An Investigation of Yam Ingestion Customs in Ghanaian Urban Communities, Ghana

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Abstract

This study examined the major factors that drive changes in yam consumption patterns across income groups, seasons and urban centers in Ghana to inform food policy formulation. The study, among other things, sought to provide evidence on whether or not yam had become a luxury food commodity in Ghanaian urban communities. Special attention was also given to the question of whether household income allocation between males and females had any significant effect on yam consumption. The study estimated yam expenditure elasticities for the pooled/aggregate data and the four different urban centers across different income groups to test Engel's law.

Results of the study showed that majority (>80%) of yam consumers in Ghanaian urban communities preferred white yam to yellow and water yams, and the most important reason for their preference was taste. Boiled yam *(ampesi)* was the most preferred yam product in Ghanaian urban centers followed by pounded yam (fufu). Rice was identified as the most important substitute for yam in urban communities. In a typical Ghanaian urban center, household food budget formed about 51% of the total household budget. Yam constituted about 12% of household at-home food budget and 13% of its away-from-home food budget.

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The shares of food budget that households allocated to yam generally increased during the peak harvest season and dropped during lean season across all urban centers in Ghana. Yam expenditure elasticity for the pooled sample was found to be inelastic (0.76), suggesting that yam is a basic food commodity in a typical Ghanaian urban center. Yam expenditure elasticity was lowest for Tamale (0.64), a less urbanized center, and highest for Accra (1.01), a more urbanized centre. However, in each particular urban center, Engel's law was affirmed; yam expenditure elasticity was higher for low-income households and lower for high-income households. Yam expenditure elasticity was found to vary across seasons; yam was expenditure elastic during the lean season and expenditure inelastic during the harvest season. Women's share of household income was found to be positively related to household yam budget share. Evidence from this study did not support the hypothesis of economies of household size with respect to household yam budget share when the pooled data was used for analysis. However, the hypothesis of economies of household size was supported in the seasonal consumption analysis where households were found to enjoy economies of size during the relatively yam abundant period of August to December and diseconomies of size during the lean season.

The study showed that yam budget share was down-price elastic but expenditure inelastic. Urban households were more responsive to changes in yam prices than changes in household income, implying that the substitution effect is stronger than the income effect. The high price elasticity for yam budget share stresses the importance of food price changes for households, and it is important that households' reactions are taken into account in the development of comprehensive agricultural and food policies in Ghana. Based on the findings of the study, recommendations have been made to help improve the Ghanaian yam sector and household food security in urban centers.

Keywords: Yam Ingestion Customs; Ghanaian Urban Communities.

1.   Introduction

It is implied from the foregoing that the potential demand for basic food staples, including root and tuber products, on both domestic and international markets will continue to rise. According to [1] agricultural potential is greatest for root and tuber crops like yam and cassava due to their adaptability to marginal environments, their contribution to household food security, and their flexibility in mixed cropping systems.

This study focuses on yam, one of the most important staples in Ghana. Lately, yam has become an important export crop in Ghana. Yam ranked second after pineapple in terms of volume and value of non-traditional export crops in Ghana. Because of its importance on the international market as an export crop, yam has increasingly become expensive on the domestic market. Low income households therefore find it relatively unaffordable compared to other roots and tubers like cassava, cocoyam, and taro.

The research will enhance understanding of the important factors affecting Ghanaian yam consumption patterns. The econometric results from this study should be useful for assessing the future trend of yam consumption pattern in Ghana and other sub- Saharan African countries. This study will represent a milestone in analyzing yam demand structure and consumption patterns in Ghana. Hopefully, the study would motivate researchers and

generate more interest in the analyses of food consumption behaviour in Ghana and perhaps, more debate on the key demand elasticities for yam and other related food commodities.

Many factors have influenced the Ghanaian food consumption pattern, and an understanding of these factors is very important for the assessment of the agricultural products market in Ghana. Whereas there is relatively satisfactory research information on yam consumption in information on yam demand and consumption patterns is limited in Ghana [9].

The few studies on yam consumption in Ghana were carried out in the 1960s and 1970s. As the second largest yam producing country and the leading yam exporting country in the world, changes in Ghana's yam consumption pattern will directly affect sub-regional and world yam trade.

The study will provide timely and useful information for assessing the future of yam as a food commodity in Ghana. There are several unique features of this study.

First, the study uses household survey data, which have been rarely used in the study of food demand and consumption patterns in many countries. The use of household data allows for the modeling of yam consumption with demographic variables. The estimates of income/expenditure elasticity obtained from cross-sectional household data are more credible than those obtained from time-series data.

Second, the study estimates different models for the individual urban centers considered in the study. An aggregate model was built by pooling the data from all the urban centers. The estimated demand elasticities would be useful for those who work on various forecasting models as well as for agricultural policymakers.

The next subsections focus on yam as a root and tuber crop, its production and consumption. The various varieties of yam produced in Ghana and yam production levels for the major producing countries have been highlighted with emphasis on how important yam is to households in Ghana in particular and the West African sub-region as a whole.

1.1 Yam production

Developing country's root and tuber supply increased to 449 million tonnes in 1996, an increase of 30% over the 1983 production level. In sub-Saharan Africa, yam output slightly exceeded the global average and cassava output grew at twice the global rate. Among the three main species in West Africa, *D. rotundata* (white yam) is the most important variety and *D. Cayenesis* (yellow yam) is the least important.

According to FAO Statistics Division, 38 million tonnes of yam were produced worldwide in 2000, 96% of this in Africa. Table 1.1 provides yam production volumes for major yam producing countries in West Africa. From the Table, the leading producer was Nigeria with average of over 26 million tonnes from 2000 to 2004,

From Table 1.1, it is evident that yam production in Ghana increased from 2.1 million tonnes in 1995 to 3.9 million tonnes in 2002. In 2003, however, yam production in Ghana decreased to 3.8 million tonnes. A similar

decline is observed between 1993 and 1994 where yam output reduced from 2.7 million tonnes to 1.7 million tonnes [11] During the period 1975-90, total yam cultivated area increased by about 38.8% globally, while the total production increased by 45.8%.

Table .1: Yam production figures for selected countries 1961 - 2004 ('0130 Mt)

Year	Nigeria	Ghana	Ivory Coast	Benin	Togo	World
1961	3,500	1,100.0	1,150.0	614.2	300.0	8,324.4
1970	12,033	909.0	1,551.0	515.8	290.0	17,428.4
1980	5,248	650.0	2,040.0	694.4	483.9	11,638.5
1989	9,609	1,258.0	2,474.0	1,009.9	405.1	17,304.6
1990	13,624	877.0	2,528.0	1,046.1	391.9	21,114.2
1991	16,956	2,631.9	2,890.0	1,177.5	376.5	26,835.7
1992	19,781	2,331.4	2,758.0	1,124.9	368.0	29,278.1
1993	21,632	2,720.3	2,771.0	1,185.1	530.4	31,647.7
1994	23,153	1,700.1	2,823.7	1,250.5	484.0	32,471.4
1995	22,818	2,125.7	2,869.0	1,285.9	530.5	32,559.2
1996	23,201	2,274.8	2,924.0	1,346.1	604.7	33,385.6
1997	23,972	2,407.9	2,987.0	1,407.7	683.0	34,428.8
1998	24,768	2,702.9	2,921.0	1,583.7	696.1	35,802.6
1999	25,873	3,249.0	2,944.0	1,647.0	665.6	37,618.9
2000	26,201	3,362.9	2,950.0	1,742.0	563.3	38,131.3
2001	26,232	3,546.7	2,938.0	1,701.0	549.1	38,379.4
2002	26,258	3,900.0	2,966.1	1,875.0	574.9	38,894.2
2003	26,324	3,812.8	3,048.3	2,408.6	568.9	39,579.9
2004	26,587	3,892.3	3,050.0	2,500.0	570.0	40,048.1

Source: [26] from year 2005.

Fig. 1.1 shows the yam production series for selected yam producing countries in West Africa from 1961 to 2004. It may be evident from the figure that Ghana has consistently been producing more yams than Benin.

However, Ghana's yam production lagged behind that of Ivory Coast until the year 1999 when Ghana became the world's second highest producer of yam after Nigeria. It may be observed from the production trends that Ghana's yam production tended to fluctuate more than the other counties in 1990-1994 probably due to price fluctuations [21]

The importance of yam in the economy of the main producing areas appears to be declining due partly to competition from other crops like cassava in Nigeria, and taro in the South Pacific [2]. However, in the case of Ghana the contribution of yam to the economy by way of meeting household food needs and foreign exchange earnings through exports has been growing [8].

1.2 Yam consumption

In Africa root crops constitute between 18.6% of per capita daily calorie consumption in East Africa to a high of 41.4% in Equatorial Africa. Root crops are the highest supplier of calories in Equatorial Africa and second highest in all other parts of Africa after cereals (Table 1.2). This underscores the importance of root crops as staple foods in Africa.

