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**Consumption and Expenditures on Key Food
Commodities in Urban Households: The Case of
Nairobi**

Mercy Kamau, John Olwande and James Githuku

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Tegemeo Institute

Tegemeo Institute of Agricultural Policy and Development is a Policy Research Institute under Egerton University with a mandate to undertake empirical research and analysis on contemporary economic and agricultural policy issues in Kenya. The institute is widely recognized as a centre of excellence in policy analysis on the topical agricultural issues of the day, and in its wide dissemination of findings to government and other key stakeholders with a view to influencing policy direction and the decision making process. Tegemeo's empirically based analytical work, and its objective stance in reporting and disseminating findings has over the past decade won the acceptance of government, the private sector, civil society, academia, and others interested in the performance of Kenya's agricultural sector.

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Abstract

According to the Kenya Integrated Household Survey of 2005/6, Kenyan households spend the largest proportion of their budget on food. The largest proportion of their food budget is on staples. Although staples continue to be an important constituent of the food basket, their share in the total budget is expected to decline as incomes rise. In contrast, high-value foods such as vegetables and fruits, milk, meat, fish and eggs are expected to receive an increasing share of the household budget. Such diversification in the food basket (decline in staple consumption) is expected from a rise in per capita incomes and a decline in the relative prices of food items which are substitutes for cereals.

In the face of a changing demography and limited resources, updated information on the consumer behaviour and wellbeing of a rapidly growing urban population is crucial for formulation of economic and social protection policies as well as for planning of public and private sector investments. Moreover, in the wake of calls for accountability, studies that provide information to support monitoring and evaluation of the progress and impacts of policies and programmes are necessary. Monitoring food consumption and expenditures in households will provide crucial information on the progress made in meeting the set targets (e.g. Vision 2030 and MDGs).

The objective of this study was to estimate the level and track changes in food consumption and expenditures by households residing in Nairobi. Food consumption and expenditures were disaggregated across food groups with a view to establishing the staple diet and diversity in food consumed, amounts consumed and expenditures on various foods. Changes in budget allocated to food and amounts consumed were compared across income groups as well as within specific food groups.

This paper is based on Tegemeo's urban surveys (2003 & 2009) in which information on consumption and expenditures of households residing in Nairobi was collected. Households in the two samples were grouped into quintiles reflecting their wellbeing. The consumption behaviour of the poor and vulnerable households in the lower quintiles is of particular interest

since the government is committed to halving the proportion of the population suffering from hunger and poverty by 2015.

The results of the study suggest that:

- 1) The marginal increase in income for the poorest group indicates that Kenya may not meet the MDG 1 of halving the poverty levels unless the government and partners intervene to stimulate greater increases in the incomes of low income groups e.g. with income generating projects with higher returns and greater access to credit, information, technology and related services.
- 2) The high and rising proportion of household budget on food is an indication that low income households in Nairobi are increasingly becoming more food insecure. There is therefore need for some form of protection against food insecurity for urban households.
- 3) The reduction in maize consumption in poorer households is attributed to the rising price of maize and stabilising retail food prices would be one way of strengthening food security in urban households. There is also merit in campaigning to increase consumer awareness and consumption of cheaper food alternatives particularly the indigenous food like banana, sweet potato, cassava etc.
- 4) Markets are the major source of food for households in Nairobi. Concerted efforts should therefore be directed towards building reliable and efficient urban commodity and food markets. Other components of the food system must also be addressed in order to ensure delivery of affordable and nutritious food at all times particularly to the poor and vulnerable segments of society.

Key words: Nairobi, households, income groups, food consumption, expenditure

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Table of Contents

Abstract	iii
Acknowledgements.....	v
1. Introduction.....	1
1.1 Background.....	1
1.2 Food Consumption Patterns in Kenya.....	2
1.2.1 Evidence From Past Studies.....	2
1.2.2 Role of Policy.....	4
2. Data and Methods.....	6
2.1 Description of Data	6
2.2 Categorisation of Households into Quintiles.....	7
2.3 Estimation of Food Consumption and Food Expenditure.....	8
2.3.1 Food Expenditure	8
2.3.2 Household Food Consumption.....	9
2.3.3 Tracking Food Consumption and Expenditure Patterns:.....	9
3. Results and Discussions.....	10
3.1 Characteristics of Households	10
3.2 Trends and Patterns in Household Food Expenditure and Consumption.....	14
3.2.1 Food Expenditure	14
3.2.2 Staple Consumption and Expenditure	17
3.2.3 Preference for Different Maize Products.....	23
4. Conclusions and Policy Implications	24
References	26
Appendices	28

List of Tables

Table 1: Sample in Tegemeo urban survey 2009 ^a	6
Table 2: Comparison of characteristics of households falling in each quintile in 2003 and 2009 urban household surveys.....	12
Table 3a: Comparison of household's monthly total and food expenditures (Nominal) in 2003 & 2009	14
Table 3b: Inflation adjusted total and food expenditures (Base February 2009)	15
Table 4: Expenditure on different food groups by quintile (KES per adult equivalent per month)	16
Table 5: Quantity of staple intake (kg per adult equivalent per month)	18
Table 6: Comparison of staple intake between 2003 & 2009	19
Table 7: Household expenditure on staples in KES per month per adult equivalent	20
Table 8a: Comparison of household expenditures (nominal) on staples between 2003 & 2009 ..	21
Table 8b: Inflation adjusted household expenditures on staples foods (Base February 2009)	22
Table 9: Comparison of annual average retail real price (KES per Kg) of main staples in diets of urban households	23
Table 10: Consumption and expenditure on maize products by expenditure quintile.....	23

1. Introduction

1.1 Background

Kenya has a population of 38.6 million people and with an annual growth rate of 3%. 75% of the Kenyan population lives in the rural areas mainly relying on agricultural activities for their food and livelihood while the rest of the population (25%) resides in the urban areas with most (over 39%) living in Nairobi, where they are principally buyers of foodstuffs, rarely producing¹ their own food. The country's urban population is rapidly growing as a result of a high birth rate and high rural-to-urban migration as the rural folk search for employment opportunities and a perceived better life in the urban areas. This changing demography combined with limited resources pose a challenge with regard to economic and social protection policies as well as planning for public and private sector investments.

Approximately 10% of Kenyans are said to be food insecure and upto thirty percent (3 million) of the food insecure² are located in the urban and peri-urban centres, making urban food insecurity and poverty a major concern to policy makers and development agents. Making food available to all Kenyans is one of government priorities and some of the key challenges to food provision include low local supply, post harvest losses, restrictions on food imports and poverty. The government is committed to meeting the Millennium Development Goals one of which is halving the population living in poverty and hunger by 2015. This commitment is echoed in the Kenya's Vision 2030, which provides the policy framework for development and poverty reduction in Kenya. Under the social pillar of the Vision, the government is committed to providing a high quality life for all its citizens by 2030. Other policies that are aimed at improving the food and nutrition security and general well being of Kenyans, for instance the Agricultural Sector Development Strategy (ASDS), the Food and Nutrition Security Policy amongst others, are hinged on this policy framework.

¹ The proportion of urban households who produce food either for home consumption or for the market is said to be increasing but the importance of such own production is low-according to Tegemeo's Urban Survey, only 16% of households in Nairobi practiced urban agriculture and the proportion is lowest amongst the low income groups(7% & 10% in 1st and 2nd quintiles).

² From the last quarter of last year, poor rains (and in some cases total failure) and high food prices resulted to food insecurity to an estimated 10 million people (FEWSNET/WFP/GOK, 2009).

In the face of changing demography and competing claims on the limited resources available, regular and updated information on key indicators are necessary for formulation & implementation of development and social policies and programmes. Such information is crucial for informing the progress that has been made in meeting the set targets in Vision 2030 and the MDGs. Moreover, in the wake of calls for accountability, studies that provide information to support monitoring and evaluation of the impacts of these policies and programmes on the well being of the citizenry are necessary. It is in this light that studies on food consumption and expenditures were deemed necessary.

