sales trends for fresh produce from several standpoints: percent of households involved, real value, share in income, and share of land devoted to these crops. In all cases, we examine the trends nationally, by quartile of land area cultivated, by per capita income quartile[4], and by agro-ecological zone. A consistent pattern emerges. First, national production and sales per rural household show little if any trend; this suggests that production in the country is keeping-up with rural population but, due to more rapid urban population growth, not with urban population. Second, this essentially flat trend at the national level contrasts with substantial increases in production and sales among households with lower incomes and less land, paired with declines among wealthier households and those with more land. Finally, Coastal Lowlands and Western Lowlands show increasing trends while other zones typically (with some exceptions) are flat or declining.

3.1 FFV Consumption in Urban Kenya

The rapid growth of urban populations in Kenya means that they are increasingly important destinations for marketed fresh produce. In fact, given the relative urban and rural population growth rates discussed in the introduction to this paper, urban areas are likely to account for over 80% of the growth in demand for marketed fresh produce over the next 25 years.[5] Table 1 shows that urban household expenditure on fresh produce (fruits, vegetables and Irish potatoes) is second only to staples at 26% compared to 34%.

[4] Quartiles break households into four equal groups based on the variable of interest. In all cases, quartile 1 contains the 25% of households with least land or income, while quartile 4 contains the 25% with most land or income.

[5] Based on projected growth in rural populations from 28m to 42m, growth in urban populations from 7.4m to 20.7m, and assumptions that rural households self-provision 80% of their fresh produce needs (buying 20%) while urban households purchase all their needs: (20.7-7.4) /[(42-28)*0.2 + (20.7-7.4)] = 0.83. Because this calculation assumes equal per capita fresh produce consumption in rural and urban areas, while actual consumption is likely higher in urban areas, it places a lower bound on the expected contribution of urban populations to growth in market demand for fresh produce.

Fresh produce's share exceeds both dairy and meat (including poultry and eggs). The table also shows that fruit expenditures increase with income, from 6% among the 25% poorest households to 9% among the 50% richest households. By comparison, expenditure share on vegetables decline as income increases, from 16% among the poorest households to 10% among the richest households. Thus vegetables are an important meal for poor households.

Table 1: Overall share of major food categories in basic food expenditure, by income quartile

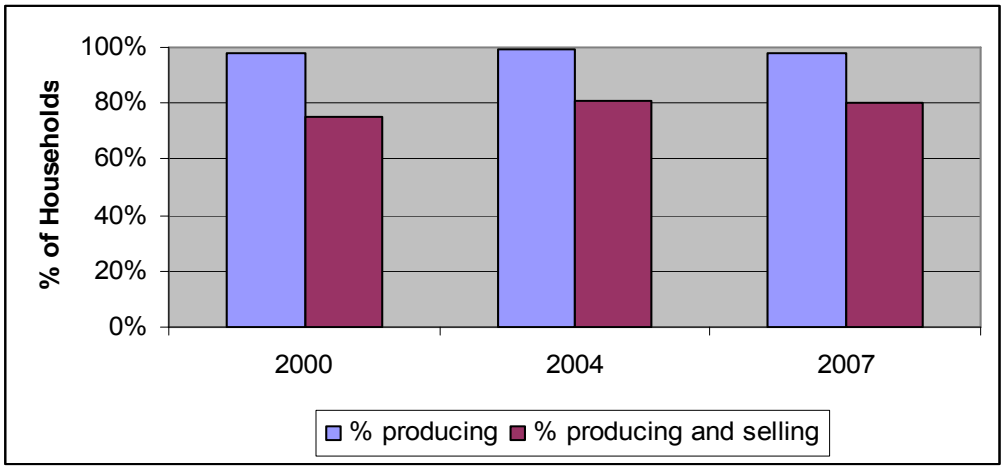
Per AE income Quartile	Food Category					
	Staples	**Dairy**	**Meat**	**Fruits**	**Vegetables**	**Potatoes**
	----------% share of total expenditure of over 40 food items---------					
1st	38	18	17	6	16	4
2nd	35	18	20	8	16	3
3rd	32	18	24	9	14	3
4th	29	20	28	9	10	3
Overall	**34**	**18**	**21**	**8**	**15**	**3**

Source: Computed by authors from Tegemeo 2003 Urban Consumption Survey in Nairobi

3.2 Share of Households Producing and Selling FFV

Nearly all rural households in Kenya produced some amount of fresh produce during each survey year, while 75% to 80% sold each year (Figure 1). These data show little apparent trend in either participation variable.

Figure 1: Share of households producing and selling FFV in Kenya



Source: Computed by authors from Tegemeo rural household panel survey

Participation in fresh produce production has no association with household income or with the area of land that a household cultivates (Table 2): essentially all households produce some amount of fresh produce regardless of their income or land size. However, participation on the sales side shows a strong positive association with household land size and incomes, as should be expected. A final pattern seen in Table 2 is that households in the bottom three quartiles of both land and income show some evidence of increased participation in sales between 2000 and 2007, while those in the top quartile of each show no trend or even (within the top income quartile) a slight decline.

Table 2: Share of households producing and selling FFV (2000 – 2007), by quartile of land area cultivated income per adult equivalent

	2000 (N=1373)		2004 (N=1351)		2007 (N=1309)	
Quartile of cultivated land	**% Producing**	**% Selling**	**% Producing**	**% Selling**	**% Producing**	**% Selling**
Quartile of cultivated land						
1st	98	70	100	75	98	73
2nd	97	72	99	78	98	80
3rd	97	77	99	85	99	87
4th	99	80	99	85	98	80
Overall	**98**	**75**	**99**	**81**	**98**	**80**
Quartile of income per AE						
1st	94	57	99	75	98	74
2nd	98	72	99	81	99	82
3rd	99	80	99	81	98	83
4th	100	88	100	88	98	82
Overall	**98**	**75**	**99**	**81**	**98**	**80**

Source: Computed by authors from Tegemeo rural household panel survey

Table 3 compares the proportion of farmers engaged in FFV production and sale by zone since 2000. Five of the eight zones show no trend or a negative trend in the share selling, while Coastal Lowlands, Western Lowlands, and Marginal Rain Shadow show substantial jumps from 2000 to 2004 and stability from 2004 to 2007.

Table 3: Proportion of households producing and selling FFV (2000 – 2007), by agro-regional zone

Agro-regional zone	2000 (N=1373)		2004 (N=1351)		2007 (N=1309)	
	% Producing	% Selling	% Producing	% Selling	% Producing	% Selling
Coastal Lowlands	96	67	99	77	99	79
Eastern Lowlands	100	81	100	79	100	73
Western Lowlands	87	53	100	75	99	74
Western Transitional	100	88	100	90	100	87
High Potential Maize Zone	99	71	98	80	96	73
Western Highlands	100	90	100	92	100	92
Central Highlands	100	83	100	80	100	91
Marginal Rain Shadow	94	44	95	61	94	60
Overall	**98**	**75**	**99**	**81**	**98**	**80**

Source: Computed by authors from Tegemeo rural household panel survey

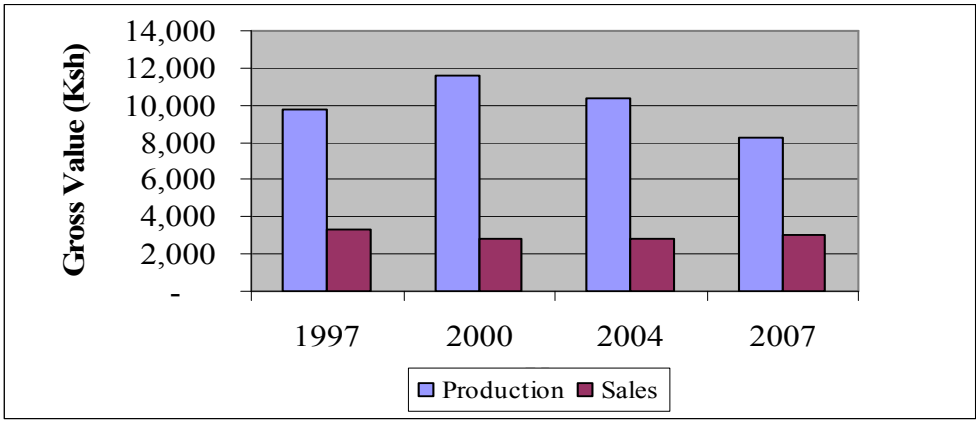
3.3 Real Value of FFV Production and Sales per Household

An equally useful way to assess the trends in the domestic FFV subsector is to examine the value of production and sales over the past decade. The objective here is to see whether increases in proportion of farmers engaging in commercial FFV production translates into more money in the pockets of the farmers, thereby leading to improvement of the farmer's welfare. Figure 2 provides a summary of the real (median) gross value of FFV production and sales for the four panel years, among those producing and those selling[6]. The values were deflated using the Consumer Price Index (CPI), with 2007 taken as the base year.[7] We include 1997 in these calculations while excluding it from the participation calculations because the results on the former are likely to be less biased. Specifically, we expect the results to be accurate for those who declared production and sales, while they leave out those who did produce or sell but failed to mention that fact. As a result, we expect that the results for 1997 provide an upper bound on actual median values among all producers and sellers. It is evident from the chart that there has been a general decline in the real value of FFV production since 2000, from a median of Ksh 11,600 to Ksh 8,200 in 2007. FFV sales, however, have remained fairly stable at about 30% of the value of production.

[6] In other words, no zero values for production or sales are included in these calculations.

[7] Similar deflation was done using the GDP deflator and the results were comparable, though the CPI gives higher values than the GDP deflator. The authors have opted to use the CPI figures in this paper.