Table 1.2: Per capita daily consumption of food commodities as percent of total consumption (1983 - 1996)

Food Commodity	Equatorial Africa	Humid West Africa	Semi-arid West Africa	East Africa
Root Crops	41.4	29.6	19.1	18.6
Cereals	26.7	38.9	49.0	48.5
Pulses	4.9	1.5	3.5	3.8
Fruits & Vegetables	6.2	7.7	2.0	4.4
Oil Crops	10.4	12.7	13.3	9.1
Livestock products	3.2	3.7	4.5	6.4
Other products	7.2	5.9	7.7	9.6
Total	**100.0**	**100.0**	**100.0**	**100.0**

[26]; from year 2009.

Table 1.3: Share (%) of dietary components of total energy consumption for selected countries (2001-2003)

COUNTRY	Cereals (excl. beer)	Vegetable oils	Sugar & Sweeteners	Meat &Offals	Roots and Tubers	Milk, Eggs & Fish	Fruits & Vegetable	Animal fats	Pulses	Others
Ghana	29.2	5.2	2.6	1.4	42.7	2.9	10.4	0.2	0.2	5.3
Nigeria	45.4	12.3	4.1	1.6	19.3	1.4	4.8	0.3	3.3	7.6
DR Congo	19.8	8.2	1.8	1.2	56.3	0.8	3.8	0.1	2.1	5.9
Cote d'lvoire	40.8	12.4	4.1	2.1	24.1	1.8	7.8	0.1	0.2	6.4
Togo	49.5	9.5	2.3	1.7	26.9	1.4	1.3	0.2	3.0	4.4
Jamaica	33.7	10.8	19.4	8.8	6.7	4.1	7.9	2.0	1.0	5.6
Cameroon	40.2	8.0	4.4	3.2	18.0	2.5	9.1	0.3	5.9	8.5

Source: [26]; from year 2009.

Table 1.3 shows that tropical root crops may supply from as much as 56% of the total daily calorie (energy) intake in DR Congo to as little as 7% of the total daily calorie intake in Jamaica. In Ghana, roots and tubers constitute 43% of total calorie intake per day as compared to 19% in Nigeria. Yam contributes more than 200 dietary calories per capita daily for more than 150 million people in West Africa [18].

Per capita yam consumption in this group is thus far higher (72.4Kg/annum) than Group I members (6.6Kg/annum) and Group III members (3.5Kg/annum). In Group III, where cereals play far greater role in consumption, the countries include Botswana, Burkina Faso, Cape Verde, Chad, Ethiopia, Gambia, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Namibia, the Niger, Reunion, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Zambia, and Zimbabwe.

Table 1.4: Levels of consumption of staple foods in sub-Saharan Africa, 1981 - 1983

Food Staple	K	g per caput/Annum			Perceni	tage (in Calorie Equivalent)		
	Group I	Group II	Group III	Total	Group I	Group II	Group III	Total
Starchy staples	453.4	274.0	45.1	205.1	78	49	9	39
Cassava	407.4	123.0	21.3	117.8	70	22	4	24
Yams	6.6	72.4	3.5	36.8	1	14	1	7
Sweet potatoes	6.6	20.3	5.0	12.5	2	3	1	2
Plantains	26.2	39.1	2.0	22.7	4	6	-	4
Others	6.6	19.2	13.3	15.3	1	4	3	2
Cereals	39.7	83.8	134.1	98.3	22	51	91	61

Source: [26]; from year 1987.

In 1981, per capita consumption of yam in Colombia was found to be higher in the rural areas (5.9 kg/year) than the urban areas (2.8kg/year) when quantity eaten from own production were valued [25]. According to [2], yam accounted for 55.3% of total root and tuber consumption in West Africa and 4.1% in Central Africa during 1975 – 1984

They further showed that average per capita consumption of yam was 99.4Kg/yr in W/Africa and 10.5kg/yr in C/Africa. The authors in [25] noted that in southeast Nigeria, people in major food producing rural areas consume 757 calories per capita per day from yam, compared to 345 calories from cassava, 298 calories from rice, 185 calories from wheat, and 149 calories from grain legumes, with lower but comparable figures in urban areas.

Table 1.5 shows that Ghanaians consume more yam than Nigerians on per capita basis; whereas the average Ghanaian consumes a little more than 110kg of yam per annum, the average Nigerian consumes less than 80kg of yam per annum.

Table 1.5: Yam consumption in ^ Ghana and Nigeria (kg/caput/year)

Country	2000	2001	2002	2003
Ghana	114.00	119.00	116.00	114.00
Nigeria	79.00	77.00	76.00	74.00

Source: [26]; from year 2009.

In Ghana, however, yam consumption level in urban areas is higher than that in rural areas. Per caput yam consumption per day in urban communities in Ghana was found to be more than double the consumption level in rural areas. The level of consumption is dependent on the locality of the study. In the forest belt for instance, communities will depend more on roots and tubers like cassava and cocoyam; however, in the savanna and transitional belt, communities will depend more on cereals and yam. Since many households in these areas produce their own food, what they eat will hinge critically on the production possibilities in the locality [5].

High transportation cost due to bad road network linking producing and consuming centers and the bulky nature of yam leads to high marketing costs and high consumer prices.

Table 1.6 shows the average per capita food expenditures and food budget shares for households in rural and urban Ghana.

Food Group	Cash Expenditure (GH^)	Value of home produced food (GHC0)	Total (GHC£)	Food budget share (%)
Urban Centers				
Food and beverages	*67.57*	*2.92*	*70.51*	*97.2*
-Cereals and cereal products	10.34	0.312	10.65	14.7
- Roots and tubers	9.69	1.92	11.61	16.0
- Other food and Beverages	47.56	0.69	48.25	66.6
Total Food Consumption	**69.47**	**2.96**	**72.42**	**100.0**
Rural Areas				
Food and beverages	*30.91*	*17.21*	*48.13*	*96.4*
-Cereals and cereal products	4.79	1.97	6.76	13.5
- Roots and tubers	4.00	11.85	15.85	31.7
- Other food and beverages	22.13	3.39	25.52	51.0
Total Food Consumption	**32.76**	**17.26**	**50.02**	**100.0**

Source: [27]

Ghana Cedis (GHfi) is name of the Ghanaian Currency (exchange rate: US$1.00 = GHfi 1.20).

Per capita cash expenditure on roots and tubers in Ghana in the year 2000 was estimated at GH09.69 in urban centers and GH04.00 in rural areas. However, the value of home produced roots and tubers was far higher in rural areas (GH0 11.85) than in urban areas (GH0 1.92). When own production and purchased foods were put together, rural households in Ghana consumed more roots and tubers by value (GH0 15.85) on per capita basis in the year 2000 than urban households which consumed GH0 11.61 worth of root and tubers. On the average, urban consumption levels of staple foods are lower than in or sub-urban areas and non-staples tend to dominate urban diets.

2.   Theoretical, Empirical and Conceptual Framework of the Study

2.1 The theory of consumer behaviour

The reference [3] define consumer behaviour as the decision process and physical activity individuals engage in when evaluating, acquiring, using, or disposing of goods and services. Consumer purchase decisions appear to be based on a combination of economic and sociological factors and they could therefore be better understood if the concepts of the two disciplines are combined for the purposes of analysis. Consumers around the world vary tremendously in age, income, educational level and taste, among other factors and therefore buy an incredible variety of goods and services to satisfy their needs According to Kinsey, because majority of people in developing countries have low disposable incomes and because conditions of supply and demand are very different, it is assumed that physiological needs (e.g. food and water) are predominant in developing countries. She however pointed out that this may not always be the case because of people's self-concept and the cultural values and beliefs individuals subscribe.

The implication is that even though poorer people are supposed to spend more money on their physiological needs, certain cultural and economic factors can compel them to purchase some luxuries they may not desperately need. Thus, consumer behaviour can sometimes be too complex to be predicted.

The household's consumption function gives the maximum amount of commodities consumed as a function of product price, income and some qualitative socio-cultural factors. Actual consumer behaviour is multidimensional and very complex. When a consumer goes shopping, his concern is not limited to how much of one good to buy; rather he must decide which of many available goods to buy at their respective prices. Thus, the presence of different yam products on the market and the differences in preferences among household members complicates yam consumption decisions of the household. In all cases, the consumer

wants to get maximum satisfaction from his available income. According to Schiller, the economic explanation for consumer choice builds on the theory of marginal utility and the law of demand.

Another postulate of consumer-choice theory takes into account the market prices of goods that are desired by consumers. Thus, rational behaviour requires one to compare the anticipated utility of each expenditure with cost and to choose those products that promise to provide the most pleasure for the amount of income available. Varian argues that the key to utility maximization is not simply buying what one likes best; instead, one must compare goods on the basis of their marginal utility and price.