From consumption and expenditure surveys we are able to associate expenditures with characteristics of the consumers and hence demography. This information enables the identification of groups vulnerable to food and nutrition insecurity and the ways that they can be supported in order to be food secure. Moreover, since the Kenyan urban population is principally a buyer of foodstuffs, rarely producing their own food³, issues like food availability, affordability, adequacy and safety are key considerations for such urban households particularly the poor and the market is expected to play an important role as a source of food for this population. Up-to-date knowledge on consumer behaviour is therefore important for private and public investments in market development.

1.2 Food Consumption Patterns in Kenya

1.2.1 Evidence From Past Studies

The average household size in Nairobi in 1977 was 5.68 (6.6 for poor households) and the total household expenditure was KES 14,184 (8,268, 14,700 & 26,892 for poor, medium and rich households respectively). This is according to results of an analysis of data from an urban food purchasing survey carried out in 1977 ‘food consumption pattern for rural and urban Kenya’. The survey was limited to households earning less than KES 2,500.00 and who comprised 80% of the urban population then (Shah & Frohberg, 1980). According to Shah & Frohberg (1980), all the household categories in Nairobi at the time of the 1977 survey spent the largest proportion of their budget on non-food items. The share of food in the household’s total expenditure was 46,

³ The proportion of urban households who produce food either for home consumption or for the market is said to be increasing but the importance of such own production is low.

37.6 and 27.4 percent for the poor, medium and rich households respectively. The analysis showed that, households' average food expenditure was KES 5,163 (3,816, 5,520 and 7,356 for poor, medium and rich households respectively).

Nearly two decades later (KHIBS, 2005), households were shown to spend the largest proportion of their budget on food. According to the Kenya Integrated Household Budget Survey of 2005/6, poor households in both rural and urban areas spend a larger proportion of their budget on food (74% & 57% respectively). The non-poor households spend 63% & 44%. Even with smaller household size in Nairobi (3.8).

According to the earlier 1977 survey, households allocated the largest share of the food budget to staples, specifically cereals (31.5, 27.4 and 24.3 percent for poor, medium and rich households) while fruits and vegetables took up 12 percent across all groups. Pulses were allocated 3.5, 2.2 and 2.8 percent; meats took 29.3, 33.7 and 34.8 percent while starchy roots made 3.6 and 2.4 percent of the food budget for poor & other households respectively. According to the Kenya Integrated Household Budget Survey of 2005/6, Kenyan households are still spending the largest proportion of their food budget on staples with the poor households in rural and urban areas spent 34% & 29% respectively. This is in contrast to their richer counterparts in rural and urban areas who spent less at 27% & 21% respectively.

A survey conducted by Tegemeo Institute (Muyanga et.al., 1995) showed that staples were an important constituent of household's food basket. The main staples in the diet of urban households in Kenyans then were: maize in form of flour, whole grain, green maize; other cereals like wheat (chapati, mandazi, cake, spaghetti, cereals) and rice. The other staples consumed are Irish potatoes, bananas, sweet potatoes, cassava, sorghum and millet. Two decades ago (1977), households' preference for cereals differed sharply between income groups in Nairobi with poor households allocating an overwhelming proportion of their cereal budget to maize and much less to wheat and rice. Within the cereals food group, the poor, medium and rich households allocated: to maize flour, 83, 70 and 52 percent; to wheat flour, 7, 16 and 25 percent and to rice, 4, 10 and 20 percent respectively of the cereals budget. The average monthly per capita consumption of maize meal in Nairobi then was 7.22kg and was observed to decline with income. 41% of the households received maize grain from their rural homes and less than 5% grew maize in an urban plot.

Although staples continue to be an important constituent of the food basket, their share in the total budget is expected to decline as incomes rise. In contrast, high-value foods such as vegetables and fruits, milk, meat, fish and eggs are expected to receive increasing share of the household budget. Such diversification in the food basket (decline in staple consumption) is expected from an increase in per capita incomes⁴ and the decline in the relative prices of food items which are substitutes for cereals. This has been observed even for very low income groups in India (Mittal, 2006). Consistent with expectations, Muyanga et al., (2005) found that levels of staple consumption (kg) in households residing in Nairobi had fallen by an average of 3% compared with results from a survey carried out in 1995. The largest decline was amongst the poorest households whose consumption declined by 22%. Surprisingly, staple consumption amongst the wealthy increased by 19%. They found that maize continues to be the primary staple although its contribution to total staple consumption declined to 45%. Meanwhile the consumption of wheat had risen particularly amongst the richer segments of the population. The importance of other food groups in the diet and expenditures of urban households in Kenya are further elaborated in Tegemeo's 2005 Conference Proceedings "Integrating Consumers in the Policy and Program Agenda in Kenyan Agriculture".

1.2.2 Role of Policy

One of the critical challenges for African governments to ensure food and nutrition security for all is to keep food prices at tolerable levels particularly for poor consumers. This is especially complicated with the food and economic crises on one hand and the calls for incentives for producers on the other.

From consumer theory we know that food demand is a consequence of price, income and cultural preferences. Food demand is therefore to a large extent policy-driven since policy influences affordability/relative prices as well as the ability and convenience in accessing food. Government interventions affect dynamics in markets and any evidence or information on how policy influences consumption is critical in ensuring food and nutrition security and in informing food production as well as trade. The flip side is that misinformation exacerbates the food insecurity problem by misdirecting government actions/interventions. For example, previously urban

⁴ It is widely recognized in literature that an increase in per capita income is accompanied by a fall in per capita consumption of staple foods.

consumers were erroneously branded as unresponsive to relative price changes between sifted maize flour and the relatively cheaper hammer milled 'posho' (Mukumbu et. al., 1994). Some of the policies pursued by the government in the past encouraged high marketing costs and impeded low cost channels of availing food particularly to low income consumers (Mukumbu et. al., 1994). The government's policy of controlling maize marketing and of subsidizing sifted maize meal is said to have: one, exaggerated the apparent urban consumer preference for the more expensive and less nutritious sifted maize flour; two, elite capture of food subsidies intended for the poor for example, the 1993 government subsidy on sifted maize meal. The government's 2009 subsidy on maize grain was similarly captured by large millers since they were the major ones who could access subsidized grain through the NCPB.

Government interventions may also impede the potential role of imports in ensuring food and nutrition security. Lack of consultations or predictable and transparent rules governing state involvement in markets, for example, changes in import tariff rates and NCPB purchase and sales prices increases uncertainty in the part of the private sector and hence, the costs of food (Kirimi et.al., 2010).

Current efforts by government and partners to improve accessibility to food particularly for poor urban households include: subsidies on maize grain, a food subsidy where poor households and the elderly receive cash to boost their income and a 12.5% increase in the minimum wage. There is a bill in parliament which seeks to improve accessibility by controlling prices of food. Such interventions should be augmented with information before and during their implementation to ensure that they benefit the targeted population. The objective of this study was to inform government's policy and interventions in food and nutrition security by tracking food consumption and expenditures in urban households specifically those residing in Nairobi. Food consumption and expenditures were disaggregated across food groups with a view to establishing the diet and diversity in food consumed, quantities consumed and expenditures on various foods. It establishes and compares levels and changes in the household budget allocation and quantities of foods consumed. Comparisons were made across income groups as well as within specific food groups and policy implications made. In meeting our objectives, the following questions were addressed:

1. What proportion of household budget is spent on food and specific food groups by various income groups that comprise the urban population?
2. What are the consumption levels of various staples by different income groups
3. What are the emerging patterns of food consumption and food expenditure across different income groups that comprise the urban population?
4. What are the policy implications of the observed consumptions and expenditure patterns?