Figure 2: Real median value of FFV production and sales per household (1997 – 2007)



Source: Computed by authors from Tegemeo rural household panel survey

While households with more land consistently sell more fresh produce, trends over time in the value of sales per household do not appear to be strongly correlated with cultivated land area (Table 4); the lowest and third land area quartiles show declines, the second a slight rise, and the fourth a sharp rise through 2004 followed by an even sharper decline in 2007. Trends over time are, however, strongly and negatively correlated with household income, echoing the trend seen in participation: median sales values per household nearly tripled in real terms for the bottom income quartile, doubled for the second, and showed much less pronounced trends for the third and fourth quartile.

Table 4: Real median value of FFV sales per household (1997 – 2007), by quartiles of land area cultivated and income per adult equivalent

	Median Sales (Ksh)			
	1997	**2000**	**2004**	**2007**
Quartile of cultivated land				
1st	1,307	1,207	947	1,184
2nd	2,614	2,112	2,461	2,955
3rd	5,664	3,515	3,977	4,548
4th	4,902	6,268	9,274	3,917
Overall	**3,301**	**2,794**	**2,773**	**3,000**
Quartile of income per AE				
1st	743	543	1,421	1,902
2nd	1,416	1,752	2,190	2,899
3rd	3,475	3,515	4,622	3,723
4th	4,357	13,172	7,200	5,930
Overall	**3,301**	**2,794**	**2,773**	**3,000**

Source: Computed by authors from Tegemeo rural household panel survey

Table 5 presents regional trends in value of sales over the decade and provides some interesting results. In Coastal Lowlands for example, sales increased six-fold from about Ksh 600 in 1997 to Ksh 3,300 in 2007. This could be attributed to increased fruit production and sales in the region. Western Lowlands' sales also doubled during the period with the highest sales realized in 2004, but with the exception of Central Highlands, sales showed no trend in other zones.

Table 5: Real median value of FFV sales per household (1997 – 2007), by zone

	Median Sales (Ksh)			
Agro-Regional Zone	**1997**	**2000**	**2004**	**2007**
Coastal Lowlands	586	1,582	2,197	3,288
Eastern Lowlands	2,941	5,235	4,445	3,024
Western Lowlands	610	651	1,746	1,273
Western Transitional	4,202	3,787	3,440	3,353
High Potential Maize Zone	1,961	1,748	2,300	1,800
Western Highlands	5,403	5,009	4,121	5,550
Central Highlands	3,785	5,316	3,968	6,799
Overall	**3,301**	**2,794**	**2,773**	**3,000**

Source: Computed by authors from Tegemeo rural household panel survey

A clear success story is the Central Highlands whose sales growth was unstable but nearly doubled during the decade, from Ksh 3,800 to Ksh 6,800 per household. This could be attributed to the proximity to Nairobi, which is a major consumption point for FFV. A crucial question to try to ask then, is how important is FFV production in the household? What is its contribution to the household income? The next section attempts to answer this question.

3.4 Income Share of FFV Production

The preceding sections have shown the importance of FFV production in terms of value per household. In this and the next section, we attempt to show its importance in the household relative to other sources of income and as a share of land allocated to crop production. Table 6 provides information on the share of FFV production in the household income, with households grouped, as in Tables 2 and 4, by the size of land cultivated and by their income per adult equivalent. The table reveals a slight tendency for income shares from FFV to be slightly higher among the land-poor than among the

land-rich, and a pronounced tendency for these shares to be higher among low income households compared to high income households. In other words, land-poor and lower income households rely more on income from FFV than do better off households and those with more land. Thus, to these smallholder farmers, FFV production is an important source of income.

The share in Coastal Lowlands and Western Lowlands has tended to increase, with little clear pattern elsewhere (Table 7); this finding is consistent with previous results on participation and value of production and sales. In terms of magnitude, farmers from Western Highlands and Central Highlands in 2004 and 2007 derived an above-average share of income from FFV production. These zones are located within access to urban markets. Central Highlands is the major source of FFV to the city of Nairobi, while Western Highlands and Coastal Lowlands serve Kisumu and Mombasa respectively. This seems to suggest the importance of access to markets as an incentive to increase FFV production.

Table 6: Household share of income from FFV production (1997-2007), by quartile of land area cultivated and quartile of income per adult equivalent

	1997	2000	2004	2007
Quartile of land area cultivated				
1st	17	7	15	13
2nd	19	11	14	13
3rd	18	7	12	13
4th	12	8	12	10
Overall	**17**	**8**	**14**	**12**
Quartile of income per AE				
1st	---	14	19	18
2nd	35	8	12	12
3rd	19	7	12	12
4th	11	7	10	7
Overall	**17**	**8**	**14**	**12**

Source: Computed by authors from Tegemeo rural household panel survey

Table 7: Household share of income from FFV production (1997-2007), by zone

Agro-Regional Zone	1997	2000	2004	2007
	--- Mean share of total household income from FFV ---			
Coastal Lowlands	9	11	13	12
Eastern Lowlands	15	11	13	13
Western Lowlands	10	16	15	12
Western Transitional	22	6	13	10
High Potential Maize Zone	11	5	9	7
Western Highlands	23	7	18	19
Central Highlands	16	8	17	15
Marginal Rain Shadow	50	11	14	18
Overall	**17**	**8**	**14**	**12**

Source: Computed by authors from Tegemeo rural household panel survey

3.5 Share of Land under FFV

The share of land allocated to FFV has shown little trend since 2000 (falling slightly), driven by steady or slightly negative trends among the bottom three quartiles of land and income, and fairly sharp declines in the top quartiles of land and income (Table 8). Also, within a given year, the land-poor and income-poor tend to devote a higher share of land to FFV production. This seems to suggest that when farmers are faced with land constraint or low earnings, they often make the rational decision to put the land to high value use.

Table 8: Share of land allocated to FFV production (2000-2007), by quartile of cultivated land

	2000	2004	2007
Quartile of land area cultivated			
1st	47	45	43
2nd	44	37	41
3rd	38	35	35
4th	36	32	28
Overall	**41**	**37**	**37**
Quartile of income per AE			
1st	48	40	43
2nd	42	36	39
3rd	38	39	36
4th	37	34	29
Overall	**41**	**37**	**37**

Source: Computed by authors from Tegemeo rural household panel survey

There are also regional differences with regard to share of land allocated to FFV production (Table 9). Coastal Lowlands clearly has the highest share of land devoted to FFV, though this share fell from 2000 to 2007. Eastern Lowlands also tends to have a relatively high share, while others fluctuate from year to year. High Potential Maize zone saw its share of land devoted to FFV fall sharply during each period of the panel surveys.

Table 9: Trends in share of land allocated to FFV production (2000-2007), by zone

Agro-regional zone	2000	2004	2007
	---- Mean share of land devoted to FFV ----		
Coastal Lowlands	72	64	61
Eastern Lowlands	43	41	46
Western Lowlands	38	36	52
Western Transitional	37	26	24
High Potential Maize Zone	43	36	27
Western Highlands	34	31	43
Central Highlands	37	39	33
Marginal Rain Shadow	43	45	37
Overall	**41**	**37**	**37**

Source: Computed by authors from Tegemeo rural household panel survey

4.0 The Flow of Fresh Produce from Rural Areas to Urban Markets of Nairobi

Fresh produce flows into Nairobi from over 45 districts plus Tanzania and Uganda. Most of this produce is funneled through one of five wholesale markets before making its way to retail market stall and kiosk owners, along with a small amount that goes to hawkers, dukas, and green grocers. Wakulima market continues to hold a majority share in wholesale transactions in the city, but the system has become more decentralized over time, driven by congestion and lack of maintenance at Wakulima, and increasing populations on the periphery of the city. Key actors in the supply chain include small and medium farmers, rural assembler/wholesalers who bulk product in rural areas and transport it to Nairobi, urban wholesalers operating primarily within the city, and market stall and kiosk owners selling at retail.

4.1 Rural Assembly and Transport to Nairobi

Figure 3 provides a channel map of the flow of fresh produce from farmers to retail traders in Nairobi[8]. Nearly 80% of all produce moving off the farm is assembled by assembler/wholesalers in rural areas, who then transport the produce to the city. Rural assembly appears to be quite dispersed, with only 2% of all produce flowing through formal rural assembly markets. Assembler/wholesalers work with smaller assemblers and also visit farms directly, assembling product by the truck load for forward shipment. Supermarket chains, with a 4-5% retail marker share in Nairobi and at most one-half of their volume flowing through preferred supplier channels, also play a minor role in rural assembly.

Nearly one-fifth of all produce coming off of farms flows directly to retail traders in the city. Sukuma wiki, indigenous vegetables, and some fruits produced near the city are the most likely to be procured in his manner. Truck sizes used in transport to Nairobi follow a bimodal pattern, with about 40% holding one-half to two tons, and another 40% holding between three and six tons. Canters, with a median load of almost four tons, make up about 65% of vehicle types entering Nairobi markets; tomatoes are transported almost

[8] The map is based on produce value, not volume.

exclusively in smaller pickup trucks of under one ton. Large lorries (median load five tons) are used almost exclusively on fruits, though even here canters are most common.

Vegetables make up 85% of the volume and 79% of the value of fresh produce entering the city (Table 10). Vegetable production is also more geographically concentrated, with 84% of volume coming from the top five districts, compared to 64% for fruit. Vegetable production for the Nairobi market takes place primarily within 150 km of the city, in an arc running from northeastern Narok district to the northwest of Nairobi, through Kirinyaga district to the northeast (Figure 4). Fruit production is more dispersed, with Kisii to the west, Meru to the north, and Machakos to the east all being important supply points. Tanzania and Uganda have meaningful shares of the fruit market – 10% and 7% volume shares, respectively (10% and 3% value shares) – while their shares in vegetables are about 1% and nearly zero.