The basic approach to utility maximization is to purchase the next yam product that delivers the most marginal utility per cedi. Varian concludes that all goods included in the optimal consumption mix yield the same marginal utility per cedi. From the first order condition for utility maximization, the utility-maximizing rule is to satisfy the condition where the marginal utility per cedi derived from one yam product is the same as that derived from consuming another yam product in the consumption basket of the consumer. In other words, a cedi spent on one yam product must yield the same marginal utility as that obtained when a cedi is spent on another yam product. This condition gives the greatest satisfaction from the limited income of the consumer.

2.2 The theory of consumer demand

A consumer's demand gives the number of units of a particular product that the consumer would choose to buy at each possible price over a specified period of time. Given any available set of bundles of products, the consumer chooses that bundle which maximizes his utility or satisfaction. Thus, consumer's demand for a good is the quantity chosen as a result of this utility maximization, which is also dependent on precisely what sets of bundles of goods are available in static and dynamic demand analysis, also found that income, own-price, prices of substitutes, and previous consumption are the important determinants of household beef consumption patterns in Cameroon [3].

Apart from product price, prices of substitutes and income, certain household and socio-cultural factors play very significant roles in shaping household consumption patterns. Household factors such as household size/number of dependants, age, gender and socio-cultural factors such as religion, tribal/ethnic affiliation, educational background, and occupation, among others, affect consumption pattern

Demand is defined as the quantities of goods and services people are willing and able to buy at alternative prices in a given time period. For the ultimate buyer of food, demand could relate retail prices to amounts that will actually be consumed within a given time frame. Purchases essentially reflect the demand for immediate consumption and the inclination of consumers to restock their shelves or freezers when prices are particularly attractive or reduce inventories when prices are high. On the other hand, ***consumption*** is defined as the quantity of a particular commodity consumed or amount spent on the commodity by the household in a specified period. Often, consumption of food items is expressed in terms of three different measures: weight of food items consumed, expenditure on different food items, and nutritive value of food items expressed in terms of calories, proteins, fats, and other vitamins and minerals. When we are interested in the demand for an individual commodity, the most appropriate measure of consumption would be the quantity of the commodity being used. However, when aggregates of individual commodities are being dealt with, it will be difficult to aggregate different commodities if they are expressed in physical units. In such a case, we have to convert the quantities to comparable units. In this situation, it becomes convenient to measure demand in terms of expenditure or nutritive values. In this study, yam consumption refers to the amount spent on yam products by the household in a given period, say a week or month. Measurement of yam consumption in nutritive value terms is beyond the scope of this study as that might require some chemical analysis [4].

2.3 Income

National income statistics suggest that there is a close relationship between consumption expenditure and the level of disposable income. According to [2], the level of disposable income principally determines aggregate consumption expenditure. According to Baker, having income or purchasing power implies having a choice not only between products but also between different versions/brands/varieties of the same product. As income rises, the proportion spent on basic necessities like food products tends to fall whereas the proportion of consumers' expenditure devoted to services and durable goods tends to rise. He observed that the most obvious limitation on consumption is the level of income, stressing that in the long run, most people cannot consume more than their real income. In the short run, however, there is the possibility of supplementing one's income by borrowing; but such debts have to be repaid so that a borrower, in the future, must spend less while the debt is repaid. Therefore, in the long run income provides the upper limit in the ability to consume.

It is normal for a person to wish to eat until his appetite is completely satisfied. If his income is so low that he cannot afford his desired level of food consumption, any increase in income is likely to be spent mainly on food. On the other hand, at high income levels, food consumption becomes a less important factor in the individual's budget and any increase in income will not lead to an increase in the quantity of food consumed although it might result in extra expenditure through the purchase of better quality food. That is to emphasize that when incomes rise consumers could afford to switch to more expensive and superior substitutes.

Consumer income has a significant effect on the quantity of goods demanded and consumption pattern, for that matter. A rise in consumer income shifts the demand curve for "normal" products to the right; indicating that more will be demanded of that product at each possible price. However, for "inferior" goods, a rise in consumer income leads to a reduction in their purchases (i.e. the demand curve will shift to the left). Thus, the income elasticity of demand for normal goods is positive whereas that for inferior goods is negative. It must be emphasized that the economic terms of "normal" and "inferior" imply no 'value judgment' on the items they categorize. In other words, the nutritional value or content is not considered in classifying food commodities into inferior, normal or luxury goods; rather, the response of consumers to the demand for these commodities when their income increases is considered.

2.4 Commodity prices

Product characteristics such as own price and price of substitutes have effects on yam consumption patterns. The quantity demanded of some commodities is fairly sensitive to changes in the commodity's price. That is, changes in own price results in significant changes in quantity demanded. Price elasticity of demand is expressed in terms of relative (i.e. proportional or percentage) changes in price and quantity demanded. Even though it is generally assumed that demand curves are negatively sloped, there are exceptional cases in which the relationship between demand and commodity price may be positive. In the case of ostentatious consumption the demand function may have a positive slope if the consumer derives utility from a high price.

However, in a case where the demand for a commodity is unitary elastic, a price increase or decrease results in no difference in the total amount spent on the commodity. This is so because a price decrease (increase) of a certain percentage always results in a quantity increase (decrease) of the same percentage so that the product

(multiplication) of the price and quantity is unaffected. A numerically large value for elasticity implies that quantity demanded is proportionately very responsive to price changes noted that if a demand curve has elasticity less than unity (i.e. inelastic), a rise in price will increase consumer expenditure, and if the curve has elasticity greater than unity (i.e. elastic), a fall in price will increase consumer expenditure on the commodity in question.

The prices of substitute products also affect the demand for a particular commodity. Two commodities are substitutes if both can satisfy the same need of the consumer. A rise in the price of a substitute increases the demand for the competing product while a decrease in the price of the substitute causes a reduction in the demand for the competing product. Prager also noted that the price of a substitute product is directly (positively) related to the quantity demanded of a product and if a commodity has many close substitutes, its demand is likely to be highly elastic.

The decision to buy less of one good depends in part on the availability of other products, which serve as substitutes. Consumers have different tastes and preferences for the various varieties of yam and the other root crops. Consumers who purchase and consume expensive yam varieties or root crops are likely to spend more than those who consume relatively cheaper products, given that quantities consumed remain unchanged, implying higher elasticities for the former group than the latter group. Since availability of close substitutes for yam varies across the season, it may imply that elasticity will also vary across the season.

Even though economists maintain that when a product becomes cheaper a greater quantity is demanded, [13] contended that whilst this generalization has a lot of truth in it, there are some exceptions. He noted that some individual customers and consumers often regard price as a mark of quality and in some situations more is purchased at higher prices. He stated further that in some situations, when delivery or immediate possession is an urgent requirement or where a particular price level is perceived to be the 'going rate,' price becomes relatively unimportant in the buying and consumption process. In the specific case of yam, the commodity may be urgently required towards the end of the 'hunger' season (i.e. commencement of the harvest season) and thus price may be relatively unimportant and hence price elasticity may be low.

[23] found yam, cassava tuber and gari to be strong substitutes in Nigeria in their study to examine the determinants of urban household demand for cassava and cassava products. The cross price elasticity between cassava and yam was found to be 1.024 and that between yam and gari was estimated at 0.835. Potato and cocoyam were found to be weak substitutes for yam with cross price elasticities of 0.107 and 0.451 respectively. The study found an inverse inelastic relationship between own price of yam and yam consumption (own price elasticity of yam was 0.21 for low income earners, 0.78 for high income earners, and 0.72 for all households). This implies that high income earners are more likely to benefit from lower yam prices through increased production/supply. However, since prices will come down, low income households would also benefit a great deal as yam will become affordable.

2.5 Personal and household characteristics

Buyers' decisions are influenced by personal characteristics such as age, gender, and educational level. Household factors like household size, number of dependants (<15 and >60 year olds) in household, number of household members in full time employment, number of women in household and their employment status also influence household consumption patterns.

2.6 Age

Consumption decisions are shaped by the age of the consumer. [19] asserted that marketers often define their target markets in terms of lifecycle stage and develop appropriate products and marketing plans for each age group. [16] also noted that young people spend more on basic necessities than the aged who spend a lot more on durable consumer goods. Empirical work shows that age influences consumption demand in a nonlinear fashion. According to these authors, the inclusion of the age variable in household consumption models could be justified on the grounds that it may capture changes in purchase behaviour due to the changes in the consumer's biogenic and psychogenic needs over the life cycle.

These empirical findings notwithstanding, for yam products one does not expect a total shift to or from the commodity with increasing age since it is a major staple food commodity in Ghana. However, in this study an attempt was made to disaggregate the data according to age profile to examine how age differences influence yam consumption patterns in urban communities.

2.7 Gender

Gender of the consumer influences his purchasing decisions and hence consumption expenditure on goods and services. [19] noted that males and females have different purchasing and spending patterns due to differences in their needs and wants. It was noted that whereas males are normally concerned about capital expenditures as well as away-from-home food expenditures, females are mostly interested in the purchase of clothing, cosmetics, and most importantly food for the home, among other things.