2. Data and Methods

2.1 Description of Data

Data used were from a cross-sectional survey of 821 households in Nairobi and its environs. The households were randomly drawn from the NASSEP IV⁵ frame and were interviewed between June and July 2009. Results from this survey were compared with results from an earlier survey conducted in 2003 in which a sample of 542 households similarly drawn from the NASSEP frame was interviewed between November-December 2003. The samples were stratified according to household income to reflect the socio-economic diversity in urban areas (see Table 1).

Table 1: Sample in Tegemeo urban survey 2009^a

Income category	No. of clusters covered in 2009	No. of clusters covered in 2003	No. of households interviewed in 2009 ^a	No. of households interviewed as % of total
Upper	8	8	83	10
Lower Upper	7	3	94	11
Middle	10	5	180	22
Lower Middle	13	10	237	29
Lower	12	4	227	28
Total	50	30	821	100

^a In 2009 our target was 1000 households. In 2003, the target was 600 households however due to non-responses the sample is of 542 households.

Data were collected on food obtained from three sources: (1) food purchases, including food purchased and consumed away from home; (2) food given to a household member as a gift or as

⁵ In collaboration with the Kenya National Bureau of Statistics

payment for work; and (3) food consumed from home production. Secondary data on retail prices of various foods over the period (2003 - 2009) were also collected.

Details on the Sampling and weighting procedures are in the annex.

Sample Size: Target, actual and response rates

Although the actual sample for the 2009 survey was 20 households in each of the clusters (50 clusters), 22 households were sampled for each cluster to cater for the missed households. The total target was therefore 1100 households. The response rate was 74.64 % resulting to an actual sample size of 821 households. Most of the non-responses were in the high income areas where the main reason was refusal to be interviewed.

2.2 Categorisation of Households into Quintiles

The households were categorized into five groups (quintiles) each containing 20% or a fifth of the total number of households. In the first/previous report on urban consumption and expenditure patterns which was based on a survey carried out in 2003, the quintiles were based on a households' monthly income per adult equivalent. The income was calculated as the sum of wages, salaries, remittances and gifts received by members of a household. This has been the primary means by which households are classified. Income levels, the regular cash receipts by members of a household represent households' ability to purchase goods and services and hence a useful measure of household wellbeing.

There are however, disadvantages associated with reported consumers' income. For example, household income is highly subject to transitory variations due to variations in employment, family unit etc. Because of this transitory loss or gain in income, low income category will include households with temporary loss in income while high income category will include households with temporary gain in income. In addition, incomplete reporting or underreporting of household income is common because respondents may find it difficult to recollect some of their income particularly where there are multiple sources as is the case in developing countries. In other cases households are unwilling to report some of their income e.g. income from illicit trade.

In this study, households were categorized into expenditure quintiles that were based on households' monthly expenditure per adult equivalent. This switch from income to expenditure-based quintiles was driven by the need to have an accurate measure which is comparable to other estimates within and outside Kenya. Consumption is considered to be a comparatively better indicator of family welfare or material well-being particularly in poor families. Compared to other measures, consumption is better reported and less prone to under reporting. It is also less prone to fluctuations due to changes in family status. Household expenditure, which is the cost of goods and services acquired for private use during a survey reference period is considered to be a suitable substitute for household income because it is relatively less variable than household income since consumers may not make long term adjustments to spending if they believe that changes in their income is only temporary. It is also easily divisible into essential categories like food and housing which are direct indications of a household's wellbeing. Household expenditures are considered to be comparatively a more accurate estimate of households' income in developing countries as opposed to asking the household to enumerate the income by source.

In this study therefore, households were categorized into expenditure quintiles that were based on households' monthly expenditure per adult equivalent. The total expenditure included household expenditures on consumables namely, foodstuffs purchased for home consumption, food consumed outside the home and expenses in production of own food; expenses on non-food items like housing, schooling, health, clothing, savings and payment of loans/credit. The recollection period was: the past 30 days for foodstuffs for home consumption and food consumed outside home; twelve months for food production split into two six month periods; the past 30 days for frequent nonfood purchases; and one year for major nonfood expenses.

2.3 Estimation of Food Consumption and Food Expenditure

2.3.1 Food Expenditure

To obtain this estimate, the different food types purchased by the household were enumerated and the monthly expenditure on each food item estimated. The food items have been classified into the commonly known food groups namely: staples, fruits and vegetables, pulses, meat & eggs, dairy products, oils & margarine, and beverages (soft drinks, tea/coffee). Alcohol &

tobacco are placed in a separate category since they are not considered as food. The total monthly expenditure on food was obtained by aggregating expenditures on all food items whilst the total monthly expenditure on each food group was obtained by aggregating expenditures on all food items falling within a group. Per capita expenditure was obtained by dividing these expenditures by the adult equivalents in a household.

We estimated the following indicators:

- Proportion of food expenditure in total household expenditure
- Per capita expenditure of various food groups and the proportion in “food expenditure”.
- Per capita expenditure on individual staple foods and the proportion in “staple expenditure”.

2.3.2 Household Food Consumption

This analysis is limited to the staple food group only. The different types of staple foods consumed in each household were enumerated and the physical quantity of each food item consumed in a month estimated. Staple foods that were purchased, produced by self or received as a gift were included in this estimation. The foods were then aggregated to give total staple consumption. Staple foods consumed outside the home were left out of this estimate because of the difficulties associated with accuracy in conversion of purchased food into physical quantities.

To allow comparisons across households, consumption figures for each household were converted into per capita consumption by dividing the total quantity consumed in a month by the number of adult equivalents.

2.3.3 Tracking Food Consumption and Expenditure Patterns:

Changes in per capita food consumption and per capita food expenditures were tracked by comparing the estimates obtained from the 2009 survey to the estimates that were obtained from an earlier survey in 2003 by Tegemeo Institute (Muyanga et al, 2005). In the 2009 estimate, food items like Irish potatoes were included in the ‘staples’ food group because they are mainly consumed as a staple (as opposed to a vegetable). We also include in this group, cassava, sweet

potatoes, sorghum and millet which are widely viewed as strategic crops in Kenyan because compared to maize and other staples like wheat and rice, they have desirable qualities like high nutrition value (millet), high calorie content (cassava), drought and heat resistant (sorghum) & can produce in depleted soils that are poorly fertilized and dry. With the negative effects of climatic change (variable rainfall, short rainy periods) and depleted soils, these foods will remain cheaper and hence affordable compared with maize, wheat, rice which are grown using conventional methods that depend on predictable rains and expensive inputs.

Absolute figures and percentages are used in describing the changes and differences that have occurred between 2003 and 2009 in consumption of staples. For this comparison, we restricted 'staples' to maize, wheat, rice and bananas. These are the four staples that were included in the 2003 estimates.

3. Results and Discussions

3.1 Characteristics of Households

In 2009 survey, the households are divided into five quintiles based on their total expenditures with the first quintile having the lowest expenditure whilst the fifth quintile had the highest expenditure. The characteristics of the households falling in each of the quintiles are shown in Table 2. We provide for comparison the characteristics of households interviewed in 2003. In this earlier study, the quintile groups were based on household's total income⁶.

The average household size is 4.2 persons and, as expected, household expenditure increases with the household size. The households in the highest quintile are older families with a majority having 4 adults. The number of children ranges from zero to three or more. The households are headed by relatively young adults with the higher quintile having the oldest heads (46 years) and the lowest quintile having the youngest head (34 years). Households in lower quintile have the highest percentage of household heads with just primary school education whilst households in the highest quintile have highest number of household heads with above secondary level education.

⁶ Harmonization was not feasible since expenditure items included in 2003 were fewer (incomplete).

Over thirty percent (30%) of households in the lowest quintile are female headed compared to only twelve percent (12%) in the highest quintile. The 4th quintile group also has a relatively high proportion of female headed households.

Only twelve percent (12%) of the households own the house in which they stay while the rest are hiring. Most house owners are concentrated in the highest quintile (25%). The rent paid increases with the quintile group which perhaps reflects the amenities provided as well as the quality of materials used in flooring, roofing and the walls.

