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Consumption and Expenditures on Key Food Commodities in Urban Households: The Case of Nairobi[1]

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Executive Summary

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 with the poor in rural and urban areas spending 34% & 29% respectively while their richer counterparts in rural and urban areas spent 27% & 21% respectively. 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.

Total Expenditure and Food Expenditure

On average, the households' monthly budget is: KES 14,000 for the lowest quintile, 19,117 for second quintile, 25,231 for the third quintile, 40,712 for the fourth quintile and 140,828 for the highest quintile. Household expenditures recorded a nominal increase of 39% between 2003 and 2009 with the greatest increase being recorded in the higher quintiles (59 to 101%) and just a marginal increase recorded for the lowest quintile (9%). However, in real terms households' total expenditure actually declined by 22% with the greatest decline recorded in the lowest quintile (55%). Only the highest quintile recorded an increase in total expenditure (16%). Our conclusion is that over the last seven years (2003 – 2009), the real incomes for urban household in Nairobi declined with the poorest experiencing the greatest decline whilst only the highest income group experienced an increase in income.

Low income households are spending a high (44% & 49%) and increasing proportion of their income on food. The proportion of household budget spent on food by households in the lowest income group increased by 24%. In nominal terms, between 2003 and 2009 household expenditure on food seem to have increased by over 75% for the first four quintiles and more than 100% for the lowest quintiles. In real terms however, household spending on food increased for all but the highest quintile with the greatest increase of 21 to 22% recorded in the lowest two quintiles. In contrast, expenditures on food declined by 37% in the highest quintile. 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 suggest that low income households in Nairobi are increasingly becoming more food insecure.

On average, the household food budget is distributed as follows: 27% on staples (maize, wheat, rice, banana and potatoes), 21% on fruits and vegetables, 21% on meats and eggs, 15% on dairy products and only 3% on pulses. There are however differences between the income groups. As is expected, households in the lowest quintile spend the greatest proportion of their food expenditure on staples (32%) and this was the highest amongst all households. The actual amount spent on each food group increases with the income level. However, households in the lower income groups (first three quintiles) spend less than the sample average on all food groups which may have implications on their food security and health.

Consumption of staples

The average monthly per capita consumption of staples by Nairobi residents is 21kg but ranges between 14 kg and 30 kg and increases with the household income. Consumption is lower than the average in the first and second quintiles (lower by 7 kg and 2 kg respectively) and is greater than average in the 4th and 5th quintile (higher by 3 kg and 9 kg respectively). Maize is the most consumed staple amongst low quintile households whilst Irish potatoes (followed by bananas) are the most consumed amongst the highest quintiles.

Compared with 2003, the consumption of maize declined by 21% from 5.9 to 4.7 kg per capita per month in the lowest quintiles and by 30% in the highest quintile. This reduction in maize consumption in poorer households may be attributed to the rising retail price of maize over this period. This decline seems to have been compensated with mainly cooking bananas and lesser by wheat products or rice. Consumption of bananas greatly increased across all quintiles although the greatest increase is in the highest quintile (386%) and the lowest increase (130% & 163%) in the lowest quintiles.

In nominal terms, the average monthly per capita budget on staples seems to have increased by 80% from KES 390 to 701 with expenditures on staple increasing across all the quintiles. In real terms however, the average budget on staples increased by only 6% from KES 660 to KES 701 with the low quintiles (1 & 2) cutting back their per capita spending on staples and higher quintiles increasing the spending on staples. Across all quintiles the average per capita expenditure on maize declined while per capita expenditure on cooking bananas increased.

As maybe expected, the poorer households spend the greatest proportion of 'staple budget' on maize and maize products i.e. 37% and 30% respectively. This is followed by expenditure on wheat products

(24% and 26% respectively), rice (15% and 16%), potatoes (10% and 12%), cassava (6% and 5%), bananas (4% and 5%) and lastly sorghum/millet (5%). In contrast, households in the fourth and fifth quintiles spend the greatest proportion of 'staple budget' on wheat products (35% and 39% respectively) followed by rice (23% and 19%). For households in the fourth quintile maize comes third (20%) followed by potatoes (10%) in the fourth place. For the fifth quintile potatoes rank third (14%) followed by maize and maize products (13%).