This apparent paradox could suggest that males in Brazil spend more on other food commodities like fruits, vegetables, and food-away-from- home whereas females spend more on carbohydrate and protein sources..

Since yam meal preparation can be time consuming (especially, fufu, fried and roasted yam), households with female heads who are not into full time employment may consume more yam. Male-headed households with mature females who are non-workers or part-time workers are also expected to have high expenditure on at-home yam consumption. Accordingly, this study incorporated number of females in household and females in full-time employment in the regression analysis to examine their respective effects on household yam expenditure.

In this study the proportion of household income controlled by women/females was estimated and related to household yam budget share. To obtain this variable, the sum of the monthly incomes of all female household members was found and divided by the total household income from all household members.

2.8 Education

The effects of education are widely researched in many advanced societies. However, classical works of the effects of education have tended to focus on the analysis of the financial returns to education. The measurements of increased wage compensation and increased total income are often strikingly conclusive. The level of education is likely to affect the consumption patterns of households. The higher the level of formal education and the more widely available it is, the more it will be an agent of change in the definition of wants and needs. As people become more conscious that a better standard of living is possible, new needs develop as old ones become satisfied [17].

In a study to examine the effect of educational level on consumption in South Africa by [22], the results of the regression analysis consistently revealed that an increase in educational level yielded an increase in percent per capita expenditure for all expenditure categories investigated. The largest percentage increase was related to risk aversion expenditure (e.g. savings and insurance expenditures), while per capita food expenditure experienced the smallest magnitude effect. The regression analysis, while controlling for race, residence location, and per capita income, indicated a 1.7% increase in per capita expenditure for an increase in the educational level of a household. It was noted that these results might be a function of the nature of the goods being investigated. Savings and insurance expenditures usually involve discretionary spending, while food expenditure is essential to every household. Therefore, these results may suggest that increased education has more of an effect on non-essential goods expenditure in households than it has on essential goods. Since yam is an essential good, the educational level of household members is not expected to have much influence on household yam consumption.

2.9 Household size

Household can be defined as a group of people (or a social unit) who live together and eat from the same pot. The worldwide web defines a household to include all the persons who occupy a housing unit together with common housekeeping, sharing at least one meal a day, and occupying a common living or sitting room. Household size has relevant implications for household purchasing and spending behaviour [17]. Households with large family sizes spend more on consumer goods than households with small family sizes, ceteris paribus. [1]emphasized that an understanding of household dynamics is important in consumer marketing as the household is the basic unit of consumption.

Although recent studies shed new light on the nature of household economies, the puzzle remains unresolved. Different studies have had mixed results and this study attempts to estimate household food budget share elasticity with respect to household size in the Ghanaian context with an important staple food (i.e. yam).

In this study household members are considered to be people who have continuously resided together and shared resources for at least a quarter of a year (i.e. three months continuous stay). It does not include members who only sleep but do not eat from the household. Members considered were those who ordinarily ate at least once a day or seven times a week from the household. However, members who ate from the household (and

were considered when food purchases were being made) but did not sleep in the house regularly were considered as household members in this study.

2.10 Occupation and away-from-home food consumption

Consumer's occupation affects the products he buys and consumes. [16] reports that results from consumer surveys in 1979 and 1981/82 in Cote d'Ivoire and Nigeria respectively indicated that clerks and wage earners are major consumers of milk products. [20], in recognition of the effect of occupation on consumption, suggested that marketers should try to identify the occupational groups that have an above-average interest in their products and target them as separate market niches.

As household members eat away from home, the total at-home food consumption will decrease. Yam is bulky and meals that can be prepared from yam can be relatively time

consuming. As a result, members of the working class who are bent on eating yam would prefer to

take already prepared yam product away from home due to limited time at home. Therefore, a negative relationship between away-from-home food consumption and household expenditure on yam is envisaged. Also, household expenditure on yam is expected to be low for households with many full time employees. Also, longer shelf life of gari and the fact that it can easily be packaged and stored in the corner of a room, unlike yam, makes it a convenient commodity for the urban household.

2.11 Cultural factors (ethnic and religious affiliation)

[15] described culture as one of the most significant factors that may be used to explain differences in consumer behaviour. She stressed that whilst basic needs are the same the world over, the drives to satisfy them are affected by the compulsion, checks and guidance systems, which originate from culture. Thus cultural overlay forms the foundation for all motivational differences between consumer groups. [20]also stated that cultural factors exert the broadest and deepest influence on consumer behaviour. The ways in which culture directly affects needs and wants may be understood with reference to the major aspects of culture: ethnic and religious affiliations.

Ethnic groups may be formed around national, racial or geographical factors. Members of an ethnic group or tribe share similar values and patterns of behaviour, which make them attractive market targets for specific products or brands. Particular tribes may have certain beliefs about specific food products and this influences their decision to consume such foods or otherwise.

Religion, being the mainspring of culture, affects the type of products consumed by a certain group of people based on their belief and value systems. Because some products have traditional importance in many countries, religion might affect the consumption pattern of such products if taken to its logical conclusion. However, [15] contended that in reality, rarely are religious ideals taken to their ultimate conclusions. Also, there has been much watering down of traditional and religious beliefs through the introduction of new values and products

from other cultures. Nevertheless, [15] maintained that tribal and religious affiliations still affect tradition, superstition, taboos and perceptions and may help explain otherwise inexplicable consumer attitudes which determine how needs are fulfilled.

Yam is associated with a lot of traditional practices and ceremonies in most yam growing countries. It is therefore expected that tribal and religious affiliations of consumers will affect household yam consumption patterns.

The preceding subsections have provided the theoretical and empirical framework for the study and have set the stage for the conceptualisation of the research problem, objectives and hypotheses as well as the justification for the study, which form the subject matter of the next subsections.

2.12 Study Area

The study was conducted in four urban communities in Ghana. Two communities, Accra and Kumasi, are purely consuming urban centers whereas the remaining two, Techiman and Tamale, serve as both producing and consuming urban centers for yam.

According to Table 3.1, the whole Greater Accra Region does not produce yam; yam is only sold and consumed in Accra.

Table 3.1: Production of major crops by ^ Regions in Ghana - 2004 (figures in metric tonnes)*

Region	Yam	Cassava	Cocoyam	Plantain	Maize	Rice
Western	94,291	827,439	246,751	521,182	85,480	24,204
Central	24,748	1,549,226	-	-	159,622	3,898
Eastern	622,555	2,058,413	438,104	757,482	241,621	25,420
Gt. Accra	-	56,498	-	-	2,714	3,621
Volta	212,600	1,085,950	31,300	43,500	53,868	42,243
Ashanti	230,367	1,226,931	638,942	600,595	183,032	9,926
BrongAhafo	1,848,323	2,463,455	360,768	458,098	281,267	3,407
Northern	568,275	470,900	-	-	74,566	92,650
Upper West	291,099	-	-	-	60,801	5,748
Upper East	-	-	-	-	14,650	30,691
Total	3,892,259	9,738,812	1,715,864	2,380,858	1,157,621	241,807

*dash (-) means no production (these food commodities were not produced in the affected regions during the period). Source: [28]

2.13 Kumasi

The Kumasi metropolis is centrally located in the Ashanti Region of Ghana. The Kumasi metropolis has a population of 1,170,270 and accounts for nearly one-third of the Ashanti region's population of 3,612,950.

The services sector is the largest and most important sector in the metropolis, contributing about 60% of its GDP. The unique location of the city as a traversing point from all parts of the country makes it an ideal place for the development of commercial activity. It is, therefore, not surprising that Kumasi's central market is the largest single market in Ghana. The metropolis has additional 20 markets within which yam and other food commodities are sold. The industrial sector accounts for about 30% of the metropolis' GDP. About 50% of the labour force in the industrial sector is employed in the wood and wood-related industries. Like any other urban economy, the figure 3.1 Map of Ghana showing study Areas in their respective Regions agricultural sector is very small, accounting for just about 10% of its Gross Domestic Product. Agriculture is mostly practiced in the peripheral areas. Crops grown in the metropolis are mostly staple crops for subsistence; few cash crops are also cultivated for industrial processing and little for export. One important agricultural activity in the metropolis is the cultivation of exotic vegetables like cabbage, lettuce and carrots. The Ashanti Region produced 230,367 Metric tonnes of yam in 2004 (Table 3.1). However, the Kumasi metropolis is purely a yam consuming but not a producing center.

2.14 Prices of yam and other root & tuber crops in Ghana

Table 3.2 shows the wholesale and retail prices of the main roots and tubers in Ghana. Yam appears to be more expensive than the other root and tuber crops on per unit basis.