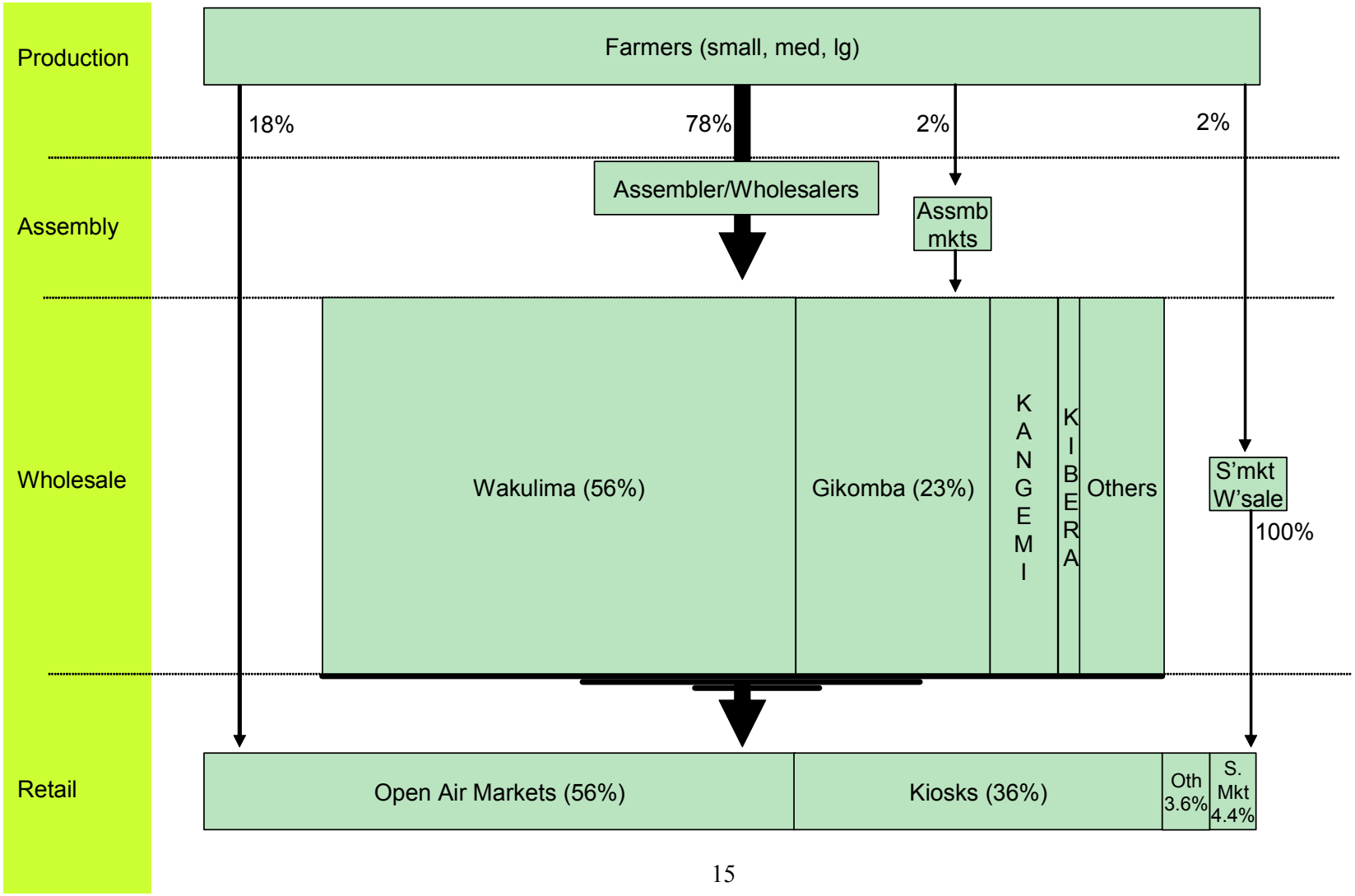
Table 10: Basic indicators of fruit and vegetable trade into Nairobi (December 2004 - March 2005)

Vegetables			**Fruit**		
Top 5 Districts	Volume Share	Value Share	Top 5 Districts	Volume Share	Value Share
Nyandarua	.37	.34	Meru	.19	.26
Narok	.22	.17	Machakos	.17	.16
Nakuru	.12	.09	Kisii	.11	.15
Kirinyaga	.07	.12	Tanzania	.10	.10
Nyeri	.06	.11	Kiambu	.07	Not in top 5
			Kirinyaga	Not in top 5	.07
Total share of top five	0.84	0.83		0.64	0.74
Tons per day	594			101	
Value per day ('000 Ksh)	7,871			2,134	

Source: Computed by authors from Tegemeo's monitoring of wholesale markets in Nairobi

Irish potatoes dominate the volume of product entering the city with a 51% share, more than five times that of the next most common item (Table 11). In value terms, the Irish potato share falls to 28%, compared to 17% for cabbage and 12% for tomatoes. Bananas are the top fruit, with a value share of 11% of all FFV, followed by mangos and oranges. Over all items, nearly 700 mt worth Ksh 10,000,000 enters the city every day, amounting to Ksh 3,650,000,000 or USD56m per year.

Figure 3: Channel map for fresh produce entering Nairobi, 12/04 through 3/05 (value terms)



The geographical pattern of sales of individual crops is reasonably concentrated (Figure 5). For example, nearly half of Irish potatoes sold into Nairobi are produced in Nyandarua district, most of this in Olkalou and Kinangop locations. Nearly 80% of tomatoes come from Kirinyaga district, primarily from Mwea; much of the rest comes from the Loitoktok area of Kajiado district. Cabbage sales are heavily concentrated in the Kinangop area of Nyandarua district. Banana production is more spread, though with heavy concentrations in Kisii and Nyamira (about a one-third share), and Meru and Kirinyaga (nearly 60%). Mango sales are the most dispersed, ranging from Meru, through Embu and Machakos to Makueni, and also Kitui.

Figure 4: Map of Kenya with principal fruit & vegetable production areas supplying Nairobi

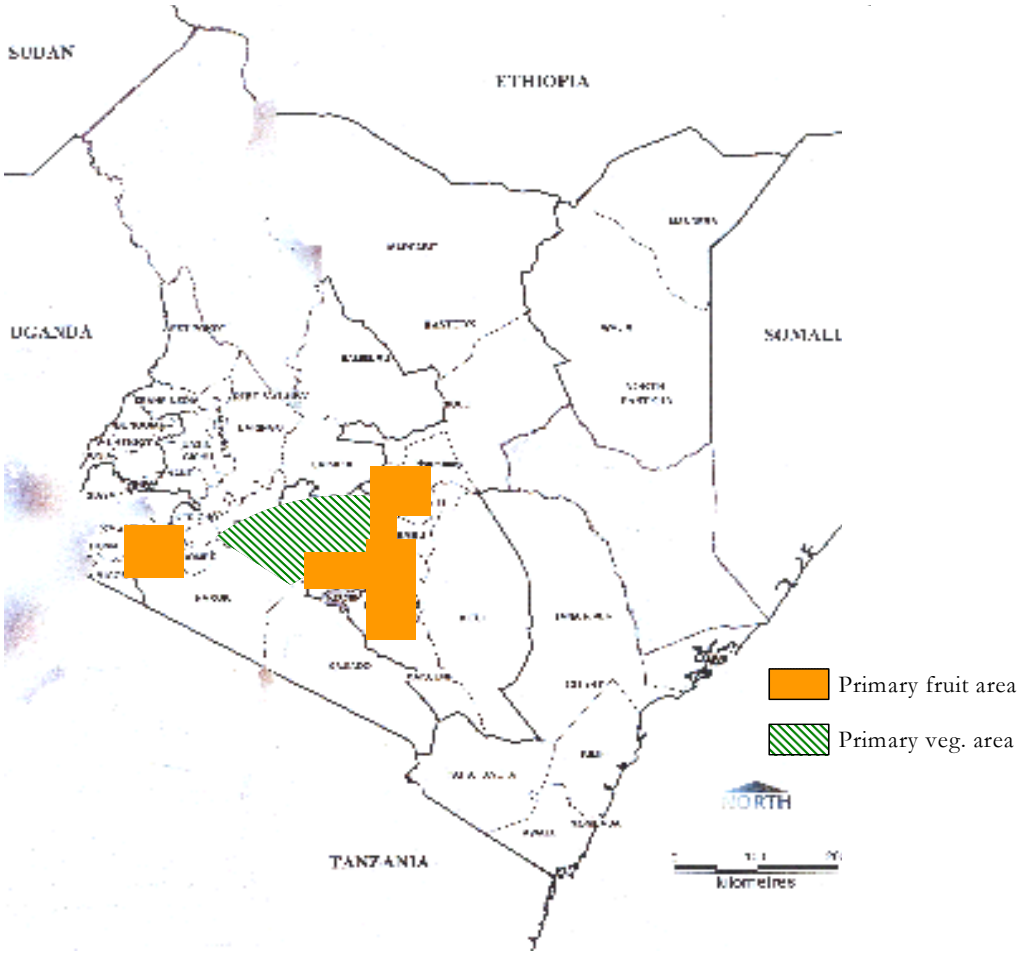
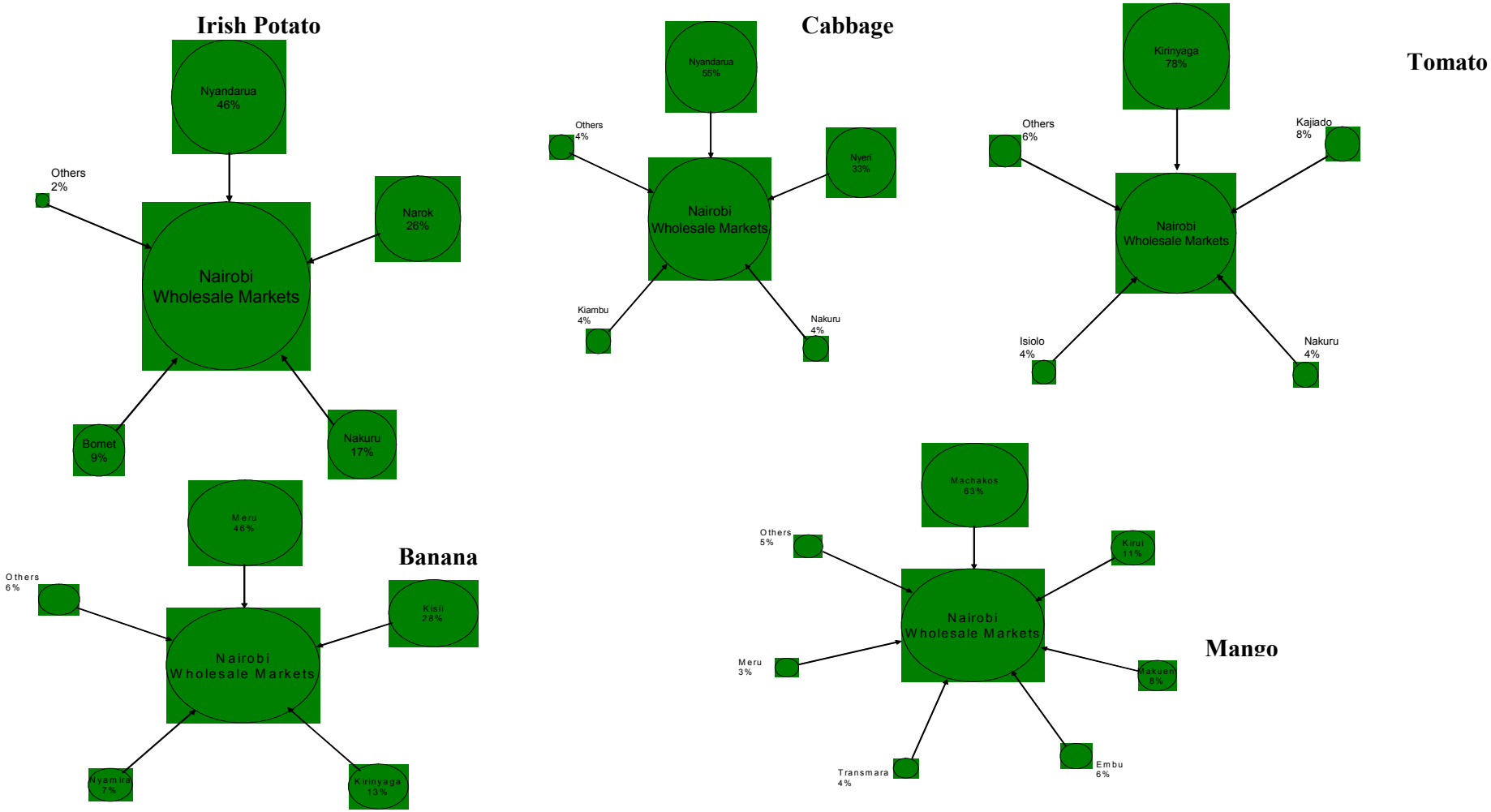