Banana followed by potatoes are a relatively cheaper staple compared with popularly consumed staples like maize and much cheaper than wheat and rice. Maize however, remains the staple of choice particularly for the lower quintiles. This preference by households (particularly those in low quintiles) to consume the relatively more expensive[2] staple like maize may be attributed to tradition. However, households are increasingly consuming more of the cheaper options e.g. banana as evidenced by the increase in per capita consumption and per capita expenditure on this item across all quintiles. We note that unlike other staples, the retail price of bananas not changed (increased) over the last seven years. This may have encouraged households to consume more bananas.

Compared with 2003, there has been a huge increase in consumption of 'posho' maize meal in all quintile groups and particularly in the higher quintiles. Surprisingly, the greatest increase in consumption of sifted maize meal is in the lowest quintile. This may be attributed to the food subsidy schemes targeting households in this group during the food crises.

Conclusions and Recommendations

1) The decline in real income particularly 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 households' food expenditure and the proportion of household budget on food particularly for lowest quintile is an indication that low income households in Nairobi are increasingly becoming more food insecure. There is therefore need 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

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[2] With KES 194/=, a household in the lowest quintile consumes 5.7 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 potatoes[2].

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.

1.   Introduction

1.1 Background

Kenya has a population of 38 million people and with a growth rate of 3% per annum. 75% of the Kenyan population lives in the rural areas mainly relying on agricultural activities for their food and livelihood. On the contrary, the Kenyan urban population is principally a buyer of foodstuffs, rarely producing their own food. The country's urban population is rapidly growing as a result of: 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. In the face of a changing demography and limited resources available, updated information on the consumer behaviour and wellbeing of this growing urban population is crucial for formulation of economic and social protection policies as well as for planning of public and private sector investments.

10 % of Kenyan population is said to be food insecure and thirty percent (3 million) of the food insecure[3] 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 which includes halving the population that is in poverty and hunger by 2015. Kenya's Vision 2030 provides the policy framework for development and poverty reduction in Kenya. Under the social pillar, the government is committed to providing a high quality life for all its citizens by 2030. Other policies that are aimed at improving the well being of Kenyans are hinged on this policy framework including the Agricultural Sector Development Strategy (ASDS), the Food and Nutrition Policy amongst others.

Studies on urban food consumption and expenditures by Tegemeo Institute were necessitated by the high demand for evidenced-based development policy making. In the face of changing demography and competing claims on the limited resources available, regular updates of key indicators are necessary for the formulation & implementation of development and social policies and programmes. Moreover, in the wake of calls for accountability, studies that provide information to support monitoring and evaluation of the progress and impacts of these policies and programmes on the well being of its citizenry were necessary.

Monitoring food consumption and expenditures for households will provide crucial information on the progress that has been made in meeting the set targets (Vision 2030 & MDGs). From consumption and expenditure surveys we are able to associate expenditures with characteristics of the consumers and hence demographic and to identify the characteristics of vulnerable groups. Moreover, the Kenyan urban population is principally a buyer of foodstuffs, rarely producing their own food[4]. Issues like food availability, affordability, adequacy and safety are key considerations for such urban households

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[3] 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).

[4] 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.

particularly the poor and the market is expected to play an important role as a source of food for the urban 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: Evidence from past studies

According to the Kenya Integrated Household Survey of 2005/6, Households in Kenya spend the largest proportion of their budget on food. According to this survey, poor households in both rural and urban areas spend a larger proportion of their budget on food (74% & 57% respectively) compared to non-poor households (63% & 44% respectively). Kenyan households spend the largest proportion of their food budget on staples with the poor in rural and urban areas spending 34% & 29% respectively while their richer counterparts in rural and urban areas spent 27% & 21% respectively. A survey conducted by Tegemeo Institute around the same period showed that staples were an important constituent of household's food basket. The main staples in the diet of urban households in Kenyans were: Maize in form of flour, whole grain, green maize; other cereals like Irish potatoes, wheat (chapati, mandazi, cake, spaghetti, cereals) and rice. The other staples consumed are bananas, sweet potatoes, cassava, sorghum and millet.