Table 3.2: Wholesale and retail prices of selected roots and tubers (GH^/kg)

Year	Yam		Cassava		Cocoyam		Plantain	
	Wholesale	*Retail*	*Wholesale*	*Retail*	*Wholesale*	*Retail*	*Wholesale*	*Retail*
2000	0.09	0.16	0.02	0.06	0.08	0.13	0.09	0.14
2001	0.14	0.27	0.09	0.14	0.11	0.21	0.14	0.22
2002	0.17	0.24	0.07	0.13	0.14	0.22	0.11	0.25
2003	0.19	0.27	0.06	0.26	0.14	0.24	0.12	0.27
2004	0.22	0.29	0.08	0.14	0.19	0.27	0.15	0.31
2005	0.27	0.40	0.12	0.21	0.23	0.34	0.16	0.37
2006	0.28	0.38	0.12	0.21	0.26	0.37	0.18	0.40

Source: [14]

Figure 3.2 provides the monthly market price series for yam in the four urban centers under study. It could be inferred from the Figure that yam prices are generally high during the pre-harvest (lean) season which spans from May through July. Prices are at their lowest levels during the peak harvest (main) season ranging between August and October. From November to January, yam prices pick up due to the Christmas and New Year festivities. Prices increase further during the planting season (February to April).

From Figure 3.2 yam price was higher in the main producing urban centers (Techiman and Tamale) compared to the consuming urban centers (Accra and Kumasi) during the lean season. The possible reason could be the high market demand in Techiman and Tamale to feed destination markets in neighbouring Burkina Faso and Togo. In the *State of the Ghanaian Economy* for 2006, yam price was quoted at between GH0 0.25 and GH0 0.31 per kg at the wholesale level, with Tamale recording the lowest price and Techiman recording the highest price.

3.   Research Methodology

3.1 Data issues (Types and sources of data)

Primary data was used for the household yam consumption analysis. A quarterly panel data collected from August 2006 through July 2007 was used for the study. This was cross-sectional micro data collected from the same households for four quarters in one complete year cycle. The first set of data focused on household characteristics, personal characteristics of the household head and the socio- cultural factors in addition to household food consumption information. The subsequent quarterly data was only on household expenditures. This information was obtained from household heads and/or the household member in charge of food purchases, especially wives.

According to [14]; analysis of micro or household level data can provide valuable insights in understanding household consumption behaviour by estimating relatively long-run relationship in comparison with macro data. This justifies why the study uses primary data at the micro level for yam consumption analysis.

Data on amounts spent on various yam products and substitute products (e.g. cassava, gari, cocoyam, plantain, rice, and maize, among others) consumed by households for a period of one week and one month were gathered. Prices of these products as well as the income of the household members were also obtained. The socio-cultural factors of interest in the study were educational background, age, gender, religious and ethnic affiliation of the household head. Information on household characteristics such as household size, number of wage earners in the household, proportion of 59 household income controlled by women, and region of household location, among others, were elicited. Another important variable in consumption pattern analysis is the percentage of away-from- home food expenditure; the study collected data on amounts spent on yam and other foods consumed away from home.

The focus of the study was on the three main yam varieties produced and consumed in West Africa and for that matter, Ghana; namely yellow yam, white yam and water yam. With regards to the various forms in which yam is purchased and consumed, yam products have been classified into boiled/cooked yam *(ampesi),* pounded yam *(fufu),* roasted yam, fried yam/yam chips and yam floor. Apart from these yam products and their substitutes, an attempt was made to gather information on all household expenditure items including other food products and non-food products/services like education, healthcare, funerals, travels, and clothing, among others, to help in the budget share analysis and in the computation of per capita expenditure.

3.2 Sampling technique

A multi-stage sampling method was adopted for the study. Four urban centers in which the study was conducted were purposively selected to reflect not only yam production and distribution patterns in the country but the agro-ecological zones as well. The four (4) urban centers include: Tamale in the Northern Region (Guinea Savannah zone), Techiman in the BrongAhafo Region (Transitional zone), Kumasi in the Ashanti Region (Forest zone), and Accra in the Greater Accra Region (Coastal Savanna zone).

A combination of stratified, systematic and simple random sampling techniques was used to select respondent households. The selected urban centers were stratified into low, medium, and high-income areas with the help of the local government authorities (i.e. the Municipal and Metropolitan

Assemblies) in the respective study communities. Within each income stratum, a systematic random sampling technique was employed to select respondent houses. Where there were streets, every third street in the area was selected and along each street, every fifth house was selected until the number required for that stratum was obtained. In areas where there were no clear cut streets, each area was imaginary divided into four parts - north, south, east and west and for each part or quadrant, field enumerators moved from one end to the other and selected every fifth house.

The suburbs selected for enumeration in the four urban centers are provided in Table 3.3 according to income group. A total of five hundred and ten respondent households were sampled for the study.

Table 3.3: Selected communities for the study by income group

Location	Low income areas	Middle income areas	High income areas	Sample Size
Accra	Nima James Town Bukom	Kaneshie Labadi/Labone Ashongman	East Legon Ring Way Airport Resid. Area	150
Kumasi	Moshi Zongo Aboabo	Tafo/Pankrono Kwadaso/Abuakwa Atonsu	Bomso/KNUST Nhyiaeso	120
Techiman	Tonnsuoase	Abanmu	Ahenfie	120
Tamale	Chogu Sabongida Moshi Zongo	Sakasaka Gumani Kukuo	Vitim Estate Kapohini Estate VRA	120
Total	**170**	**170**	**170**	**510**

3.3 Methods of data collection

The methodology of conducting household expenditure surveys has been discussed extensively in the literature [13]. A mixed approach, which combines both retrospective interview and diary surveys, was used to gather primary data for this study. Respondent characteristics, household characteristics, and other demographic variables were collected through recall interview. Also weekly and monthly expenses on food and non-food

items were captured under the recall interview approach. Detailed household expenditure data on all food commodities and other expenditure items were collected through diary survey.

3.4 Diary survey - a review

From the forgoing, it can be concluded that even though diary survey is superior over recall interview, respondent fatigue and non-cooperation, if not checked, could reduce an expensive diary survey to an ordinary recall survey.

In this study, therefore, both personal recall interviews and diary survey were used. Respondents were asked firstly to recall food and non-food expenditures for the past one-week and one month. The diary was placed in the household for two continuous weeks and each household was visited at least three times during the survey period to ensure that daily expenditures were correctly recorded in the diaries. The household head was made to fill the diary if literate. If the household head could not complete the diary, any household member above 15 years who could write was asked to complete the diary for the family with support from those in charge of household purchases.

Due to resource constraints, and also to reduce measurement error to the barest minimum, panel data was collected quarterly through the use of diary survey method throughout one calendar. The first and second week expenditure figures were averaged out to get household expenditure for a typical week and multiplying the figure by 4, the monthly household expenditure figures were obtained.

The difference between the Canadian survey and the current study is that in the former, replacement sampling was done. In the current study, however, the same households were covered throughout the year to collect the panel data for analysis. Continuous data collection on the same sample on weekly, fortnightly, or monthly basis throughout the year raises data quality issues due to respondent fatigue. Time and cost implications could also be enormous. In view of this consideration, diary survey was conducted for two continuous weeks in each of the four quarters in the specified survey period.

3.5 Econometric models for consumer behaviour analysis

Empirical analysis of consumer behaviour is not completely an application of the science of economics, but it also entails the artful eye of an econometrician. The estimation of demand or expenditure models involves the application of econometric and mathematical tools for estimating single equations and by systems of equations. Even though it is admitted that some "trial and error" efforts are inevitable, Ferris contends that strong logic is paramount in approaching demand and consumption measurements.

According to Ferris, the consumption demand for a commodity is a function of many factors too numerous to measure independently by the Ordinary Least Square (OLS) approach. The task of the econometrician is thus to introduce conditions that will conserve on degrees of freedom, reduce multicolinearity and still meet certain *a priori* beliefs about demand.

In the theory of econometrics, there are a number of mathematical forms that a demand or consumption function can take. Apart from the simple linear specification of a regression model, a function could also be specified in the quadratic form, power form (e.g. Cob Douglas function), and logarithmic form or in the exponential form. Linear specification of economic relationship is too simplistic a way of describing rather complex real life economic phenomena. Consequently, most empirical studies on consumption demand have tended to focus on the nonlinear specification. According to [7], economic theory provides little guide concerning the mathematical form of the regression model that suite a particular study. He revealed that in practice researchers tend to follow either of two approaches. First, a strong assumption may be made concerning the particular mathematical form that would best characterize the problem being investigated. Second, if the researcher is unable to make such an assumption, *ex-post* criteria may be relied upon by fitting different mathematical functions to the data and selecting the best on the basis of R , t-values, and the "reasonableness" of the estimated parameters.

[9] used the double logarithmic function to find the determinants of household nutritional intake in Ghana with satisfactory results. [7]also used double logarithmic regression function in his study to examine the structural relationships underlying household food expenditures in Ile Ife, Nigeria. He used the double logarithmic function as a logarithmic transformation of a Cobb-Douglas type of production function.