Table 2: Comparison of characteristics of households falling in each quintile⁷ in 2003 and 2009 urban household surveys

Quintile	Lowest		2		3		4		Highest		Average	
	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
Household size(\sum mem)	5.1	5.4	4.6	4.2	4.5	3.7	5.0	3.7	4.9	3.5	4.8	4.2
Adult equivalents (\sum ae)	4.3	4.5	3.7	3.5	3.6	3.1	4.3	3.1	4.1	3.0	4.0	3.5
Fulltime AEs (\sum ftae)	3.3	4.0	2.8	3.1	2.9	2.7	3.7	2.6	3.6	2.6	3.2	3.1
Composition												
No adult (%)	0.0	0.0	0.8	0.0	3.0	0.0	0.0	0.0	0.9	0.0	1.0	0.0
1 adult (%)	10.3	3.9	10.5	7.1	9.0	11.7	11.1	22.9	4.7	30.9	9.5	13.2
2 adults (%)	38.0	50.0	42.5	56.6	44.2	52.3	29.1	39.2	35.3	22.7	38.4	46.9
3 adults (%)	28.9	28.3	32.7	25.0	24.9	22.8	30.2	19.6	22.9	15.5	28.3	23.1
4 adults (%)	22.8	17.8	13.5	11.2	19.0	13.2	29.6	18.3	36.2	30.9	22.8	16.8
0 children (%)	15.7	14.9	26.4	19.4	25.7	34.2	28.4	41.2	34.8	57.7	24.6	24.8
1 child (%)	25.4	10.5	20.7	27.6	31.2	30.1	26.5	28.8	22.7	20.6	25.8	25.7
2 children (%)	20.5	25.4	14.0	31.1	23.1	26.0	25.7	19.6	22.0	11.3	21.1	20.9
3 or more children (%)	38.3	49.2	38.9	21.9	20.0	9.7	19.4	10.5	20.4	10.3	28.5	28.7
Household head												
Age (Yrs)	36.1	39.1	34.9	35.0	37.5	33.7	41.6	37.7	46.4	42.7	39.3	37.0
Education level												
No education	3.8	4.4	2.6	0.0	1.5	3.1	0.0	0.0	3.5	1.0	2.3	1.8
Primary	57.8	49.4	31.3	29.9	20.9	17.3	18.5	15.2	5.6	6.2	30.4	25.7
Secondary	36.4	39.4	54.1	56.3	53.6	56.6	40.6	38.4	30.2	27.8	44.1	46.0
College	1.9	5.6	9.5	10.2	16.7	17.9	28.3	25.8	25.6	20.6	14.5	15.1
University	0.0	1.1	2.5	3.6	7.3	5.1	12.5	20.5	35.1	44.3	8.7	11.3
Female Headed (%)	23.1	15.0	11.9	16.8	21.9	21.4	20.8	21.6	7.0	19.6	17.9	18.7
Dwellings (%)												
Ownership												
Own house	9.1	12.7	19.0	6.1	10.4	7.7	13.4	15.1	26.4	25.0	14.3	11.8
Renting	90.3	82.9	79.1	91.9	87.0	89.3	86.1	82.9	71.6	74.0	84.2	85.5
Free/housed by employer	0.6	4.4	1.9	2.0	2.6	3.1	0.5	2.0	2.0	1.0	1.5	2.7
Value (Rent per month in Ksh)	1,310.0	2,147.2	1,471.0	2,852.7	2,510.0	4,686.1	5,211.4	10,581.8	13,213.8	30,719.6	3,566.7	7,859.6

⁷ Quintiles: Income Quintiles in 2003, Expenditure Quintiles in 2009

Quintile	Lowest		2		3		4		Highest		Average	
	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
Amenities (% Having)												
Electricity		57.2		83.2		89.3		90.8		93.8		81.6
Modern Plumbing		6.1		9.6		20.9		40.1		69.1		24.2
Floor												
Cement	80.0	74.3	82.3	91.8	86.4	87.8	83.7	81.6	67.4	51.5	81.1	80.4
Earthen	18.6	25.7	16.6	6.6	8.0	8.2	4.0	3.3		1.0	10.9	9.9
Ceramic tiles	1.4	0.0	0.8	1.0	4.7	3.6	8.3	11.8	17.9	32.0	5.3	7.1
Wooden	0.0	0.0	0.3	0.5	1.0	0.5	4.0	3.3	14.7	15.5	2.8	2.7
Roofing												
Iron sheet	88.1	71.5	79.8	56.6	70.4	56.1	66.6	57.2	31.0	28.9	71.6	56.6
Roofing tiles	2.9	8.9	6.0	6.6	11.6	7.1	21.7	18.4	50.1	44.3	14.6	13.9
Concrete	5.5	19.0	12.5	35.7	15.7	36.7	10.2	23.0	18.9	26.8	11.8	28.9
Asbestos	0.0	0.6	0.0	1.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.6
Grass thatched	3.6	0.0	1.7	0.0	2.3	0.0	1.5	0.0	0.0	0.0	2.1	0.0
Walls												
Mud	20.2	24.4	13.1	10.2	7.2	8.7	2.2	4.6	0.0	1.0	10.1	10.9
Brick /stone	55.4	40.0	52.9	65.0	68.8	67.2	85.4	77.5	94.3	86.6	68.0	64.9
Wood	6.5	7.8	5.4	3.0	4.6	2.1	1.6	0.7	0.7	0.0	4.3	3.0
Iron sheet	17.9	21.7	22.8	17.3	18.4	16.4	10.8	10.6	5.0	5.2	16.2	15.4
Plaster	0.0	6.1	5.7	4.6	1.2	5.6	0.0	6.6	0.0	7.2	1.5	5.9
Value of assets		11,059.7		20,031.8		55,353.1		198,788.5		708,453.0		143,359.0

Source: Authors' Compilation

3.2 Trends and Patterns in Household Food Expenditure and Consumption.

In this section, household food consumption and expenditures in 2009 are computed and compared with previous research findings by Muyanga et al., (2005).

3.2.1 Food Expenditure

Table 3a: Comparison of household's monthly total and food expenditures (Nominal) in 2003 & 2009

Expenditure Quintile	Total HH			Food			Food as a % of Total		
	2003	2009	Change (%)	2003	2009	Change (%)	2003	2009	Change
Lowest	12,841	13,979	9	3,208	6,876	114	25	49	24
2	11,859	19,117	61	3,900	8,467	117	33	44	11
3	15,852	25,231	59	5,766	10,256	78	36	41	4
4	24,799	40,712	64	7,396	13,964	89	30	34	4
Highest	70,114	140,828	101	17,793	21,934	23	25	16	(10)
Sample Average	27,301	37,830	39	7,536	11,155	48	28	29	2

Notes: The table (3a) indicates a nominal change in household expenditure. Inflation adjusted expenditures are provided in the Table below (3b).

Source: Nominal expenditure on for 2003 was obtained from Tegemeo Conference Proceedings of 2005 pg 80 (for total) and page 145 (for food); Author's Estimation, 2009

The average monthly expenditure for households in Nairobi is KES 14,000 for the lowest quintile group, 19,117 for second quintile, 25,231 for the third quintile, 40,712 for the fourth quintile and 140,828 for the highest quintile. These household expenditures are a good indicator for household incomes for each quintile.

On average, households in Nairobi spend 29% of their total expenditure on food (they spent 28% in 2003). The proportion of total expenditure is lowest (16%) in the highest quintile group and highest (44% - 49%) in the low quintile (first and second), confirming Engel's law that the proportion of income spent on food decreases with income.

On average, households monthly spending on food is KES 11,155, however this increases with income. Expenditure on food is higher than average in the fourth and fifth quintiles and lower than average in the first three quintiles.