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 incomes[5] 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).

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 rich 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".

The objective of this study was to track 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 the budget allocation and amounts consumed were compared across income groups as well as within specific food groups and policy implications made. In meeting our objectives, the following questions were addressed:

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[5] 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.

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 research findings?

2. Methodology

2.1 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 they 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 it 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 expenses on food production split into two six month periods; the past 30 days for frequent nonfood purchases and one year for major nonfood expenses.

2.2 Estimation of food consumption and food expenditure

i) Food Expenditure

To obtain this estimate, the different food types purchased by the household were numerated 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& and 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".

ii) Household Food Consumption

This analysis is limited to the staple food group only. The different types of staple foods consumed in each household were numerated 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.

iii) 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 foods for Kenyans because compared to maize and other staples, they are drought resistant & can produce in depleted soils (KARI reports).

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.

2.3 Description of Data

Data used were from a cross-sectional survey of households in Nairobi and its environs. A random sample of 823 households was drawn from the NASSEP IV[6] frame and the households were interviewed between June-July 2009. Results from this survey were compared with results from an earlier survey conducted in 2003 in which a random sample of 542 households were similarly drawn from the NASSEP frame and the households 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

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 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.

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[6] In collaboration with the Kenya National Bureau of Statistics

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. One of the reasons was that the houses had been converted into offices or in the process of conversion to flats or offices.

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 the Table 1. We provide for comparison the characteristics of households interviewed in 2003. In this earlier study, the quintile groups were based on household's total income[7].

The average household size is 4.2 persons per household and as expected the expenditure increases with the household size. The households in the highest quintile are older families with 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.

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 seems to have a high number 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 high quintile (35%). 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.

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

Table 2: Comparison of Characteristics of Households Falling in Each Quintile[1] 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

Amenities (% Having)

Amenities (% Having)	2003 Income Quintiles[1]						2009 Expenditure Quintiles[1]					
	Q1	Q2	Q3	Q4	Q5	All	Q1	Q2	Q3	Q4	Q5	All
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	82.3	86.4	83.7	67.4	81.1	74.3	91.8	87.8	81.6	51.5	80.4
Earthen	18.6	16.6	8.0	4.0	4.0	10.9	25.7	6.6	8.2	3.3	1.0	9.9
Ceramic tiles	1.4	0.8	4.7	8.3	17.9	5.3	0.0	1.0	3.6	11.8	32.0	7.1
Wooden	0.0	0.3	0.5	1.0	4.0	2.8	0.0	0.5	0.5	3.3	15.5	2.7
Roofing												
Iron sheet	88.1	79.8	70.4	66.6	31.0	71.6	71.5	56.6	56.1	57.2	28.9	56.6
Roofing tiles	2.9	6.0	11.6	21.7	50.1	14.6	8.9	6.6	7.1	18.4	44.3	13.9
Concrete	5.5	12.5	15.7	10.2	18.9	11.8	19.0	35.7	36.7	23.0	26.8	28.9
Asbestos	0.0	0.0	1.0	0.0	0.6	0.0	0.6	1.0	0.0	1.3	0.0	0.6
Grass thatched	3.6	1.7	2.3	0.0	0.0	2.1	0.0	0.0	1.5	0.0	0.0	0.0
Walls												
Mud	20.2	13.1	7.2	2.2	0.0	10.1	24.4	10.2	8.7	4.6	1.0	10.9
Brick/stone	55.4	52.9	68.8	85.4	94.3	68.0	40.0	65.0	67.2	77.5	86.6	64.9
Wood	6.5	5.4	4.6	1.6	0.7	4.3	7.8	3.0	2.1	0.7	0.0	3.0
Iron sheet	17.9	22.8	18.4	10.8	5.0	16.2	21.7	17.3	16.4	10.6	5.2	15.4
Plaster	0.0	5.7	1.2	0.0	0.0	1.5	6.1	4.6	5.6	6.6	7.2	5.9
Value of assets							11,059	20,031	55,353	198,788	708,453	143,359