In a study to examine the determinants of urban household demand for cassava products in Nigeria, [23] used the Almost Ideal Demand System. In the study, income, price and household characteristics were used as the explanatory variables in the model.

According to [11], the more theoretically appealing static model of the double-log form is normally used in empirical work using cross-sectional consumption data. He used the double-log functional form in his analysis of the consumption of meat in Cameroon.

Peel also used the double logarithmic regression model to estimate the Keynesian and permanent income consumption functions for the United Kingdom from 1956 to 1966.

In a study on consumption expenditure on alcoholic beverages, Duffy estimated demand equations in the log-linear form where he expressed the consumption of each alcoholic beverage as a function of real income, own price and advertising for the alcoholic beverages. In another study, however [13] used data from 1956-75 to estimate a simple linear demand equation with total alcohol consumption as the dependent variable. The real price of alcohol, real income, real cost of advertising of beer, wine and spirits (individually) and the number of licensed premises were the explanatory variables.

In a subsequent study, [13]estimated separate linear demand equations for beer, wine and spirits with the volume of consumption of each beverage as the dependent variable. He however acknowledged that the simple linear regression model is a rather simplistic way of specifying a demand function, which has income as one of the regressors.

[12] revealed that the double log functional form is the most common specification for consumption expenditure studies.

The literature in applied economics shows that the AIDS and the Rotterdam are frequently used demand specifications. The success of these two models is partly due to the possibility of estimating some of their specifications without relying on procedure of nonlinear estimation. In addition, theoretical restrictions can be imposed and tested with ease.

3.6 Respondent Characteristics and Household Food Expenditure Analysis

3.6.1 Characteristics of Respondents

Respondents selected for the study had diverse characteristics which were expected to influence their purchasing and consumption behaviour.

3.6.1.1 Gender

As shown in Table 4.1, about 55% of all households interviewed were male-headed. This is a reflection of the national situation where majority (70.5%) of households in Ghana are male-headed. In Accra, Kumasi and Tamale, more than 50% of the households were male-headed. However, in Techiman females formed the majority (61%) of household heads.

Table 4.1: Gender Distribution of Respondents

Sex	Accra		Kumasi		Techiman		Tamale		Pooled	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Male	84	58.3	69	64.5	47	39.2	67	56.8	267	54.6
Female	60	41.7	38	35.5	73	60.8	51	43.2	222	45.4
Total	144	100.0	107	100.0	120	100.0	118	100.0	489	100.0

Source: [29]

3.6.1.2 Age

Respondents for the study have been categorized into different age groups by the author in Table 4.2. In all study communities, the middle aged consumers (30 - 65 years age group) formed the majority in the sample. For the pooled sample, this group of consumers constituted 77% and consumers below 30 years constituted 15%.

3.6.1.3 Educational level

Table 4.3 provides the distribution of respondents according to their level of education. Majority (40%) of the pooled sample had either no formal education or attained only basic formal education. Generally, the consumers were evenly distributed across the three categories of educational level in the Table.

3.6.1.4 Income Level

Income level in the study was defined as cash income earned or received by households. Consumers considered in the study fell within different monthly income groups as shown in Table 4.4. An analysis of per capita expenditure figures in GLSS5 suggest that households in Ghana could be put in three main income groups (low, Middle and high). Low income households have an average of GHC58.00 as per capita monthly income. The middle income group has average per capita income of about GHC200.00 per month. It could be deduced from Table 4.4 that consumers in the middle income category (GH0101 - 500) formed majority (52%) of the pooled sample; low income (< GH0100) consumers formed about 37% of the pooled sample; and 11% were in the high income (> GH0500) group. High income consumers formed less than 10% of the sample from all the study communities, except in Accra where 27% of respondents was in the high income group.

Table 4.2: Age Distribution of Respondents

Age (Years)	Accra		Kumasi		Techiman		Tamale		Pooled	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
< 30	18	12.9	17	15.9	19	15.8	19	16.1	73	15.1
30 -65	118	84.3	88	82.2	81	67.5	88	74.6	375	77.3
> 65	4	2.9	2	1.9	20	16.7	11	9.3	37	7.6
Total	140	100.0	107	100.0	120	100.0	118	100.0	485	100.0

Source: [29]

Table 4.3: Distribution of Respondents by   Educational Level

Educational Level	Accra		Kumasi		Techiman		Tamale		Pooled	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Basic/No formal education	34	23.8	47	43.9	68	56.7	47	39.8	196	40.2
Secondary/ Pre-tertiary	53	37.1	25	23.4	44	36.7	32	27.1	154	31.6
Tertiary	56	39.2	35	32.7	8	6.7	39	33.1	138	28.3
Total	143	100.0	107	100.0	120	100.0	118	100.0	488	100.0

Source: [29]

3.6.1.5 Religious affiliation

Table 4.5 provides the distribution of the respondents according to their religious affiliations. Christians and Muslims constituted 63% and 32% of the pooled sample respectively. Traditional believers and those who did not belong to any religion together formed only about 5% of the pooled sample. These proportions reflect the respective population strengths of the various religious groups in Ghana. According to [21], Christians constitute majority (66.7%) of the Ghanaian population followed by Islam (16.5%) and Traditional believers

(9.2%). In Tamale, Muslims formed 66% of the sample. However, in the other study communities Christians constituted majority of the respondents.

Table 4.4: Distribution of respondents by Income level

Monthly Income (GH0)	Accra		Kumasi		Techiman		Tamale		Pooled	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
< 20	5	3.5	3	2.8	2	1.7	12	10.2	22	4.5
20 - 50	5	3.5	11	10.3	11	9.2	20	16.9	47	9.7
51 - 100	11	7.7	37	34.6	34	28.3	30	25.4	112	23.0
101 - 200	36	25.4	42	39.3	34	28.3	23	19.5	135	27.7
201 - 500	47	33.1	13	12.1	34	28.3	25	21.2	119	24.4
> 500	38	26.8	1	0.9	5	4.2	8	6.8	52	10.7
Total	142	100.0	107	100.0	120	100.0	118	100.0	487	100.0

Source: [29]

Table 4.5: Distribution of respondents by religion

Religion	Accra		Kumasi		Techiman		Tamale		Pooled	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Christianity	123	86.0	65	60.7	80	66.7	37	31.4	305	62.5
Islam	11	7.7	38	35.5	31	25.8	78	66.1	158	32.4
Traditional	6	4.2	2	1.9	4	3.3	3	2.5	15	3.1
No Religion	3	2.1	2	1.9	5	4.2	-	-	10	2.0
Total	143	100.0	107	100.0	120	100.0	118	100.0	489	100.0

Source: **[29]**

3.6.1.6 Ethnic affiliation

By birth, Ghanaians belong to various ethnic groups across the country. A summary of the tribal distribution of respondents has been provided in Table 4.6.*Akans* and people of Northern Ghana extraction formed 42% and 32% of the pooled sample respectively. These two groups are made up of several different tribes and members of these groups formed the majority of the Ghanaian population. In the Ghana Living Standards Survey Round 5 report, GSS noted that majority of household heads in Ghana are *Akans* (52.7%) followed by *Mole-Dagbani* (12.4%) and Ewes (12.4%). The *Akan* group is made up of specific tribes like Ashanti, *Akuapim, Akyem, Fante, Sefwi, Nzema,* etc. In the subsample for Tamale, people who belong to Northern Ghana tribes or Mole- Dagbani ethnic affiliation *(Dagomba, Sissala, Mamprusi, Dagaba, Konkomba, Bimoba,* etc.) formed the majority (69%)

of the respondents. Accra is the most cosmopolitan of all the cities in the country and in that subsample, *Ewes* and *Akans* were more than *Gas* who are the indigenes.

Table 4.6: Distribution of respondents by tribe

Tribe	Accra		Kumasi		Techiman		Tamale		Pooled	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Akan	51	35.7	54	50.5	86	71.7	12	10.2	203	41.6
Ga	25	17.5	5	4.7	7	5.8	0	0.0	37	7.6
Ewe	46	32.2	11	10.3	1	0.8	5	4.2	63	12.9
Northerner	15	10.5	37	34.6	24	20.0	81	68.6	157	32.2
Others	6	4.2	-	0.0	2	1.7	20	16.9	28	5.7
Total	143	100.0	107	100.0	120	100.0	118	100.0	488	100.0

Source: [29]

3.7 Household Preferences for yam varieties, processed forms and substitutes

Table *4.7a* and *4.7b* provide the distribution of respondents according to their most preferred yam varieties and the reasons for their preferences. It may be evident from Table 4.7a that at least eighty (80) per cent of households in all the four urban communities preferred white yam to yellow yam and water yam varieties. It is important to stress the point that there are so many local cultivars which make up the white yam variety. Some of these cultivars include *Serwaa, Nkaseebayere, Denteh, Labreko, Pona,* among others. Generally, *Pona* and *Labreko* were the most preferred white yam cultivars by many Ghanaian consumers due to their superior taste.