Compared with 2003, household's monthly spending (total expenditure) increased by approximately 39%. The increase varied across the quintiles with the greatest increase being recorded in the higher quintiles (59% to 101%) and the smallest increase (9%) recorded in the first quintile.

The proportion of expenditure on food increased for all groups except for the highest quintile where the spending is 10 percentage points less. The first and second quintiles experienced the greatest increase (24 and 11 points respectively) whilst the proportion of total expenditure on food by third and fourth quintiles increased by about 4 points.

Compared to 2003, household total expenditure in real terms declined for all but the highest quintile. The results show a modest three to six percent decline in expenditure for the second, third and fourth quintiles, but a massive 55% decline in for households in the first quintile. This very large decline in the lowest quintile may be partly attributed to an error in the earlier (2003) survey where households belonging to a higher income group may have ended up in the lowest income group. This kind of error is common in reported income if a household received a remittance or gift which boosted its regular income for that year. The fifth quintile experienced an increase of 16% in real expenditure. Conversely, household expenditure on food in real terms is shown to have increased in all but the highest quintile. Food expenditure increased by 21% & 22% for the first and second quintiles respectively and by 5% and 10% for the third and fourth quintiles respectively. These results suggest that with the exception of the highest quintile, Nairobi residents are worse off than they were in 2003 since their incomes as measured by total expenditure declined while expenditure on food increased.

Table 3b: Inflation adjusted total and food expenditures (Base February 2009)

Expenditure Quintile	Total HH			Food		
	2003	2009	Change (%)	2003	2009	Change (%)
Lowest	21,728	13,979	(55)	5,428	6,876	21
2	20,066	19,117	(5)	6,599	8,467	22
3	26,822	25,231	(6)	9,756	10,256	5
4	41,961	40,712	(3)	12,514	13,964	10
Highest	118,636	140,828	16	30,107	21,934	(37)
Sample Average	46,195	37,830	(22)	12,751	11,155	(14)

CPI: 2003 = 59.1; 2009 = 100

Foods in the diet of households in Kenyan can be broadly classified into staples, fruits and vegetables, pulses, dairy products, meat and eggs. Others included as foods are beverages, alcohol and soft drinks. Table 4 shows mean expenditure on each of the nine food groups for each quintile. Expenditures for 2003 are not included since they are incomparable because foods included in 2003 survey are not as comprehensive as those in 2009 survey.

Table 4: Expenditure on different food groups by quintile (KES per adult equivalent per month)

Expenditure quintiles		Lowest	2	3	4	Highest	Sample Average
Staples	Mean	432	614	774	919	1,121	727
	% w/o A & T	32	30	29	25	22	27
	% w A & T	27	24	23	21	13	19
Fruits & Vegetables	Mean	292	476	524	716	1,139	570
	% w/o A & T	21	23	20	20	23	21
	% w A & T	18	19	16	16	13	15
Pulses	Mean	52	64	85	106	108	80
	% w/o A & T	4	3	3	3	2	3
	% w A & T	3	3	3	2	1	2
Dairy products	Mean	176	297	364	560	856	400
	% w/o A & T	13	14	14	15	17	15
	% w A & T	11	12	11	13	10	11
Meats & eggs	Mean	203	334	522	892	1,170	552
	% w/o A & T	15	16	20	24	23	20
	% w A & T	12	13	16	20	14	15
Soft drinks	Mean	34	57	89	148	212	107
	% w/o A & T	2	3	3	4	4	4
	% w A & T	2	2	3	3	2	3
Oil /margarine	Mean	67	96	119	140	192	114
	% w/o A & T	5	5	5	4	4	4
	% w A & T	4	4	4	3	2	3
Others (honey, coffee, tea, sugar)	Mean	105	142	155	161	216	149
	% w/o A & T	8	7	6	4	4	6
	% w A & T	6	6	5	4	3	4
Alcohol /tobacco	Mean	262	452	712	765	3,565	1,052
	% Alcohol	16	18	21	17	42	28
Quintile average	Mean	188	280	353	477	734	370
	% w/o A & T	14	13	13	13	15	14
	% w A & T	12	11	11	11	9	10
Sum of means	Without A & T	1,362	2,080	2,630	3,642	5,014	2,700
	With A & T	1,624	2,532	3,342	4,407	8,580	3,752

w/o A & T: without expenditures on alcohol and tobacco; w A & T: with expenditures on alcohol and tobacco included

Source: Author's Estimation, 2009

On average households spend 27% of their food budget on staples (maize, wheat, rice, banana and potatoes), 21% on fruits and vegetables, 20% on meats and eggs, 15% on dairy products and 3% only on pulses. These estimates do not include expenditures on alcohol and tobacco. On average the monthly per capita budget on food is approximately KES 2,799.00 which translates to an average daily per capita expenditure of US\$1.12. The food budget increases as income increases with poor households in quintile 1 & 2 spending KES 1,362 and 2,080 respectively, which is less than a dollar (\$0.5 & \$0.8) whilst households in higher income groups (4 & 5) spend KES 3,642 and 5,014 (\$1.5 and \$2.0) respectively.

The level of spending and the proportion of food budget spent on each food group varies across the quintiles. Spending by the lowest quintile is distributed as follows: They spend the greatest proportion of their budget on staples (32%) which is the highest proportion to any food group in the sample, followed by fruits and vegetables (21%), meats and eggs (15%) which is the lowest on meats in the sample, dairy products (13%) also the lowest in sample and pulses (4%) the highest in sample. A similar distribution is observed for the second and third quintiles although the actual expenditures vary. In the highest income group, the largest proportion of food budget is spent on meats and eggs (23%), fruits and vegetables (23%). This is followed by staples (22%) and 17% on dairy products. They allocate only 2% to pulses, the lowest in the sample.

3.2.2 Staple Consumption and Expenditure

Staples are the most consumed food group in Kenya. Common staples in the diet of Kenyans residing in urban areas are: Maize (in form of flour, whole grain, green maize, cereals); bananas; Irish potatoes; wheat (chapati, mandazi, cake, spaghetti, cereals); and rice. Other emerging staples are sweet potatoes, cassava, sorghum and millet. Table 5 provides an estimate of the quantity of intake of each staple in a month by consuming households in the different quintiles.

Table 5: Quantity of staple intake (kg per adult equivalent per month)

Expenditure quintiles		Lowest	2	3	4	Highest	Sample Average
Maize products	Mean	4.7	5.2	5.1	4.8	3.8	4.8
	%	33.8	27.4	24.5	20.1	12.9	23.1
Wheat products	Mean	1.9	2.7	4.2	4.5	5.8	3.6
	%	13.5	14.5	20.0	18.9	19.6	17.3
Rice	Mean	1.0	1.5	1.9	2.2	2.2	1.7
	%	7.0	7.7	8.9	9.3	7.4	8.0
Cooking bananas	Mean	2.1	2.8	4.4	5.6	7.3	4.3
	%	14.8	14.9	20.7	23.4	24.5	20.6
Irish /sweet potatoes	Mean	2.8	4.2	4.3	5.6	8.0	4.7
	%	19.9	22.4	20.4	23.6	26.7	22.3
Cassava products	Mean	1.1	1.8	0.5	0.4	2.0	1.2
	%	7.5	9.5	2.6	1.9	6.6	5.7
Millet /sorghum	Mean	0.5	0.7	0.6	0.7	0.7	0.6
	%	3.5	3.6	2.9	2.8	2.3	3.0
	Mean	5.6	7.5	8.7	10.2	13.1	8.6
Sum of Means		14.0	18.8	21.0	23.8	29.8	21.0

Source; Author's Estimation, 2009

Unlike the 2003 study by Muyanga et al., 2005 which confined staples to maize, wheat, rice and bananas, Table 5 includes other staples like Irish potatoes, cassava, sorghum and millet. For comparability, estimates in Table 6 are confined to the original four staples namely maize, wheat, rice and bananas.