Source: Authors Compilation

[1]Quintiles: Income Quintiles in 2003, Expenditure Quintiles in 2009

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 Household expenditure			Food expenditure			Proportion (%) of food to total expenditure (2003)		
	2003	2009	Change (%)	2003	2009	Change (%)	2003	2009	Change
Lowest	12,841	13,979	8.9	3,208	6,876	114.3	25.0	49.2	24.2
2	11,859	19,117	61.2	3,900	8,467	117.1	32.9	44.3	11.4
3	15,852	25,231	59.2	5,766	10,256	77.9	36.4	40.6	4.3
4	24,799	40,712	64.2	7,396	13,964	88.8	29.8	34.3	4.5
Highest	70,114	140,828	100.9	17,793	21,934	23.3	25.4	15.6	(9.8)
Sample Average	27,301	37,830	38.6	7,536	11,155	48.0	27.6	29.5	1.9

Notes: Table 3a indicates a nominal change in household expenditure. Inflation adjusted expenditures are provided in the Table 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

Table 3a shows that the average monthly expenditure for households in Nairobi was 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.

Compared with 2003, household's monthly spending (total expenditure) increased nominally by approximately 39%. The increase is shown to have varied across the quintiles with the greatest increase being recorded in the higher quintiles (59 to 101%) and the smallest increase recorded in the first quintile group (9%) (Table 3a). In real terms, households' total expenditure declined by an average of 22% (Table 3b). This decline occurred in all but the highest quintile which is shown to have had a 16% increase. The greatest decline of 55% in household expenditure was registered in the lowest quintile. Since household expenditures are good indicators for household incomes we can conclude that over the last seven years (2003 – 2009), the income for urban household in Nairobi declined with the poorest experiencing the greatest decline whilst only the highest income group experienced an increase in income.

On average, households in Nairobi spend 30% of their total expenditure on food (they spent 28% in 2003). As is expected the proportion spent on food decreases with income. It is lowest (15.6%) in the highest quintile group and highest (44 - 49%) in the low quintile (first and second).

On average, households residing in Nairobi spend KES 11,155 on food in a month (Table 3a). However the expenditure on food is higher than average in the fourth and fifth quintiles and lower than average in the first three quintiles.

The proportion of expenditure spent on food increased for all groups except for the highest quintile where the spending is 10 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 with 2003, nominal expenditures are shown to have increased by an average of 48% and by over 100% for the first and second quintiles. In real terms though, the expenditures on food generally declined by 14% (Table 3b). Quintile specific information indicates that household food expenditures increased for all but the fifth quintile with greatest increase of 22 & 21% registered in the first and second quintiles.

Table 3b: Inflation Adjusted Total and Food Expenditures (Base February 2009)

Expenditure	Total HH			Food		
Quintile	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)