Apart from the fact that white yams were more readily available on the Ghanaian market than the other varieties, they also had superior qualities for *fufu* and *ampesi,* the two most important and common food products prepared from yam. Mainly for these reasons, the majority of Ghanaian urban consumers preferred white yam variety to water yam and yellow yam. This finding is consistent with the results of a study in Nigeria by [6] which identified white yam as the most preferred yam variety among about 70% of root and tuber crop consumers.

Water yam was the least preferred yam variety. However, due to its relatively long shelf life it was the variety that was readily available during the lean season when other yam varieties were scarce. During this period, almost all yam consumers consumed water yam. After long storage, water yam looses most of its high water content and that improves the taste.

Even though yellow yam has good taste it is relatively scarce than all the yam varieties. Majority of the respondents had never seen or consumed yellow yam. For those who preferred yellow yam to other yam varieties, they were either cultivating it themselves (in the case of Techiman) or they had been exposed to it before in their villages and had come to the cities with those preferences. They all attested to yellow yam's superior taste when boiled as *ampesi* or when roasted.

Table 4.7a: Household *distribution* by most preferred yam varieties

Yam Variety	Accra		Kumasi		Techiman		Tamale		Pooled	Sample
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yellow yam	9	6.3	7	6.7	19	15.8	7	6.0	42	8.7
White yam	130	90.3	91	87.5	100	83.3	110	94.0	431	88.9
Water yam	5	3.5	6	5.8	1	0.8	-	-	12	2.5
Total	144	100.0	104	100.0	120	100.0	117	100.0	485	100.0

Source: [29]

Table 4.7b: Reasons for yam variety preference

Reason	Accra		Kumasi		Techiman		Tamale		Pooled Sample	
	Freq	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Taste	128	89.5	90	85.7	104	88.9	99	84.6	421	87.3
Price (affordable)	8	5.6	5	4.8	1	0.9	1	0.9	15	3.1
Longer shelf-life	5	3.5	1	1.0	1	0.9	3	2.6	10	2.1
Pounding ability	0	0.0	2	1.9	5	4.3	12	10.3	19	3.9
Availability	2	1.4	4	3.8	4	3.4	2	1.7	12	2.5
Others	-	-	3	2.9	2	1.7	-	-	5	1.0
Total	143	100.0	105	100.0	117	100.0	117	100.0	482	100.0

Source: [29]

It may be found in Table 4.7b that taste was the single most important factor that determined the type of yam variety purchased and consumed by households. Eighty-seven (87) percent of the respondents indicated that their choice of a particular yam variety was a function of the taste of the variety. Other factors considered before a particular yam variety was consumed included ability of yam variety to be used to pound *fufu* (3.9%), affordability (3.1%) and availability (2.5%). Figure 4.1 depicts the relationship between income level and reasons for the preference of a particular yam variety for the pooled sample (all the respondents in the study).

Table 4.8 provides the distribution of respondents according to most preferred yam product (processed form). The four yam products or processed forms mostly consumed in the four urban centers were found to include boiled yam *(ampesi),* pounded yam *(fufu)*, fried yam/chips, and roasted yam. Boiled yam *(ampesi)* ranked first as the most preferred yam product. About 72% of households in the pooled sample preferred to consume yam in the boiled form with stew or gravy. In three of the urban centers considered in this study, majority (at least 63%) of households preferred boiled yam to the other processed forms. In Tamale, however, majority (52%) of the households preferred to take yam in the pounded form *(fufu)* with soup.

Table 4.8: Household distribution by most preferred yam product

Processed yam Product	Accra		Kumasi		Techiman		Tamale		Pooled Sample		*Rank*
	Freq	**%**	**Freq**	**%**		**Freq.**	**%**	**Freq.**	**Freq.**	**%**	
Boiled *(Ampesi)*	138	95.8	87	82.9	76	63.3	47	40.2	348	71.6	*1*
Pounded *(Fufu)*	6	4.2	13	12.4	43	35.8	61	52.1	123	25.3	*2*
Fried/Chips	-	-	3	.9	1	.8	8	8	12	5	*3*
Roasted	-	-	2	1.9	-	-	1	0.9	3	0.6	*4*
Total	**144**	**100.0**	**105**	**100.0**	**120**	**100.0**	**117**	**100.0**	**486**	**100.0**	**-**

Source: [29].

It could be deduced from the table that many more households (at least 36%) in the producing urban centers (Techiman and Tamale) preferred pounded yam as compared to purely yam consuming urban centers (Accra and Kumasi) where, at most, only 12% of households preferred pounded yam to the other processed forms. Cassava is traditionally used to prepare *fufu* in Southern Ghana where cassava is relatively common and less expensive when compared with yam. Pounded yam is a time- intensive activity and could explain the difference in the preference between urban and countryside consumers. In all the four urban centers, roasted yam was the least preferred processed form of yam. Yam flour was not mentioned by any respondent as the preferred yam product; the product is not common in Ghana.

Table 4.9 provides a distribution of the households according to the most preferred yam substitute in case yam is not available or when yam is too expensive. Among all the yam substitutes considered in the study, rice ranked first as the most preferred food commodity when there was no yam or when yam was very expensive.

About 41 percent of the households in the pooled sample indicated that they preferred rice as yam substitute. The other three important yam substitutes were found to be plantain (26%), maize (16%) and cassava (6%). Yam was mainly consumed in the boiled form (ampesi) probably due to the easy and less time intensive nature of its preparation. Rice is also easy and less time consuming to prepare; therefore, it may not be surprising that urban households considered rice as the most preferred substitute for yam. In urban centers because of pressures from work and the high opportunity cost of time household members do not normally have the luxury of time to prepare meals that take time to cook at home.

In Accra, Kumasi, and Techiman, cocoyam was more important as yam substitute than cassava. It may be evident from Table 4.9 that in Techiman, plantain was the most important yam substitute, followed by rice, maize and cocoyam. In Tamale, however, the most important yam substitute was rice followed by maize, cassava and plantain. Gari, taro/colocasia and potato were identified as the least preferred yam substitutes in Ghanaian urban centers.

3.8 Household consumption expenditure and yam budget share analysis

This section discusses items on which households made day-to-day (recurrent) expenses with emphasis on yam budget shares.

Table 4.9: Household distribution by most preferred yam substitute

Yam Substitute	Accra		Kumasi		Techiman		Tamale		Pooled Sample		Rank
	Freq	%	Freq.	%		Freq.	%	Freq.	Freq.	%	
Plantain	41	28.5	19	18.1	57	47.5	10	8.5	127	26.1	2
Cocoyam	7	4.9	10	9.5	8	6.7	1	0.8	26	5.3	5
Gari	2	1.4	1	1.0	0	0.0	2	1.7	5	1.0	8
Cassava	5	3.5	4	3.8	3	2.5	17	14.4	29	6.0	4
Colocasia	1	0.7	4	3.8	0	0.0	1	0.8	6	1.2	7
Potato	12	8.3	2	1.9	0	0.0	4	3.4	18	3.7	6
Rice	55	38.2	49	46.7	36	30.0	59	50.0	199	40.9	1
Maize	21	14.6	16	15.2	16	13.3	24	20.3	77	15.8	3
Total	**144**	**100.0**	**105**	**100.0**	**120**	**100.0**	**118**	**100.0**	**487**	**100.0**	**-**

Source: **[29]**

3.9 Household recurrent expenditure

In this study recurrent expenditure items, as provided in Table 4.10a, were items on which household members made frequent expenses to ensure their survival and they included: food, child education, health care, utilities, communications and other social expenditure items like donations at funerals and Church/Mosque. It may be seen from Tables 4.10a & *b* that food, utilities, education, fuel and public transportation were the major household expenditure items in Ghanaian urban centers.

The average monthly household expenditure on all recurrent items was estimated at GH0219.30 for the pooled sample with average household size of five. Food alone constituted about 51% of the average monthly household recurrent expenditure. Household expenditure on each one of the other items was less than ten percent (refer to figure 4.5).

Figure 4.4 shows the average monthly household food and recurrent expenditures made by households in the four urban communities considered in this study. It may be seen from the figure that food formed a little more than fifty (50) percent of the total household recurrent expenditure in all the urban centers except in Accra where households spent about 42% of their recurrent budget on food (also refer to Table 4.10b). However, in absolute terms households in Accra spent more on food (GH0140.00) and total recurrent items (GH0410.00) in a month than households in the other locations. Monthly household expenditure on food and recurrent items was found to be least in Kumasi as compared to the remaining three urban centers. This may not be surprising since food andother recurrent items are generally cheaper in Kumasi than all other regional capitals in Ghana due to

the strategic central position of Kumasi in the country. Kumasi serves as the center from where food commodities brought from the major producing centers of the country are distributed to other urban communities. As a result, food is normally abundant in Kumasi throughout the year and at relatively cheaper prices.