Table 11: Top fresh produce items entering Nairobi, December 2004 – March 2005

Item	Volume per Day (tons)	Volume Share	Value per Day ('000 Ksh)	Value share
Irish Potatoes	348	0.51	2,787	0.28
Cabbage	59	0.09	1,699	0.17
Tomatoes	50	0.07	1,207	0.12
Carrots	43	0.06	870	0.09
Bananas	38	0.06	1,142	0.11
Onions	36	0.05	718	0.07
Green Maize	31	0.05	234	0.02
Mango	28	0.04	555	0.06
Sukuma Wiki	16	0.02	237	0.02
Watermelon	10	0.01	86	0.01
Oranges	8	0.01	272	0.03
Pineapples	6	0.01	53	0.01
Sweet Potato	5	0.01	80	0.01
Plums	5	0.01	.	0.00
Spinach	3	0.00	38	0.00
Avocado	1	0.00	19	0.00
Total	**687**		**9,997**	

Source: Computed by authors from Tegemeo's monitoring of wholesale markets in Nairobi

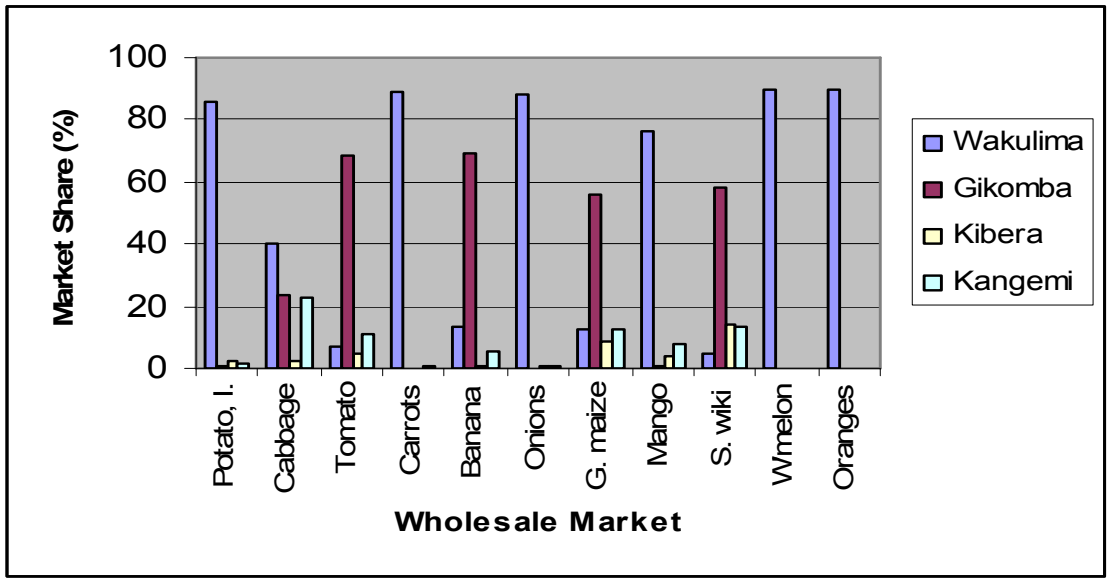
Figure 5: Geographic origin of Irish potato, tomato, cabbage, banana, and mango marketed into Nairobi



4.2 Wholesale Markets in Nairobi

Wakulima continues to dominate overall flows of FFV into Nairobi, but its congestion and lack of upkeep, together with expanding populations on the outskirts of the city, have led to a more decentralized wholesale distribution system in recent years. Overall, Wakulima carries an estimated 56% of value and 67% of volume flowing into wholesale markets in the city.[9] Gikomba is in second place with 23% of value and 16% of volume. Wakulima dominates the flow of Irish potato, carrots, onion, mango, watermelon, and oranges, with shares of nearly 80% or higher on each (Figure 6). Gikomba dominates tomato, banana, green maize, and sukuma wiki, with a nearly 60% - 70% share in each. Kangemi and Kibera trail in all products, though Kangemi has meaningful shares in cabbage, tomato, green maize, and sukuma wiki, and Kibera is also strong in the latter.

Figure 6: FFV market shares of various wholesale markets in Nairobi, 12/04 through 3/05 (based on volume)



Source: Computed by authors from Tegemeo's monitoring of wholesale markets in Nairobi

[9] We estimate that Korogocho has a 10% share, and thus adjust our data on the four surveyed wholesale markets down by 10%.

Wakulima was built in the late 1960s as a wholesale market and for a time functioned effectively in that regard. However, there has been no physical expansion or infrastructural upgrading of the market since it was built; during the intervening 30 years, Nairobi's population has increased from under one million to nearly 3.5 million. Given changing consumption patterns, the volume of fresh produce transactions likely increased by more than this. Combined with the market's location downtown and the dramatic increase in general traffic there in recent decades, the lack of physical upgrading of the market has contributed to substantial congestion and increased time costs for traders, and probably contributed to the observed lack of hygiene in the market.

One response by some assembler/wholesaler has been to bypass Wakulima entirely, going directly to what were previously retail markets: Gikomba, Korogocho, Kibera, and Kangemi. In addition, as noted above, retail traders source a substantial share of their product directly from nearby farmers. Yet the fact is that the physical infrastructure for wholesaling in Wakulima is dramatically better than in the other markets, which have adapted to the overflow out of Wakulima without putting in any significant infrastructure for the purpose. Typically, the wholesaling areas in these markets are simply an open area of bare ground where product is unloaded and, as quickly as possible, moved on to retail traders within the market. Poor access and exit mean substantial waiting time for assembler/wholesalers or transporters, leading (as in Gikomba), to unloading going on literally throughout the night.

4.3 Produce Flow to Retail Markets

Table 12 shows several different measures of size of retail markets in the city, judged by the number of traders within the market, the amount of produce coming into the market and amount of sales. By any measure, Marikiti and Gikomba are the largest, each with close to 30% of all FFV traders in the city; Gikomba's value shares are as high as 61% among the five surveyed markets.[10] Korogocho and Kibera are next, with similar results on all measures of size. Kangemi and Kawangware complete the set of principal FFV markets in the city, with all others being substantially smaller.

[10] Recall that we counted the number of retail traders in all but the very smallest markets we could find, but conducted detailed surveys in only five of these markets.

Table 12: Alternative measures of size of retail markets in Nairobi

Market	By Approx Number of FFV Traders		By Previous Day's Flow of Product into the Market		By Previous Day's Sales		By Previous Week's Sales	
	N	Share[1]	'000 Ksh	Share[2]	'000 Ksh	Share[2]	'000 Ksh	Share[2]
Marikiti	1,670	0.29	Not included in survey					
Gikomba	1,456	0.26	2,545	0.41	5,350	0.56	33,415	0.61
Korogocho	754	0.13	1,396	0.22	1,482	0.15	6,911	0.13
Kibera-Toi	730	0.13	1,448	0.23	1,417	0.15	8,483	0.15
Kangemi	403	0.07	762	0.12	1,316	0.14	6,060	0.11
Kawangware	306	0.05	Not included in survey					
Jogoo Road	167	0.03	Not included in survey					
Wangigi	128	0.02	Not included in survey					
Westlands	22	0.00	Not included in survey					
City Market	21	0.00	58	0.01	31	0.00	303	0.01
Jericho Market	19	0.00	Not included in survey					
Westlands	9	0.00	Not included in survey					

[1] Source: All data based on interviews and market trader counts during week of 5 December 2005, [2] Among markets included in survey.