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 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 Avg
	Mean	432.0	614.1	774.1	918.9	1,120.5	727.2
	% w/o A & T	31.7	29.5	29.4	25.2	22.3	26.9
staples	% w A & T	26.6	24.3	23.2	20.9	13.1	19.4
	Mean	292.4	476.5	524.3	715.7	1,139.4	570.2
fruits & vegetables	% w/o A & T	21.5	22.9	19.9	19.7	22.7	21.1
	% w A & T	18.0	18.8	15.7	16.2	13.3	15.2
	Mean	52.2	64.3	84.6	106.2	108.0	79.7
pulses	% w/o A & T	3.8	3.1	3.2	2.9	2.2	3.0
	% w A & T	3.2	2.5	2.5	2.4	1.3	2.1
	Mean	175.8	297.4	363.8	559.6	855.9	400.0
dairy products	% w/o A & T	12.9	14.3	13.8	15.4	17.1	14.8
	% w A & T	10.8	11.7	10.9	12.7	10.0	10.7
	Mean	202.9	333.9	521.6	892.1	1,170.1	552.2
meats & eggs	% w/o A & T	14.9	16.1	19.8	24.5	23.3	20.5
	% w A & T	12.5	13.2	15.6	20.2	13.6	14.7
	Mean	33.9	56.5	88.5	147.6	211.8	106.7
soft drinks	% w/o A & T	2.5	2.7	3.4	4.1	4.2	4.0
	% w A & T	2.1	2.2	2.6	3.3	2.5	2.8
	Mean	67.4	95.8	119.0	140.4	191.7	114.4
oil /margarine	% w/o A & T	4.9	4.6	4.5	3.9	3.8	4.2
	% w A & T	4.1	3.8	3.6	3.2	2.2	3.0
	Mean	104.9	141.8	154.5	161.1	216.4	149.1
others (honey, coffee, tea, sugar)	% w/o A & T	7.7	6.8	5.9	4.4	4.3	5.5
	% w A & T	6.5	5.6	4.6	3.7	2.5	4.0
	Mean	262.2	451.9	711.8	765.2	3,565.5	1,052.4
alcohol /tobacco	% Alcohol	16.1	17.8	21.3	17.4	41.6	28.0
	Mean	187.5	279.8	353.0	477.3	733.5	370.5
Quintile Average	% w/o A & T	13.8	13.5	13.4	13.1	14.6	13.7
	% w A & T	11.5	11.1	10.6	10.8	8.5	9.9
Total	Without A & T	1,361.5	2,080.3	2,630.4	3,641.7	5,014.0	2,699.6
	With A & T	1,623.7	2,532.2	3,342.2	4,406.9	8,579.5	3,752.0

Notes: w/o A & T means without expenditures on alcohol and tobacco; w A & T means 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, 21% 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 the income level increase where the poor households in quintile 1 & 2 spend less than a dollar (0.5 & 0.8 respectively) whilst households in higher income groups (5 & 5) spend 1.5 and 2.0 dollars 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 as follows: they spend the greatest proportion of their budget on staples (32%) which is the highest in the sample, followed by expenditure on fruits and vegetables (22%), meats and eggs (15%) – the lowest in sample, and dairy products (13%) – lowest in sample and pulses (3.8%) – higher in sample. A similar trend 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%) and fruits and vegetables (23%). This is followed by staples (22%) and 17% on dairy products.

With alcohol and tobacco included in food expenditure, the lowest income group has the lowest food budget and lowest proportion to the total expenditure spent on food compared with all other households.

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. Others are sweet potatoes, cassava, sorghum and millet. Table 5 provides an estimate of consumption of each staple by households in different quintiles.

Table 5: Consumption of Staples in kg per adult equivalent per month

Expenditure quintiles		Lowest	2	3	4	Highest	Sample Avg
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 (Muyanga et al.,) which confined staples to maize, wheat, rice and bananas, Table 5 includes other staples like Irish potatoes, cassava, sorghum and millet. For comparability, the consumption estimates in Table 6 are confined to the original four staples.

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

Maize is still the most consumed staple in the low income groups (first three quintiles). These households consume 4.7 kg to 5.2 kg of maize in a month. Potatoes and bananas rank second and third. In the fourth and fifth quintiles, bananas (5.6 kg & 7.3 kg respectively) and potatoes (5.6 kg & 8.0 kg

respectively) are the most consumed staples having overtaken wheat and maize which were shown to be most popular in 2003 (see Table 6).

Table 6: Comparison of staple consumption between 2003 & 2009

		Lowest		2		3		4		Highest		Sample Avg	
		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	45.32	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	30.62	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; Author' s Estimation, 2009

Compared with 2003, for lower quintiles, this decline is probably due to the households purchasing lower quantities of maize as a result of high maize prices. In highest quintile group the declined may be attributed to the lower expenditures on maize due to changes in preferences. the monthly per capita consumption of staples increased by 2 kg i.e. from 12.5 kg to 14.5 kg. These figures are lower than 21kg (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). In the lowest quintile, the monthly per capita consumption of maize declined by 21% (from 5.9kg to 4.7kg). per capita consumption in the highest quintile declined by 30%.