The results in Table 5 show that consumption of staples increases with the household income. Monthly per capita consumption of staples in Nairobi ranges from 14 kg to 30 kg and averages at 21 kg. In the first and second quintiles, consumption is lower than the average by 7 kg and 2 kg respectively whilst it is greater than average in the 4th and 5th quintile by 3 kg and 9 kg respectively.

A comparison between maize, wheat, rice and bananas (Table 6) indicate that maize is still the most consumed staple in the low income groups (first three quintiles). These households consume 4.7 kg to 5.1 kg of maize in a month. Potatoes and bananas rank second and third for these households. This is in contrast to the higher quintiles (fourth and fifth) where bananas (5.6 kg & 7.3 kg respectively) and potatoes (5.6 kg & 8.0 kg respectively) are the most consumed staples. These have overtaken wheat and maize which were shown to be most popular for higher

quintiles in 2003 (see table 6). It is important to note that these are estimate of reported consumption i.e. consuming households only.

Table 6: Comparison of staple intake between 2003 & 2009

		Lowest		2		3		4		Highest		Sample Average	
		2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
Maize products	Mean	5.9	4.7	5.6	5.2	5.7	5.1	4.3	4.8	5.5	3.8	5.7	4.8
	%	58.7	48.9	49.1	42.4	46.0	33.0	34.1	28.0	37.5	20.1	45.3	33.4
Wheat products	Mean	2.3	1.9	3.1	2.7	3.5	4.2	4.8	4.5	5.6	5.8	3.8	3.6
	%	22.4	19.5	27.0	22.5	27.8	26.9	37.5	26.4	38.3	30.4	30.6	25.1
Rice	Mean	1.2	1.0	1.6	1.5	1.4	1.9	1.8	2.2	2.0	2.2	1.6	1.7
	%	11.5	10.1	13.6	12.0	11.1	12.0	14.1	13.0	13.8	11.5	12.6	11.6
Cooking bananas	Mean	0.8	2.1	1.2	2.8	1.9	4.4	1.8	5.6	1.5	7.3	1.4	4.3
	%	7.5	21.4	10.4	23.0	15.1	28.0	14.3	32.6	10.4	38.1	11.4	29.8
Sum of Means		10.1	9.7	11.4	12.1	12.5	15.6	12.7	17.1	14.6	19.2	12.5	14.5

Source: Authors' estimation, 2009

Compared with 2003, the decline in per capita maize consumed in lower quintiles maybe attributed to purchases of lower quantities of maize as a result of high maize prices that were prevailing during that period/year. In the highest quintile group the decline may be attributed to the lower expenditures on maize due to an increase in income or/and hence change in preferences. On average, the monthly per capita consumption of staples in Nairobi increased by 2 kg i.e. from 12.5 kg to 14.5 kg. These figures are lower than the 21kg reported in Table 5 because they exclude potatoes, cassava and sorghum/millet. On average, the monthly per capita consumption of maize declined from 5.7 to 4.8 kg (a 16% decrease) and this decline was 21% in the lowest quintile where the monthly per capita consumption of maize declined from 5.9kg to 4.7kg. The greatest decline in per capita consumption was in the highest quintile (30%).

Consumption of wheat and rice is shown to have declined in the first and second quintiles but increased in the higher quintiles. Consumption of bananas greatly increased across all quintiles (a 200% increase on average) with level of consumption increasing with income. The lowest increase (50%) in banana consumption was recorded in lowest quintile and the greatest increase recorded in the highest quintile (386%).

As indicated earlier, in 2009 estimates, the foods included in the “staples” food group has been expanded to include potatoes and bananas which are playing an increasingly important role in the diet of Kenyans. Others included are cassava, sorghums and millets which are said to be drought tolerant and hence a potentially important food coping strategy. These foods are included in Table 7 and not in Table 8 where comparisons with 2003 report are made.

Table 7: Household expenditure on staples in KES per month per adult equivalent

Expenditure quintiles		Lowest	2	3	4	Highest	Sample Average
Maize products	Mean	195	220	218	203	174	206
	%	37	29	25	19	13	24
Wheat products	Mean	128	201	306	363	498	279
	%	24	27	35	35	38	32
Rice	Mean	77	121	170	236	246	160
	%	15	16	19	23	19	18
Cooking bananas	Mean	22	37	61	81	84	57
	%	4	5	7	8	6	7
Irish /sweet potatoes	Mean	53	90	86	100	186	95
	%	10	12	10	10	14	11
Cassava products	Mean	32	40	2	23	85	39
	%	6	5	0	2	6	4
Millet /sorghum	Mean	24	40	34	38	45	36
	%	5	5	4	4	3	4
Table total	Mean	257	384	478	646	986	504
Sum of means		531	750	877	1,043	1,317	872

Notes: The table indicates a nominal change in expenditure. Inflation adjusted expenditures would show the real change in households’ expenditure on different food groups.

On average, household’s monthly per capita expenditure on staples is KES 872, with the first and second quintiles spending less than the sample average whilst the fourth and fifth quintiles spending on staples is higher than average. The results also show that expenditure on each staple increases with the quintile group, except for maize products where the highest quintile spent the least. On average the greatest proportion of the staple budget is on wheat (32%) followed by maize (24%) and rice (18%). These three take 74% of the staple budget. Potatoes and bananas account for 18% of the staple budget whilst cassava & sorghum/millet take only 8%.

Households in the first and second quintiles still spend the greatest proportion of ‘staple budget’ on maize and maize products i.e. 37% and 29% respectively. This is followed by expenditure on wheat products (24% and 27% respectively), rice (15% and 16%), potatoes (10% and 12%), cassava (6% and 5%), bananas (4% and 5%) and lastly sorghum/millet (5%).

The fourth and fifth quintiles spend the greatest proportion of ‘staple budget’ on wheat products (35% and 38% respectively) followed by rice (23% and 19%). Maize comes third (19%) for the fourth quintile followed by potatoes (10%). For the fifth quintile, potatoes rank third (14%) followed by maize and maize products (13%).

Table 8a: Comparison of household expenditures (nominal) on staples between 2003 & 2009

		Lowest		2		3		4		Highest		Sample Average	
		2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
Maize products	Mean	128	195	136	220	131	218	131	203	105	174	126	206
	%	44	46	38	38	34	29	29	23	22	17	32	29
Wheat products	Mean	98	128	133	201	150	306	211	363	255	498	170	279
	%	34	30	37	35	41	41	47	41	54	50	43	40
Rice	Mean	58	77	77	121	69	170	90	236	100	246	79	160
	%	20	18	22	21	19	23	20	27	21	25	20	23
Cooking bananas	Mean	8	22	13	37	20	61	19	81	16	84	15	57
	%	3	5	4	6	5	8	4	9	3	8	4	8
Sum of Means		293	422	359	579	370	756	451	883	477	1001	390	702

Notes: The table indicates a nominal change in expenditure. Inflation adjusted expenditures in Table 8b show the real change in households’ expenditure on staples.

Comparison with 2003 shows that, the average monthly per capita budget on staples increased nominally from KES 390 to 702 (Table 8b). Expenditure on each staple also increased in all the quintiles. However, the samples average proportion of ‘staples budget’ spent on: maize products declined by 3 percentage points from 32% to 29%; the proportion on wheat products declined with 4 percentage points from 44% to 40%; the proportion on rice increased by two percentage points from 20% to 23%; while the proportion on cooking bananas doubled increasing from 4% to 8%. The direction of change however differed across the quintiles. Among the low income groups, the greatest increase is observed in expenditure on maize and cooking bananas. For example in the lowest quintile, the proportion spent on maize and maize products increased from 44% to 46%, while that of rice declined from 20% to 18%.