The decentralization of fresh produce wholesaling in Nairobi is evident from data on where retailers in the various retail markets purchase their produce (Table 13). Between 24% (Kangemi) and 44% (Gikomba) of fresh produce sold by retailers is purchased by them in the wholesale area of their own market. These wholesale supplies in the retail markets reflect both direct flows to those markets from rural areas (as discussed in the previous section) and a second, smaller tier of wholesaling. In the latter, small intra-urban wholesalers take produce from one of the main markets (either Wakulima or Gikomba, depending on the product) to the small wholesale area of the retail markets early in the morning, for sale there to retailers. The fact that Wakulima's share in these data is only 29%, compared to 56% of value entering the city from outside, suggests that this second tier of wholesaling involves a substantial amount of produce.[11] Table 13 also shows that retail traders in Korogocho and Kangemi purchase half or close to half of their produce directly from farmers. Increased sample sizes would be needed to identify with confidence which crops are most purchased in this way.

[11] Another factor contributing to Wakulima's smaller share in these data on where retail traders buy, is that a substantial portion of Irish potato is sold out of Wakulima to institutional buyers (especially fast food restaurants). This study did not estimate the market shares of these buyers.

Table 13: Source of FFV produce for stall retailers in Nairobi

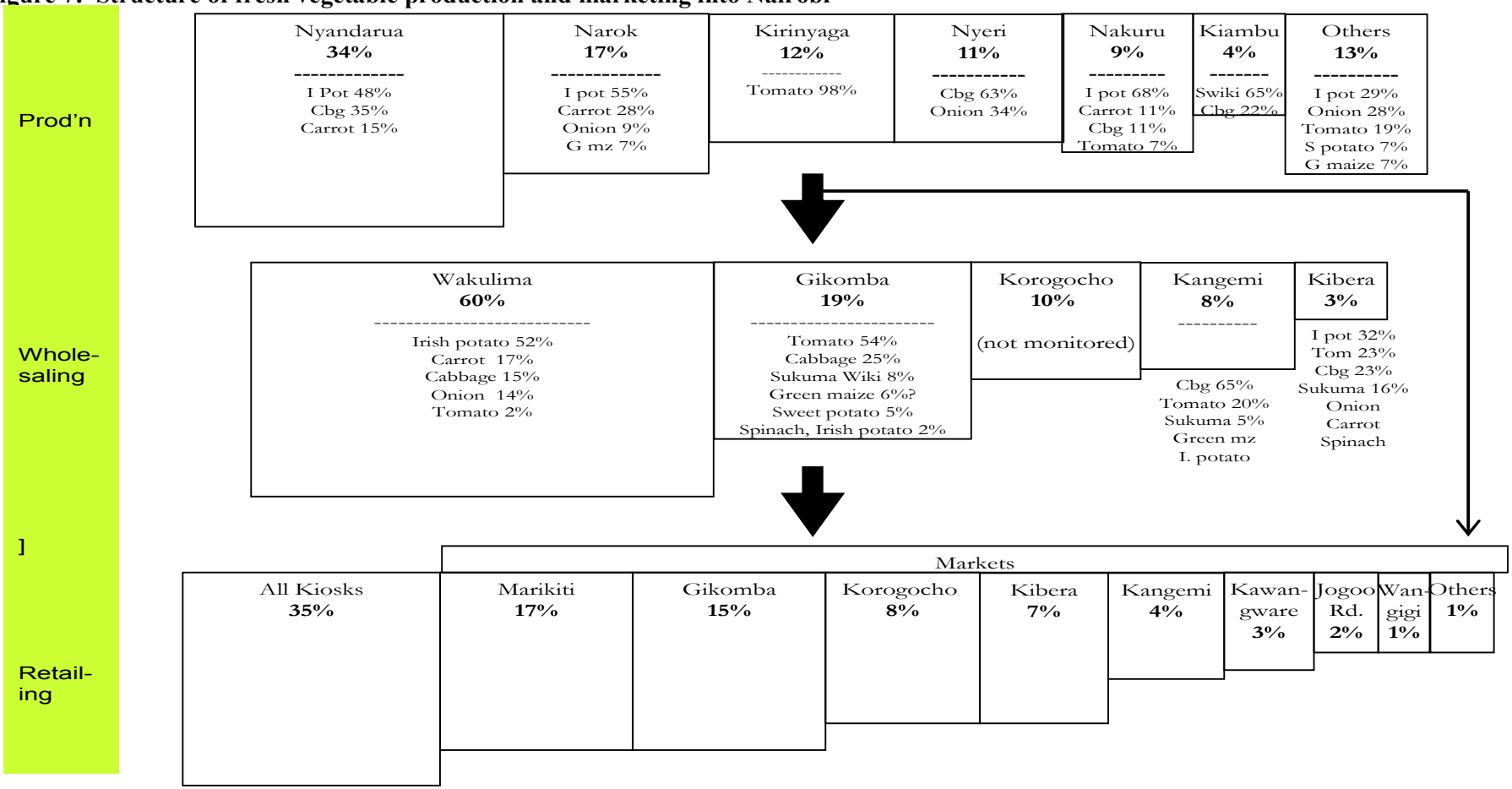
Market	Location where retailers made their purchases							
	Bought directly from farmers	Wakulima	Gikomba	Kibera	Kangemi	Korogocho	Ngara	Other
	---------- % of all produce purchased in location , by value ----------							
Gikomba	10	40	44	0	0	0	4	2
Korogocho	40	0	0	0	0	28	22	10
Kibera-Toi	0	44	3	43	0	0	1	9
Kangemi	50	9	5	0	24	0	12	0
City Market	1	86	7	0	0	0	2	5
Total	**19**	**29**	**22**	**9**	**3**	**6**	**8**	**5**

Source: Computed by authors from Tegemeo's retail market survey in Nairobi

Figures 7 and 8 bring together much of the information from this chapter, summarizing for vegetables and fruit, respectively, the main supply areas, their overall market share (value based) and the products that make it up, the market shares of wholesale markets and the products that make up those market shares, and the market shares of kiosks along with the individual markets in the city. For example, Nyandarua has a 34% value share in all vegetables shipped to Nairobi; Irish potatoes constitute 48% of Nyandarua's production, cabbage 35%, and carrots 15%. We list only enough products under each production area or wholesale market to reach 80%-90%. Relative box sizes reflect market shares.

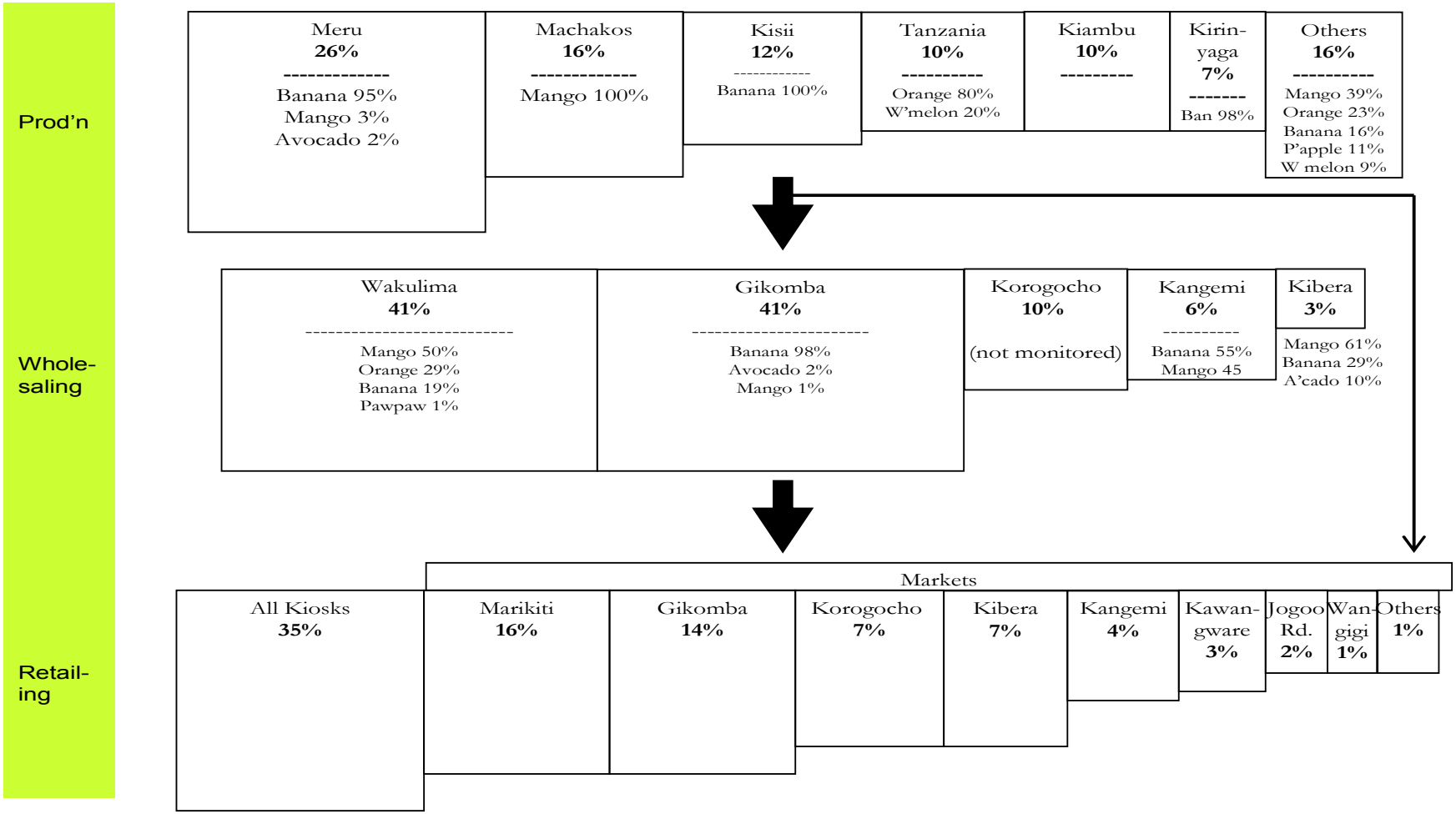
Highlights from the figures include the dominance of Wakulima in vegetables (three times the monetary size of Gikomba) but its parity with Gikomba on fruit; the importance of the kiosk sector in both fruit and vegetables, and the dominant size of Marikiti and Gikomba in the retail landscape of each.