Consumption of wheat and rice declined in the first and second quintiles but increased in the higher quintiles. Consumption of bananas greatly increased across all quintiles (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%).

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

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 8a & 8b where comparisons with 2003 report are made.

Expenditure quintiles		Lowest	2	3	4	Highest	Sample Avg
Maize products	Mean	194.7	220.4	217.5	203.2	173.9	205.5
	%	36.6	29.4	24.8	19.5	13.2	23.6
wheat products	Mean	128.2	200.5	306.4	363.1	497.7	279.1
	%	24.1	26.7	34.9	34.8	37.8	32.0
rice	Mean	77.2	121.2	170.3	235.5	245.9	159.9
	%	14.5	16.2	19.4	22.6	18.7	18.3
cooking bananas	Mean	22.2	37.0	61.3	81.0	83.5	57.0
	%	4.2	4.9	7.0	7.8	6.3	6.5
irish /sweet potatoes	Mean	53.0	90.0	85.9	99.7	185.7	95.4
	%	10.0	12.0	9.8	9.6	14.1	10.9
cassava products	Mean	31.6	40.4	1.6	23.0	85.0	39.1
	%	5.9	5.4	0.2	2.2	6.5	4.5
millet /sorghum	Mean	24.5	40.0	34.1	37.7	45.1	35.7
	%	4.6	5.3	3.9	3.6	3.4	4.1
Table Total	Mean	256.7	384.0	478.2	645.7	985.7	503.9
Sum of Means		**531.4**	**749.6**	**877.2**	**1043.2**	**1316.8**	**871.7**

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 was KES 872, with the first and second quintiles spending less than average whilst the fourth and fifth quintiles spending higher than average. The results also show that expenditure on each staple increases with income (quintile). On average households residing in Nairobi spend the greatest proportion of their staple budget on wheat (32%) followed by maize & rice. These three take 73% of the staple budget. Potatoes and bananas consume 17% of the staple budget whilst cassava & sorghum/millet take only 8%.

Households in the first and second quintiles spend the greatest proportion of 'staple budget' on maize and maize products i.e. 37% and 30% respectively. This is followed by expenditure on wheat products (24% and 26% 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 the highest quintiles spend the greatest proportion of 'staple budget' on wheat products (35% and 39% respectively) followed by rice (23% and 19%). Maize comes third (20%) 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 Avg	
		2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
Maize products	Mean	128.1	194.7	136.3	220.4	131.3	217.5	130.8	203.2	104.8	173.9	126.3	205.5
	%	43.8	46.1	38.0	38.1	34.5	28.8	29.0	23.0	22.0	17.4	32.4	29.3
Wheat products	Mean	98.5	128.2	132.9	200.5	150.1	306.4	211.1	363.1	255.5	497.7	169.6	279.1
	%	33.6	30.4	37.0	34.6	40.5	40.6	46.8	41.1	53.6	49.7	43.5	39.8
Rice	Mean	58.1	77.2	77.3	121.2	68.8	170.3	89.7	235.5	100.3	245.9	78.8	159.9
	%	19.8	18.3	21.5	20.9	18.6	22.5	19.9	26.7	21.0	24.6	20.2	22.8
Cooking bananas	Mean	8.0	22.2	12.7	37.0	20.1	61.3	19.4	81.0	16.3	83.5	15.3	57.0
	%	2.7	5.3	3.5	6.4	5.4	8.1	4.3	9.2	3.4	8.3	3.9	8.1
Sum of Means		**292.77**	**422.3**	**359.1**	**579.2**	**370.4**	**755.5**	**450.9**	**882.8**	**476.9**	**1001.0**	**390.0**	**701.6**

Notes: The table indicates a nominal change in expenditure. Inflation adjusted expenditures would show the real change in households' expenditure on staples.