Table 8b: Inflation adjusted household expenditures on staples foods (Base February 2009)

		Lowest		2		3		4		Highest		Sample Average	
		2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
Maize products	Mean	217	195	231	220	222	218	221	203	177	174	214	206
	%	44	46	38	38	34	29	29	23	22	17	32	29
Wheat products	Mean	167	128	225	201	254	306	357	363	432	498	287	279
	%	34	30	37	35	41	41	47	41	54	50	43	40
Rice	Mean	98	77	131	121	116	170	152	236	170	246	133	160
	%	20	18	22	21	19	23	20	27	21	25	20	23
Cooking bananas	Mean	14	22	21	37	34	61	33	81	28	84	26	57
	%	3	5	4	6	5	8	4	9	3	8	4	8
Sample Mean		495	422	608	579	627	756	763	883	807	1001	660	702

Expenditure on wheat products declined by about 3 to 4 percentage points for all households. These changes within the staple budget can be related to adjustments within households due to relative price changes for these substitutes. Results in Table 9 show that during the same period (2003-2009), the unit price for all staples except bananas increased by over 30%. The greatest increase is observed in wheat and rice, followed by potatoes and then maize. Households are seen to have partially shifted away from the relatively more expensive staples to the cheaper ones.

Complete substitution of relatively expensive staples with the cheaper ones was not observed indicating a strong preference for specific staples like maize. Banana followed by potatoes are the cheaper staple compared with sifted maize meal which is the most popular staple and much cheaper than wheat and rice. According to Table 5 and Table 7, with KES 194/=, a household in the lowest quintile consumes 4.7 kg of maize. With only 11.4% of this budget, the same household is able to consume 2.1 kg of banana and with 27% of this budget the household purchases 2.8 kg of potatoes⁸. The choice by households (particularly those in low quintiles) to consume a more expensive staple like maize may be attributed to a strong cultural driven preference for maize. The results showed households increasing their consumption of the cheaper options for example, banana as evidenced by the increase in per capita consumption and per capita expenditure on this item across all quintiles. We note from Table 9 that unlike other

⁸ Households in lowest quintile purchase 93% of maize consumed, 82% of bananas consumed and 96% of potatoes consumed. The rest of bananas consumed are mainly gifts from friends and relatives.

staples, the retail price of bananas has not changed (increased) over the last seven years which may have encouraged households to consume more bananas.

Table 9: Comparison of annual average retail real price (KES per Kg) of main staples in diets of urban households

Staple	Average Price in 2003 (KES per kg)	Average Price in 2009 (KES per Kg)	Change in Price (%)
Maize Grain	17.96	26.5	32.23
Sifted Maize Flour	23.78	34.5	31.07
Posho ^a Meal			
Wheat Flour	32.78	55.25	40.67
Bread	42.28	80	47.15
Rice (grade II)	35.35	64.9	45.53
Cooking Bananas	33.31	33.5	0.57
Irish Potatoes	21.23	31.7	33.03

Source: Statistical abstracts for 2004 and 2010

3.2.3 Preference for Different Maize Products

Results from this study indicate that maize is still the staple of choice in Nairobi particularly for the lower quintiles. The main types of maize products consumed by urban households in Nairobi are: the sifted maize meal (with varying levels of refinement); less refined ‘posho meal’; green maize; and whole or cracked grain (Muyanga et. al., 2005).

Table 10: Consumption and expenditure on maize products by expenditure quintile

	Quintile	Consumption (kg per adult equivalent per month)			Expenditure (KES per adult equivalent per month)			Real change (%) in expenditure (2003 to 2009)
		2003	2009	Change (%)	2003		2009	
					Nominal	Inflation adjusted		
Maize Meal (sifted)	1	3	4	23	71	119	161	35
	2	4	4	4	100	169	188	11
	3	4	4	-11	102	172	168	-2
	4	4	4	4	92	156	176	13
	5	3	3	-1	89	151	168	12
	Sample Average	4	4	4	91	154	173	12
Maize meal (Posho)	1	2	4	48	40	68	149	121
	2	1	4	72	21	36	150	316
	3	1	5	81	17	28	190	569
	4	1	4	81	14	24	117	389
	5	0	3	96	3	5	80	1456
	Sample Average	1	4	76	19	32	144	347

Notes: The base year used for inflation adjusted expenditures is 2009.

Our estimates (Table 10) show that compared with 2003, there has been a huge increase (76%) in per capita consumption of posho meal. This increase is observed in all quintile groups. The trend in consumption of sifted maize meal is mixed and of lower magnitude (increase of 4% for 2nd and 4th quintile; decline in 3rd and fifth quintile). A surprising finding is that the largest increase in consumption of sifted maize meal is in the lowest quintile. This may be attributed to the subsidy & voucher schemes targeting households in this group. The results show a huge increase in expenditures on all maize products in all quintiles.

4. Conclusions and Policy Implications

Increased household expenditures suggest that incomes for urban household have risen. This increase income is disproportionately higher for the high income groups (59 - 100%) and marginal for the lowest income group (9%). It therefore appears *critical that the government and partners intervene with income generating projects for the low income groups, preferably enterprises with higher returns.*

Low income households are spending a high (44% & 49%) and increasing proportion of their income on food. Between 2003 and 2009, the proportion of household budget spent on food by households in the lowest income group increased by 24%. It is also noteworthy that households in this lower income groups (first three quintiles) spend less than the sample average on all food groups in spite of having larger families. These results imply that *low income households in Nairobi are increasingly becoming more food insecure.* The results suggest that *low quintile groups need some form of protection against food insecurity.*

Maize is the most important staple amongst low quintile households. It is still the most consumed staple with a per capita consumption of 4.7 to 5.2 kg of maize in a month. Potatoes and bananas rank second and third respectively. In the high income groups, bananas and potatoes are the most consumed staple having overtaken wheat and maize which were shown to be most popular in 2003 among high income households. Over the last seven years, the monthly per capita consumption of maize in low income groups declined, in spite of the expenditure on maize increasing. This *reduction in maize consumption is attributed to the rising retail price of*

maize over this period. Stabilising retail food prices is one way of ensuring food security in urban households.

As expected, households in the lowest quintile spend the *greatest proportion of their food budget on staples (32%)* and this is the highest amongst all households.

Although the consumption of the *cheaper staples like banana* increased across all quintiles as evidenced by the increase in per capita consumption and per capita expenditure, households in the first and second quintiles still spend the greatest proportion of ‘staple budget’ on maize and maize products i.e. 37% and 29% respectively. This preference by households in low quintiles for the more expensive staple like maize can be mainly attributed to a strong cultural driven preference. *This suggests that there is need for campaigns to increase consumer awareness and consumption of cheaper food alternatives.* Unlike the case for other staples, the retail price of bananas did not change (increase) and this may have encouraged households to increase its consumption.

Markets are critical in ensuring food is available and accessible to all urban households. Concerted efforts should therefore be directed towards building reliable and efficient urban commodity and food markets. Other components of the food system must also be addressed in order to ensure delivery of affordable and nutritious food at all times particularly to the poor and vulnerable segments of society.

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Appendices

A3 Survey Sample Design

Sample design

The sample design for Urban Consumption Survey (UCS), 2009 by the Tegemeo Institute utilized a two stage cluster sampling methodology. The first stage involved sampling of Enumeration Areas (EAs), which were the primary sampling units (PSUs) for the survey, from a master sampling frame, while the second stage involved selection of households.

Sampling Frame

The sample for the (UCS), 2009 was drawn from the National Sample Survey and Evaluation (NASSEP) IV sampling frame, which was developed in 2002 based on the 1999 Population and Housing Census. The sampling frame is multi-purpose in nature and was designed to provide estimates for various surveys. The frame is continuously updated.

Nairobi is one of the 8 provinces in the administrative structure of the country. The administrative hierarchy starts from the provinces then districts, divisions, locations and finally sub locations. During the 1999 census, Nairobi was both a province, a district and entirely urban. Prior to 1999 population census, each sub-location was subdivided into small units called Enumeration Areas (EAs) for the purpose of the census. Nairobi province had 4,776 EAs covering all the socio-economic classes.