Figure 7: Structure of fresh vegetable production and marketing into Nairobi



Source: Computed by authors from Tegemeo's wholesale market monitoring and retail market survey in Nairobi

Figure 8: Structure of fresh fruit production and marketing into Nairobi



Source: Computed by authors from Tegemeo's wholesale market monitoring and retail market survey in Nairobi

5.0 Traditional Fresh Produce Retailing in Nairobi

This section discusses the key structure, conduct and performance aspects of the fresh produce retail marketing in urban Kenya, with reference to Nairobi city. Two retail outlet types are examined, open-air markets and kiosks. Previous studies on urban retailing showed that these two outlets account for more than more than 90% of the fresh fruit and vegetable market share (Ayieko et al. 2005; Tschirley et al. 2004). We take a look at the general characteristics of the fresh produce traders and discuss procurement practices, produce quality, and security issues. We also examine the returns accruing to the traders as measured by the net gross margins that they earn. A clear understanding of these characteristics is important in defining policy options for improving the fresh produce marketing in Kenya and identifying key interventions that can spur growth in the subsector.

5.1 Demographic and Other Characteristics of Market Stall and Kiosk Owners

Retail fresh produce trade in Nairobi is generally dominated by women. Nearly three-quarters (74%) of the businesses in the open markets are owned by females, while 72% of kiosks are female-owned (Table 14). The median age for stall owners is 35 years and that of kiosk owners is 30 years, implying that the traders are fairly youthful.

Market stall traders tend to be more specialized than kiosk traders. Less than 1% of the market stall owners are engaged in other income-generating activities, while one-sixth (17%) of kiosk traders are engaged in other businesses besides kiosk ownership. Households of kiosk traders are therefore more likely to have other family members engaged in formal employment than market stall traders. Nearly 70% of these households are engaged in activities not related to fresh produce trading, while 19% are operating more than one kiosk.

In addition, most of the fresh produce traders tend to join fresh produce trade as a result of unemployment. Half of the market traders and 42% of kiosk traders engaged in fresh produce retailing due to lack of formal employment. In addition, about one-fifth of each of these types of traders entered into fresh produce trading after some stint at formal employment. This implies that unemployment is the single-most factor driving people to engage in retailing. Furthermore, both market stall and kiosk traders tend to start off from other activities (trade

or non-trade related) before joining fresh produce trade, perhaps to accumulate the requisite start-up capital to set off fresh produce trade. This pattern could suggest a business pathway in the fresh produce trade, where because of the capital requirements and risks involved, traders start with a less risky business and then gradually move to more risky ones such as fresh produce trading.

Table 14: Demographic and other characteristics of market stall and kiosk owners

Characteristic	Market stall businesses (N=44)	Kiosks (N=97)
% interviewees who were owners of the business	90	93
% female	74	72
Median age	35	30
% involved in another income generating activity	0.5	17
... of which		
Formal employment	0	6
A(nother) kiosk	0	19
Hawking	25	6
Some other trading activity	50	38
Any other activity	25	31
Occupation prior to this business (%)		
Formal employment	23	21
A(nother) kiosk	4	7
Hawking	0	4
Other trading activity	15	20
Any other activity	9	6
Unemployed	50	42

Source: Computed by authors from Tegemeo's retail market survey in Nairobi

5.2 General Characteristics of Market Stalls and Kiosk Businesses

Market traders tend to have larger trading space than do kiosk traders (Table 15). A typical market stall measures on average 8 m^2, compared to 6 m^2 for kiosks. However, the trading space varies with the market size and the number of traders within the market. Traders in City Market, one of the retail markets with fewer traders, has larger trading space (22 m^2)

compared to, say, Gikomba with thousands of traders. Trader experience, measured by the age of business, also varies within the markets, with City market traders having longer trading experience (median=12 years) and those in Kangemi the shortest (median=6 months). On average, age of business for kiosk traders and market traders is 10 months and 3 years respectively. The very low mean experience of kiosk owners suggests great instability in this sector, driven in great degree by the informal nature with which they are established, often leading to their destruction or forced relocation by the city council authorities.

The very short trading experience in Kangemi market needs special mention. Kangemi market, unlike Kibera, Gikomba, City and Korogocho, is a private market owned and operated by traders through a management council; all other markets are owned and operated by the City Council. Kangemi market came into being in response to the high demand for fresh produce by the residents of the sprawling Kangemi informal settlement (slums) and lack of an alternative retail market in the area. This ownership arrangement has been a bone of contention between the market management and the city council for sometime, especially regarding the collection of market fees, and has led to frequent closure of the market and the demolition of the market stalls. These actions by government authorities create uncertainty, hence the low mean business age. A corollary to this is the high fixed costs that traders have to incur, either building the stalls themselves (since this service is not offered by the City Council) or rebuilding them following destruction. Traders in other markets do not have to pay for investment in physical assets since these are borne by the City Council. The traders rent the stalls from the local authority hence have very little need to invest in physical assets.

Table 15: General characteristics of market stall and kiosk businesses

Characteristic	Kiosk	Market					All Markets
		Kibera	Gikomba	Kangemi	City Market	Korogocho	
Median size of stall/kiosk (m^2)	6	8	2	4	22	12	8
Median total months operating the business	10	60	60	6	144	36	36
Median value of investment in physical asset	500	0	0	1,400	0	0	0
% using loans to finance this investment	11	25	0	17	0	0	12
% employing anyone (paid or unpaid) in the business	43	78	45	56	91	33	50
% with paid employee	12	0	76	11	14	0	29
% paying regular fees to operate business	54	22	0	67	0	11	19
Median monthly value of fees among those paying	550	800	600	1,000	2,275	917	750
Median number of FFV items for sale	9	4	2	5	23	2	2
Median number of non-FFV items for sale	6	2	1	1	2	1	1
Median net income last month	4,250	9,000	11,050	9,250	36,000	8,167	8,500
Mean share of this income in total household income (1=all or nearly all, 5=almost none):							
all or nearly all	34	78	78	100	60	100	88.5
more than half	12	11	11	0	10	0	5.6
about half	24	11	11	0	10	0	5.6
less than half	28	0	0	0	10	0	0.2
almost none	2	0	0	0	10	0	0.1

Source: Computed by authors from Tegemeo's retail market survey in Nairobi

Kiosks, which sometimes are just temporary structures, require an average investment of Ksh 500 towards their establishment. Because the level of investment in physical assets is minimal or nil in most markets, the proportion of traders using loans to finance the physical structures is also low for kiosks and retail market, averaging 11%. There are also differences between levels of employment in the trade. Market traders are more likely (29%) to employ attendants than kiosk traders. This could be due to the larger trading space of the stalls in some markets and the high flow of buyers flowing into the retail markets, especially in a market like Gikomba, thus requiring a helping hand. Kiosks are mainly located within the residential areas and the trading space allows just about one person to operate it. As a result, most kiosk owners tend to operate the kiosks themselves, or make use of unpaid labor.

The median number of FFV items for sale per market stall varies from two in Korogocho and Gikomba to 23 in City market, with a median over all markets of two items. City market is able to diversify, partly because of the large trading space allowing them to stock a variety of FFV, but also because they tend to target the high end market, whose consumers seem to prefer convenience in shopping and thus are looking for a one-stop shop. Overall, market traders tend to be specialized in fresh produce trading, as shown by the number of non-FFV items for sale in the stalls, which does not exceed two per stall in any market. Kiosks are much more diversified, carrying a median of nine FFV items in addition to six non-FFV items.

Market fees also tend to vary widely among markets, but on average, market stall owners pay more in market fees than kiosk owners. The fees include stall rental charges and the municipal fees and license. Monthly market fees are high in City market (Ksh 2,275) while relatively comparable in other markets. It is potentially noteworthy that traders in Kangemi – the only privately owned and operated market – are much more likely than traders in other markets to pay regular fees. This perhaps reflects more attentive financial management by the private operators. Most kiosk owners own the structures and only pay the municipal fees for trading.

A critical element of the market performance regards the incomes that accrue to the traders as a result of their trading activity (Table 15). A comparison of net monthly incomes of traders in the markets produces three categories of traders: incomes are highest in City Market (nearly four

times the median market income), moderate for the other market traders (all fluctuate near the monthly market median) and low for kiosk traders (half the monthly market median). The high incomes in City Market could be explained in part by its strategic location[12], from where traders serve the high end consumers and sell carefully selected produce. Moreover, its large assortment of FFV items allows the trader to diversify incomes and benefit from product differentiation.