In nominal terms, the average monthly per capita budget on staples is shown to have increased by 80% from KES 390 to 701 and the expenditure on staple to have increased in all the quintiles (Table 8a). In real terms, the average monthly per capita budget on staples increased by only 6% from KES 660 to KES 701 with the low quintiles (1 & 2) cutting back spending on staples and higher quintiles increasing their spending on staples (Table 8b). Across all quintiles the average expenditures on maize declined while expenditure on cooking bananas increased. Expenditure on wheat and rice declined in the first two quintiles but increase in the higher quintiles.

On average the proportion of 'staples budget' spent on: maize products declined with 3 percentage points from 32% to 29%; the proportion on wheat products declined with 4 percentage points from 44% to 40%; and 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 by quintile with the lower quintiles increasing the budget allocated to maize and bananas while at the same time reducing budget allocated to wheat products and rice. The high income groups reduced budget allocated to maize and wheat and increased their allocation to rice and cooking bananas.

Table 8b: Inflation Adjusted Household Expenditures on Staples foods (Base February 2009)

		Lowest		2		3		4		Highest		Sample Avg	
		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
	% of Staple	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
	% of Staple	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
	% of Staple	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
	% of Staple	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 percentage points 3-4 points for all households. The changes observed in budgetary allocation within the 'staple group' can be related to adjustments within

households due to relative price changes for these complements. Results in Table 9 show that during the period under study (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.

Poorer households are shown to have shifted from the relatively more expensive staples (rice & wheat) to the cheaper ones (bananas). Substitution of relatively expensive staples with the cheaper ones was observed to be low indicating the strong preference for specific staples like maize. Banana followed by potatoes are the cheaper staples compared with maize and much cheaper than wheat and rice. With KES 194/=, a household in the lowest quintile consumes 5.7 kg of maize. With only 11.4% of this budget, the same household is able to consume 2.1 [a] kg of banana and with 27% of this budget the household purchases 2.8 kg of potatoes[8]. The choice by households (particularly those in low quintiles) to consume a more expensive staple like maize may be attributed to a strong preference for it. The results also shows households increasing consumption of the cheaper options e.g. 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 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 <u>Real</u> 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

derived

Source: Statistical abstracts

3.2.3   Preference for different maize products

Results from this study indicate that maize is still the staple of choice particularly for the lower quintiles. The main types of maize products consumed by urban households in Nairobi are: the sifted maize meal

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[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.

(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)				
		2003	2009	Change (%)	2003		2009	Real change (%) in expenditure (2003 to 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 in per capita consumption of posho meal in all quintile groups with the largest increase being registered in higher quintiles. 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 food subsidy & voucher schemes[9] that were targeting poorest and vulnerable households. In nominal terms, the results show a huge increase in expenditures on all maize products in all quintiles. In real terms, the greatest increase in expenditure was recorded in 'posho' maize meal for all quintiles particularly in higher quintiles. The increase in expenditure on 'sifted' maize meal was 11% and 35% in the first and second quintiles respectively.

5. Conclusions and Policy Implications

There has been a decline in households' real expenditures suggesting that incomes for urban household have fallen for all but the highest income group. This decline in income is disproportionately higher for the low income groups (21-22%). It therefore appears *critical that the government and partners*

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[9] Voucher redeemed at supermarkets like Uchumi

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. 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 nominal 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, the greatest proportion of 'staples' budget is allocated to maize and maize products (30%). The preference by households (particularly those in low quintiles) for the more expensive staple like maize can be mainly attributed to tradition. *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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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 siz , 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 ≤ k/L*
(2) *The subsequent selected households are those having serial numbers:*

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

for j = 2, 3, … 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:

$$W_{hi} = D_{hi} \, x \, \frac{S_{hi}}{l_{hi}} \, x \, \frac{C_h}{c_h}$$

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

l_{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: 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 A2: Comparison between Minimum Wage in Nairobi and Retail Price for Maize (Grain & Flour)

Gazetted Averange Monthly* Basic Minimum Wages: Urban Areas (Nairobi)

*Excluding House Allowance   Annual Average prices

Year	Wage (KES)	Price of 2 Kg Maize Flour (KES)	Price of 2kg Maize 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