The NASSEP IV frame followed a multi stage cluster sampling format with first level stratification being the district or sub strata by socio economic categories. The first stage involved selection of Primary Sampling Units (PSUs), which were the EAs, using probability proportional to size (PPS) method. The second stage involves the selection of households for various surveys. EAs were selected on the basis of one measure of size (MOS), defined as the ultimate cluster with an average of 100 households, with a minimum of 50 and maximum of 149 households. Nairobi has a total of 108 clusters of which 2 are non-operational.

During the creation of NASSEP IV master sample, it was observed that six major urban areas, viz. Nairobi, Mombasa, Nakuru, Eldoret, Kisumu and Thika had a lot of variation across their populations. As a result, the areas were stratified to control for the apparent variation. The stratification was based on socio-economic characteristics of the population. The following five strata thus resulted:

- (1) Upper
- (2) Second Upper
- (3) Middle
- (4) Lower Middle
- (5) Lower socio-economic categories.

The UCS 2009 sample was drawn from the five socio economic strata in Nairobi in order to capture all the important variables for the study.

Sample size, survey domains and sample selection

Sample size and survey domain

The UCS 2009 was aimed at providing the estimates for Nairobi district/province. Therefore, the domain of the study is Nairobi province. A sample size of 1,000 households was pre-determined in order to provide estimates for Nairobi as an urban area. The power allocation method was used to distribute the sample across the five socio-economic strata. The method was adopted instead of a proportional allocation so as to have adequate sample in the smaller strata. The design of the study was to have a uniform sample of 20 households per cluster, resulting into a total of 50 clusters. The distribution of the sample is shown in Table A1.

Table A1 : Sample Distribution

Serial number	Stratum	Estimated total No. of households (1999)	No. of clusters	No. of selected households
1	Upper	26,956	8	160
2	Lower Upper	17,800	7	140
3	Middle	73,116	10	200
4	Lower Middle	313,215	13	260
5	Lower	208,395	12	240
Total		639,482	50	1,000

Sample Selection**1. Selection of clusters**

The selection of the clusters was done systematically using the Equal Probability Selection method (EPSEM). Since NASSEP IV was developed using PPS method, the resulting sample of clusters was expected to retain its properties. The selection of the clusters was done independently within each stratum.

2. Selection of Households

From each of the selected cluster, 20 households were selected systematically, with a random start. Selection of the households was accomplished using the following procedure.

Let L be the total number of households listed in the cluster; let R be a random number between $(0, 1)$ [Random numbers are different and independent from cluster to cluster]; let n be the number of households to be selected in the cluster; let $I = L/n$ be the sampling interval.

(1) The first selected sample household is k (k is the serial number of the household in the listing) if and only if $(k-1)/L < R \leq k/L$

(2) The subsequent selected households are those having serial numbers:

*$k + (j-1)*I$, (rounded to integers)*

for $j = 2, 3, \dots n$;

The systematic sampling method was adopted as it enables the distribution of the sample across the cluster evenly and yields good estimates for the population parameters. Selection of the households was done at the office and assigned to the field teams.

3. Selection of the respondents

The UCS survey targeted the head of the household or, in absence of the head, the most knowledgeable person within the household.

Estimation Procedures

Weighting the Sample Data

The resulting sample was not self weighting owing to the unproportional allocation of the sample within the strata. Weighting was therefore necessary to take account of the selection probabilities.. The weights were developed using the design weights of the clusters, the response levels and the number of clusters in the study. In the computation process, adjustment were made for cluster and household non-response. The mathematical relation is given as follows:

$$W_{hi} = D_{hi} \times \frac{S_{hi}}{I_{hi}} \times \frac{C_h}{c_h}$$

where,

W_{hi} = Overall cluster weight for the i-th cluster in the h-th stratum

D_{hi} = Sample cluster design weight obtained from cluster selection probabilities for the i-th cluster in the h-th stratum

S_{hi} = Number of listed households in the i-th cluster in the h-th stratum

I_{hi} = Number of responding households in i-th cluster in the h-th stratum

C_h = Number of operating clusters in h-th stratum

c_h = Number of selected clusters in the h-th stratum

The weights were applied to each individual item to obtain estimates on any given variable in a specified domain or category.

Weights were first developed for households per cluster and then the same weights were applied to individuals within the cluster. These provided the aggregate weights and used for estimation of totals.

Normalizing weights:

Normalization of weights was done independently for households and individuals. The aggregate weights were normalized for the whole sample so that the total number of weighted cases is equal to the number of un-weighted cases.

Normalized weights have a mean of 1.0 and are used to avoid generating incorrect standard errors and confidence intervals and are valid for estimation of proportions and means at any aggregation level. However, they are not valid for estimation of totals.

Estimation of the Population Parameters

The estimates for the population indicators may be proportions, ratios (means) or totals. The estimation process involves multiplication of the weighting factor with the sample value and summing up the products.

The estimates could include totals and ratios. In the estimation of totals, sample weights were applied to obtain national and domain totals using the expression:

$$\hat{Y} = \sum W_{hi} Y_{hij}$$

where

\hat{Y} = estimate of the total of the variable Y;

W_{hi} = weight of the i-th cluster in the h-th domain.

Y_{hij} = observed value of the variable Y in the h-th domain in the i-th cluster on the j-th individual or household

For a ratio estimate, the estimates for Y and X will be weighted before the estimation of the ratio using the expression:

$$R = \frac{\hat{Y}}{\hat{X}}$$

Estimation of Sampling Errors

Estimates from the sample are subject to sampling and non-sampling errors. Sampling errors are usually controlled through the sample design while the latter are not easy to control since they arise from sources on which the sampling process has no control. These include failure of the enumerator to locate a respondent for interview, mistakes in recording the response from a respondent, mistakes during the data entry process and other causes which are unrelated to the design. However, the sample selected for the survey is one of the many possible samples that would come up in separate sample selection processes from the population. Estimates based on different samples from the population would have differences associated with the selections. The variation observed in different independent selections of samples amount to sampling errors. As a measure of these errors, the square root of the standard deviation of the estimates from the survey provides a measure of the sampling errors of the sample design.

Since the sampling design is not of simple random in nature, variance estimation tends to be complicated due to the need to take care of the complexity of the design. In the estimation of the standard errors of the population parameters, the ultimate cluster method of variance estimation is to be used. This is considered applicable because the variability of weights within the strata is not significant.

Table A2: Items included in computing household expenditures

Components in Total Household Expenditure	Recall Period in Tegemeo's Institute Survey	Recall period KIHBS
1. Expenses on foodstuffs purchased for home consumption	Past 30 days	7 day recall
2. Expenses for food consumed outside home	Past 30 days	7 day recall
3. Expenditure on own produced food	Captured in two periods of 6 months covering the past 12 months.	?
4. Expenses on other items not food	a) Past 30 days for frequent purchases and b) Past one year for major expenses like school fees and repairs.	One month One year
Components in Total Food Expenditure		
1. Expenses on food consumed in the home	Past 30 days	
2. Expenses on food consumed outside home	Past 30 days	
3. Cost of food (inference) from own production	Captured in two periods of 6 months covering the past 12 months.	

Table A3: Comparison between minimum wage in Nairobi and retail price for maize (Grain & Flour)

Gazetted Average Monthly* Basic Minimum Wages: Urban Areas (Nairobi)			
*Excluding House Allowance		Annual Average prices	
Year	Wage (KES)	Price of 2 Kg Maize	Price of 2kg Maize
		Flour (KES)	Grain (KES)
1998	4241	48	36
1999	4538	48	37
2000	4809	53	42
2001	5172	48	36
2002	5534	38	27
2003	6142	48	36
2004	6818	55	42
2005	7295	54	41
2006	8171	54	42
2007	8171	48	38
2008	8171	69	52