Income from the FFV trade is a major source of household income for traders in all markets as well as kiosk traders. More than four-fifths of market traders (86%) reported that their household derived all or nearly all of its income from FFV sales, with the households of all traders in Kangemi and Korogocho relying solely on income from the trade. For kiosk traders, who are relatively diversified in terms of product mix, about one-third said that the income from the kiosk accounted for all or nearly all household income, while over 50% said that their household earned half or less of their income from the FFV trade. This implies that, within the markets, there is tendency to specialize in FFV while for kiosks, the tendency is to diversify into other activities (most often *not* additional kiosks) as a way of income diversification. Combining this information with that on bottom of Table 14 suggests that kiosk owners, more than market stall owners, come from households in which others are also earning income or the household derives income from other non FFV-trade sources. This evidence is not surprising given that retail markets are essentially fresh produce markets, while kiosks tend to have variability in the product mix, from general merchandise to FFV. The evidence also suggests that operating a market stall is a more reliable business capable of supporting a family, while income from a kiosk is less certain. This too is not surprising in light of the questionable legality of many kiosks and the fact that they are periodically forced to close down or move to other locations.

5.3 General Procurement Practices

We now turn to examine the general FFV procurement practices among traders. The study shows that FFV procurement is done on a regular basis (Table 16), typically several times within the week.. Nearly all kiosk traders (97%) and nine-tenths of market traders regularly frequent a specific market for all the FFV items they sell. For stall owners, the most common markets for

[12] City market is situated at the heart of Nairobi city and, and therefore conveniently located to offer convenience for office goers.

FFV items are Wakulima wholesale market (28%) and Gikomba (18%)[13] while most Kiosk owners equally prefer Korogocho and Wakulima (22% and 21%, respectively).

Table 16: General procurement practices among traders

Indicator	Market Stalls	Kiosks
% regularly frequenting one specific market	87.8	97
Most common market	Wakulima (28%)	Korogocho (22%)
Second most common market	Gikomba (18%)	Wakulima (21%)
Why frequent this market?		
... closest/cheap to get to (%)	46.2	66
... best prices (%)	22.0	20.2
% trying always to purchase from same traders	29.9	43
% purchasing on daily basis	48.5	52.6
% who changed the market they most frequented	24.1	37.1
Why change?		
... distance/transport cost (%)	10.3	41.7
... high prices (%)	36.6	22.2
... lack of availability of all items (%)	25.7	5.6

Source: Computed by authors from Tegemeo's retail market survey in Nairobi

The traders show some preferential tendencies with regard to who they purchase the items from. Most market traders (46%) and kiosk traders (66%) prefer certain specific wholesale outlets because of closeness and ease of access (convenience). Another one-fifth (22% of the market traders and 20% kiosk traders), shows preference for cheaper wholesalers. There is a fair amount of trader loyalty, with 30% of market traders and 43% of kiosk traders preferring to procure FFV items from the same traders every time they go to procure the items. In addition, and because of lack of a cold chain to preserve the quality of FFV, about half of the traders make purchases on a daily basis. Less than one-quarter (24%) of the market traders and 37% of kiosk traders have changed the market they frequent most often in recent times. Reasons for switching procurement markets vary among the outlets. For stall owners, the main reasons for changing were high prices (37%) and unavailability of all FFV items (25%), implying they have to visit more than one

[13] If Marikiti had been included in the detailed survey, then Wakulima's share would certainly have been higher.

market, which raises their costs. For kiosk owners, the main reasons for switching procurement markets were distance/transport cost (42%) and high prices (22%).

The reason for such big differences between market and kiosk traders switching procurement markets appears to be related to the business characteristics of each. We earlier showed that the median business age of kiosks is 10 months and this is in part due to the instability in the kiosk retail business occasioned by their informal nature, often leading to their destruction or forced relocation by the city council authorities. As they relocate, chances are the distance to the wholesale markets also change and with it the transaction costs. Thus the wide difference is probably due to kiosks having to change location, which is seldom if ever the case with market traders (except in Kangemi).

5.4 Quality Differentiation

Another performance aspect of the FFV retailing hinges on quality of the produce. A comparison of the market outlets shows quality variations between the respective markets (Table 17). Generally, traders tend to offer just 1 to 2 qualities for each commodity, suggesting some level of product quality differentiation. The differentiation takes the form of size and appearance. In some outlets, the differentiation may even include packaging and dicing (especially true for fresh vegetables). The proportion of FFV items with more than 1 quality is about 20% for both kiosk and market traders. Within individual markets however, there are variations, with Korogocho offering the highest proportion of differentiated items (59%) and City Market the least (4%). Quality differentiation is more pronounced in fruits than it is for vegetables. Vegetables where high quality differences are observed include onions and Irish potatoes. As for fruits, pawpaws, pears, and avocados are the main items with highest price difference between qualities.

An explanation for this could be due to the type of consumer patronizing the various markets. City market, targeting high end consumers tend to offer high quality items, and because it is a niche market, the traders fairly know what their customers want (the consumers for example will not buy low quality produce in this market). This reduces the variability in quality. Consumers in Korogocho, however are low income consumers. To meet their demand therefore, traders tend to offer produce of different quality and size to suit their purchasing ability. This may involve

sorting and selling items by size. Price difference between top and bottom qualities range between 50% for kiosk traders and 60% for market traders, with highest variation in Gikomba and the lowest in Kibera.

Table 17: Produce quality and price differentials among Nairobi FFV traders by market

		Market					
Indicator	**Kiosk**	**Kibera**	**Gikomba**	**Kangemi**	**City Market**	**Korogocho**	**All Markets**
Proportion of items with > 1 quality/price on offer	20%	49%	33%	24%	4%	59%	39%
Median # of qualities/prices on offer	1	1	1	1	1	2	1
Median % price difference between top and bottom quality	50%	40%	67%	60%	50%	59%	60%
Commodity with highest price difference between qualities	Pawpaw (67%)	Onions (63%)	Irish potatoes (93%)	Pawpaw (88%)	Pears (75%)	Avocados (73%)	Irish potatoes (93%)

Source: Computed by authors from Tegemeo's retail market survey in Nairobi

5.5 Performance Indicators for Open-Air markets

We here attempt to estimate the benefits accruing to market traders as a result of engaging in FFV retailing. This analysis is important as it highlights the extent of the reward systems to the market participants in the various market outlets. The results are presented in Table 18. Key performance attributes considered are the daily turnover and profits, gross and net margins of the traders. Median daily turnover was estimated by establishing the trader's sales the previous day. Gross margin is measured as a percent of purchase value and reported both as mean and median.

The median daily turnover ranges between a low of Ksh 1,300 in Korogocho to a high of Ksh 3,000 in Gikomba. The turnover in Korogocho is low mainly due to the caliber of customers patronizing the market, which comprises low income population, most of which live on less than a dollar a day. The FFV items in this market therefore tend to be low quality with corresponding low prices. Even though the volumes sold may be high, the low prices lead to low turnover.

Turnover in City market appears to be lower (Ksh 1,400), mainly because this is a niche market with few customers. Kibera and Kangemi have moderate turnover, which can be explained in part, due to the location of the markets, enabling them to serve both low income and middle income customers. As for Gikomba, turnover is generally high given the nature of the market both as a wholesale and retail market.

Closely related with the daily turnover is the daily median profit. As Table 18 shows, daily profits are higher in City market (Ksh 590) and Gikomba (Ksh 500), but lower in the markets neighboring the low income consumers (Kibera, Korogocho and Kangemi). While these absolute figures provide good indication of the market performance, they are flawed when it comes to comparison, since different traders in different markets face different cost structures. For example, absolute comparisons tell us that Gikomba, Kibera and Kangemi have higher turnover than City market based on the monetary value of the sales the previous day. This may not tell us much regarding market efficiency.

Table 18: Trader indicators by market, open air markets in Nairobi

		Median Daily Turnover (Ksh)	Gross Margin (% of Purchase Value)		Net Margin (% of Purchase Value)		Daily Profit (Ksh)	
Market	N	"Yesterday"	Mean	Median	Mean	Median	Mean	Median
Kibera	30	1,800	18.1	11.1	14.2	10.9	298	216
Gikomba	40	3,000	15.3	10.0	12.3	8.0	651	500
Kangemi	20	1,750	21.2	11.2	15.8	6.0	942	396
Korogocho	20	1,300	13.7	8.9	9.9	6.4	561	239
City Market	15	1,399	18.6	19.4	17.0	16.8	913	587

Source: Computed by authors from Tegemeo's retail market survey in Nairobi

We therefore turn to relative measures to provide a clearer picture of returns to traders. Two measures considered here are the gross and net margins. This kind of analysis is more meaningful because it gives an idea of returns to trader's capital. As Table 18 shows, City market has higher gross and net margins compared to the other markets. These findings are consistent with the findings on Table 15 on net monthly incomes. It can thus be concluded that the type of consumers determines the returns to traders.

5.6 Trader Safety Concerns

A normally talked-about element of market conduct is the extent to which the market is safe to allow the smooth operation of traders. Safety here is defined to include merchandise safety, personal safety, safety of premises, safety from theft, and corrupt practices along the supply chain. An evaluation of safety gives an indication of the risks that traders are faced with in their day-to-day activities. Where these risks are higher, traders may transfer the cost to consumers, thereby raising the price of FFV items. A key question with regard to trader safety is, do we have evidence of market insecurity and how does this affect procurement of merchandise? Table 19 presents a number of safety concerns, categorized as safety at the point of sale (market stall or kiosk), safety while procuring FFV items, and general tendencies towards corruption.

Table 19: General trader safety issues in fresh produce retailing

Indicator	Market	Kiosks
Theft at Market Stall/Kiosk		
% suffering regular, small theft	42.7	25.8
Median monthly losses among those experiencing it	200	100
% of all traders considering this a major problem	16.2	11.3
% whose stall/kiosk was robbed of large amounts of money	23.6	18.6
Median loss among those being robbed	600	1225
% who have been harmed during a robbery	2.3	11
Theft while Procuring Supplies		
% robbed while procuring supplies	34.4	43
Median loss among those so robbed	800	500
% harmed while robbed	0	0
% knowing others who were robbed while procuring supplies	74	
Encounters with Police		
% claiming ill treatment from police	13.9	26.8
% specifically citing bribery attempts	3.4	6.4
% citing police harassment as “biggest problem” in business	6.7	12.4

Source: Computed by authors from Tegemeo’s retail market survey in Nairobi

With regard to safety at the point of sale, markets tend to be worse off than kiosks, with some 43% of stall owners suffering regular small thefts of produce and cash, compared to 26% for kiosk owners. The amount of losses to the traders ranged from Ksh 100 per month among kiosk owners to Ksh 200 among stall owners.

The proportion of traders who reported being robbed of large sums of money at the point of sale was 24% for stall owners and 19% of kiosk owners, and the amounts which they lost during the robbery ranged from Ksh 600 to Ksh 1,225. More than one person in ten (11%) of the kiosk owners reported injury due to the robberies. As at the time of carrying out this study, 16% of market traders and 11% of kiosk traders consider insecurity at the point of sale a major problem worth dealing with. While the amounts lost during these thefts and robbery may not be substantial, repeated theft erodes the trader's profits, increases trader's risk, and may even lead to the collapse of the business, especially if the trader cannot recover the capital stock.

In addition, insecurity seems to be serious during procurement of the FFV items. More than two-fifth of kiosk owners (43%) and a third (34%) of the stall owners reported having lost money while procuring the FFV items at the wholesale markets. Amounts lost during procurement range between Ksh 500 to Ksh 800. Also, another source of safety concern stems from those who are supposed to enforce the law, the City Council policemen. During the course of doing business, kiosks tend to suffer more from council police harassment (27%) compared to market stalls (11%). This is due to the nature of the structures, some of which are often built on road reserves, in contravention of the city council bylaws. Occasionally, the harassment leads to bribery. In general, safety concerns need to be addressed because they have a tendency to increase trader risks and may result in high price hikes by traders to try and recover the losses

6.0 Looking Ahead

This paper began by reviewing trends in production and sales of fresh produce in the Tegemeo panel surveys. These trends suggest that market participation rates and value of sales per household are steady at the national level, with some growth in Coastal Lowlands and Western Lowlands and among lower income households offset by decreases among higher income households. The worrisome implication is that, while production may be keeping up with rural population, it appears not to be keeping up the higher growth in urban populations. Reversing this trend is a major challenge for the country over the next 5-10 years; doing so will require not just better technology packages at the farm level but also more efficient supply chains capable of linking rural production with urban demand.

In assessing the marketing of fresh produce, this paper focused on the so-called "traditional" system because of its dominant position in fresh produce marketing. Tschirley, Mutuku and Weber (2004) and Figure 4.1 of this paper show that supermarket chains in late 2003 had only 4% of Nairobi's fresh produce market, with 92% flowing through open air markets and kiosks. Even if supermarket market shares have doubled over the past five years, this would still leave the traditional sector with about 90% of the market. Minten (2008), in a study in Madagascar with relevance of many African countries, concludes also that market share growth of large supermarket chains is likely to be very slow in low income countries. Reardon and Timmer (2006) now suggest that "considerable uncertainty (exists) about the rate at which the supermarket sector will grow" in Africa, including in Kenya. Thus, the vast majority of any increase in production and sales of fresh produce in Kenya is likely to flow through the traditional marketing sector for some time to come.

This system has received very little investment over the past two- to three decades. As a result, the traditional marketing system has spread with little formal planning throughout the city at both wholesale and retail levels. At the wholesale level, Wakulima now receives only slightly more than half of the produce that arrives in the city from rural areas, despite the fact that it is the only market in the city specifically constructed to handle large wholesale volumes. Gikomba receives about one-quarter of all produce reaching the city, with the other 20% spread across Korogocho, Kangemi, and Kibera, in that order. At retail, the most obvious sign of this unplanned dispersion of the trade is kiosks, with over one-third of all retail fresh produce trade; retail markets are also over-run with traders operating on their edges and moving out into street vending. Traders in this dispersed system earn lower and less stable returns, and suffer from substantially higher levels of theft (including bodily injury) and difficulties with police. Overall, costs are increased and quality is very difficult to maintain. Quality standards remain informal and thus variable from trade-to-trader and market-to-market.

Wholesale and retail markets are a major focus of Vision 2030. Though the market element within Vision 2030 is not limited to fresh produce, much of it will directly or indirectly affect the sector. The strategy calls for progressively formalizing the informal sector through an

"improved business environment", investment in infrastructure, and improved grades and standards. These objectives will be pursued through a set of Flagship Projects that are believed to provide "quick wins" for all concerned, and a long series of other possible projects and programs. Among the flagship projects are:

- Creation of 10 "wholesale hubs" modeled after the experience of such hubs for cooking banana and dairy;
- Building of at least 10 "tier one" markets in selected urban areas; and
- Construction of wholesale, retail, and hawkers' markets, with one hawkers' market already in operation near Wakulima in Nairobi.

Included in the list of possible other projects and programs are efforts to support traders' associations especially for savings mobilization, and review of legal, legislative, and institutional frameworks related to market infrastructure development.

Wholesale hubs are a key innovation being pursued in Vision 2030. These involve the formation of farmer organizations such as the recently formed National Potato Farmers' Association, development of rural assembly points used by these farmer associations and equipped with requisite facilities such as improved sanitation, electricity, and parking bays, loading and offloading ramps, as well as cold storage facilities, and associated promotion of improved standard operating procedures throughout the supply chain. In the case of Irish Potato, key steps have been establishing a standard size bag for all wholesale transactions and enforcing its use, and streamlining potato wholesaling within Wakulima, including allowing wholesale traders (or farmer organizations) to sell directly to retail traders without having to go through brokers. The idea appears to be able to eventually link these rural wholesale hubs to new (as well as existing) retail centers.

Following on Vision 2030, there appears also to be tremendous movement on a stakeholder-led process of investment planning for Nairobi's domestic horticultural system. This process is

taking place within the Kenya Horticultural Task Force (HTF)[14], and has been marked by private sector leadership in collaboration with government. The centerpiece of the effort is the planned construction, with public and private funds, of a new wholesale market in Kasarani. The market, to be built on a 100-acre plot of land donated by the government, will be modeled along the lines of the Johannesburg Wholesale Market. The market will be for FFV wholesale only and is intended to accommodate a limited number of larger-scale, more capitalized traders than are found in current wholesale markets; an estimated 5-10 traders are anticipated per "commodity cluster". The market will not replace existing wholesale markets such as Wakulima and Gikomba. Rather, the idea is to establish a higher level, much more modernized wholesale market, with fewer but larger-scale traders.

As the country embarks on the modernization of Kenya's food system as envisioned under Vision 2030, several points need to be kept in mind. First, a key objective of the new infrastructure will be to ease the congestion currently being experienced in the existing wholesale markets; for the new markets to draw the volume needed, their design and construction must be done with the participation of key interest groups in the private and public sectors. This appears to be happening very strongly in the planning for the new wholesale market in Kasarani, and should be expected as well in the development of wholesale hubs.

Second, it will be important to realize that traders and consumers will continue to be strongly tied to existing wholesale and retail market places. Also, planning and implementing new wholesale and retail investments in urban areas will inevitably run into delays that could at times stretch into years. Just as the traditional system in general will carry the bulk of the fresh produce trade for many years to come, existing market places within this system will continue to carry most of the marketed volume. Improving the infrastructure in these existing market places may therefore provide very valuable "quick wins" as new wholesale and retail investments are developed. Basic improvements in access and exit routes, enforcement of rules on where in the

[14] The Kenya Horticultural Task Force brings together the public sector (Ministries of Local Government, Trade and Industry, and Agriculture (including Horticultural Crop Development Authority (HCDA)), the Nairobi City Council, and the USAID-funded Kenya Horticultural Development Program (KHDP)); and the private sector (Kenya National Federation of Agricultural Producers (KENFAP), the Kenya Horticulture Council (KHC), The Nairobi Central Business District Association, Kenya Private Sector Alliance (KEPSA), and the Fresh Produce Exporters Association of Kenya (FPEAK))

market different types of trade can take place, provision of improved market information and even cold chain facilities, will all pay high dividends while new investments are coming online. Strengthening farmer and trader associations in order to work with them in planning improvements needs to be a key element in any investment strategy. Third, and as briefly mentioned in Vision 2030, careful attention needs also to be paid to the ownership and management structures in existing and new wholesale and retail markets and in wholesale hubs; a greater managerial and planning role for farmer- and trader associations, as appears to be happening recently in Wakulima, could be a major positive development as long as they and city officials work collaboratively to address pressing concerns. Pure public management of market places is increasingly unable to deal with the challenges facing modern rural-urban marketing systems. The planned wholesale market in Kasarani anticipates a large private share in the costs of construction, though the exact mix between public and private is not yet clear. Yet this initiative suggests that private ownership of at least a share of new market infrastructure, and not just private management, may be possible.

Fourth, more clarity is needed regarding the orientation of the new wholesale market towards export or domestic markets. The location of the market in Kasarani, makes it easily accessible to the Jomo Kenyatta International Airport (assuming the planned road bypass is completed); this would make the market at least potentially a viable staging point for export. If exports will play a part in the market's operation, the question then is what the mix will be between regional exports to East African markets, or international exports to Europe? In any case, traders will still have to contend with issues of traceability and standards if the produce is to pass the export standards test.

Finally, a recent collaborative initiative between the private sector and the Municipal Council of Nairobi deserves special mention. Under this initiative, kiosks in some areas of the city, which might formerly have been forcibly removed as part of cleanup efforts, have instead been replaced by modern, slightly more spacious semi-permanent structures with electricity supplies. These structures are still located along key thoroughfares but a bit further from the street than the previous kiosks. The structures appear to be owned by the city but rented to traders. While little formal study of this initiative has taken place, this approach of collaborative problem solving

between public and private sectors, echoed by similar collaboration in the planning of the Kasarani wholesale market, represents a promising new approach as Kenya works to develop a modernized trading sector capable of serving the needs of a rapidly growing economy.

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