Table 4.10a: Mean monthly household ^ recurrent expenditure (GHC) by consumer location

Expenditure Item	Accra	Kumasi	Techiman	Tamale	Pooled Sample
Food	142.38	66.56	101.12	95.99	104.25
Education	42.68	12.53	15.97	12.39	22.96
Medical Care	12.32	7.01	2.15	6.46	7.20
Utilities	67.41	10.36	7.30	16.53	29.29
Communication	28.57	8.59	14.85	5.52	16.39
Funeral	15.36	4.74	5.99	1.42	7.53
Church Donation	11.94	5.28	8.76	1.51	7.79
Lottery	0.81	0.39	6.10	0.34	1.96
Rent	50.87	3.40	6.24	5.31	19.28
Gifts	7.80	2.16	3.40	0.37	3.71
Alcoholic Beverage	8.15	1.15	2.13	0.88	3.43
Nonalcoholic Beverage	9.79	2.05	2.50	2.24	4.56
Transportation	13.41	8.18	25.92	6.58	14.58
Fuel (Own Vehicle)	46.10	15.35	12.57	5.36	22.04
Cigarette	2.99	0.32	2.17	0.08	1.47
Others	8.76	3.88	3.37	0.25	4.73
Total	**412.17**	**138.61**	**211.14**	**167.36**	**219.31**
Household Size	***5.13***	***5.66***	***6.00***	***7.64***	***6.07***

Source: [29]

From Table 4.10b, food budget share of total household recurrent expenditure was highest for Tamale (58%) followed by Techiman (53%), Kumasi (51%) and Accra (42%). GSS (2008)

estimated household food budget share of 39.6% for Greater Accra Region, 46.5% for Ashanti Region, 55.5% for BrongAhafo Region and 65.2% for Northern Region. From economic theory it has been established that low income households spend a higher proportion of total household budget on food than high income households [10]. On the average, households in Accra and Kumasi are richer than their counterparts in Techiman and Tamale. Mean 109 annual per capita expenditure (used as a proxy for income) was estimated at GHC 1050.00 for Greater Accra Region, GHC 682.00 for Ashanti Region, GHC514.00 for BrongAhafo Region and GHC 362.00 for Northern Region [21]. The relatively high income levels in Accra and Kumasi explain why households in these consuming urban centers spend relatively smaller proportion of their recurrent budget on food as compared to their counterparts in the yam producing urban centers (Techiman and Tamale).

Table 4.10b: Household recurrent budget shares (%) by consumer location

Expenditure Item	Accra	Kumasi	Techiman	Tamale	Pooled Sample
Food	41.96	51.14	53.28	58.15	51.13
Education	10.13	7.31	7.10	7.48	8.01
Medical Care	4.26	4.83	1.29	3.58	3.49
Utilities	8.96	7.81	4.25	7.56	7.15
Communication	4.38	4.89	5.76	3.70	4.68
Funeral	2.13	3.27	4.79	0.96	2.79
Church Donation	3.46	3.86	3.14	1.43	2.97
Lottery	0.39	2.64	2.21	0.96	1.55
Rent	6.93	3.29	3.81	2.15	4.05
Gifts	0.84	1.65	1.87	0.21	1.14
Alcoholic Beverage	0.31	0.88	0.91	0.54	0.66
Nonalcoholic Beverage	2.89	1.32	1.35	2.53	2.02
Transportation	5.56	3.82	4.92	3.85	4.54
Fuel (Own Vehicle)	6.57	2.57	3.22	4.57	4.23
Cigarette	0.59	0.35	0.61	0.96	0.63
Others	0.64	0.37	1.49	1.37	0.97
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: [29]

3.10 Household food expenditure

This subsection deals with expenditures on specific food commodities in the four study communities. Table 4.11 shows the average amount spent on the various food commodities in the selected urban centers per month. As also shown in Table 4.12 and Figure 4.7, the most important food items in Ghanaian urban communities as far as household food budget shares for the pooled sample were concerned included: meat (15%), Cereals (14%), fish (12%), yam (11.65%), and fruits and vegetables (11.56%). On the average, households in the pooled sample spent about GH01O.5O per month on yam as compared to GH017.OO on meat, GH014.8O on cereals and GH012.6O on fish for an average of six household members.

In Accra, cereals and fruits & vegetables took bigger shares (18% and 16% respectively) of household food budget than meat (15%), fish (14%) and yam (7.8%). In Kumasi and Techiman, however, meat and yam accounted for higher shares of household food budget. For households in Tamale, meat and fruits & vegetables were the most important food commodities as far as household food budget shares were concerned.

Figure 4.6 provides the mean monthly expenditures on roots and tubers according to consumer location. From the Figure and Table 4.11, it may be seen that households in Techiman spent more on yam (GH014.O1 per month) in absolute monetary terms followed by households in Accra (GH01O.15), Kumasi (GH08.88) and Tamale (GH08.65). In budget share terms, households in Techiman and Kumasi spent higher proportions of their food budgets on yam than households in Tamale and Accra (also refer to Table 4.12).

Table 4.11: Mean monthly household food expenditure (GHc) by consumer location

Food Item	Accra	Kumasi	Techiman	Tamale	Pooled Sample
Yam	1O.15	8.88	14.O7	8.65	1O.48
Cassava	5.9O	3.OO	9.57	2.O3	5.21
Gari	1.O1	O.7O	1.21	O.97	O.96
Cocoyam	1.27	O.57	3.44	O.O3	1.23
Taro	O.OO	O.22	O.O5	O.OO	O.O7
Potato	O.79	O.19	O.2O	O.64	O.46
Plantain	6.9O	2.8O	8.67	3.86	5.69
Fruits &Vegetables	22.76	5.31	7.39	13.85	13.O1
Cereals	25.22	9.85	1O.66	1O.67	14.84
Meat	22.1O	12.42	16.4O	15.6O	17.O1
Fish	18.82	9.O9	11.93	8.93	12.61
Dairy products & Confectionery	9.O4	3.92	3.11	4.54	5.45
Eggs	4.14	2.27	2.14	3.29	3.O4
Cooking Oils	5.51	2.41	5.32	7.58	5.29
Total	142.38	66.56	1O1.12	95.99	1O4.25

Source: [29]

3.11 Household yam expenditure analysis

This subsection is devoted to analysis of household expenditure on yam in relation to household characteristics. It focuses on yam budget share analysis and household expenditure on various yam varieties.

3.12 Yam budget shares

Yam budget share refers to the proportion of household food budget spent on yam. Table 4.13 provides the distribution of yam budget shares for households based on household characteristics and certain personal characteristics of the household head. It may be evident from the table that for the pooled sample female headed households spent a higher proportion of their food budget (12.5%) on yam as compared to male-headed

households who spent 10.9% of their food budget on yam. An Analysis of Variance (ANOVA) test *(F = 2.302, df =486)* indicated that the difference did not occur by chance, and that gender of household head influences household yam budget share at the ten (10) per cent level; but the difference was not significant at the five (5) per cent level. However, in Accra and Kumasi (yam consuming urban centers that do not produce yam) male headed households spent a higher proportion of their food budget on yam than their counterparts headed by women.

Evidence from Table 4.13 also shows a negative relationship between age and household yam budget share. Households in the pooled sample headed by younger people (<30 year olds) spent about 13% of household food budget on yam as compared to 11% by households headed by aged people (> 65 year olds). The same pattern was observed for the households in all the four urban centers considered in this study. An ANOVA test *(F-value = 1.514, df =482),* however, led to the conclusion that the difference was rather due to chance at the 10% level and thus a household's yam budget share did not necessarily depend on the age of the household head.

Figure 4.8 depicts the relationship between income level and yam budget shares across the four urban centers. Higher income households spent a smaller proportion of their food budgets on yam as compared to low income households and it implies lower expenditure elasticity at higher income levels. An ANOVA test of the difference between means led to the rejection of the null hypothesis that there was no difference in yam budget shares for the various income groups at the one percent level. This implies that household yam budget share was affected by the income level of the household head; low-income households devoted a larger proportion of their household budget to yam consumption than high-income households.

Due to the relatively high price of yam on the market, yam expenditure formed a greater proportion of the smaller food budgets of poorer households, *ceteris paribus.* This observation is consistent with economic theory which posits that the higher a household's income level, the smaller the proportion of its budget spent on food. For poorer households, survival was more important to them and thus they normally spent a larger share of their recurrent budget on food. It does not, however, mean that low income households spent more on food (yam in this case) than high income households in absolute monetary terms.

4.   Summary and Conclusions

The descriptive analysis examined the structure of food expenditure patterns for specific food and non-food items in Ghanaian urban communities, with special emphasis on the differences in yam budget shares across income groups and other personal characteristics of household heads. This analysis identified disparities in food budget shares of different food commodities across consumer locations, income groups, age, gender and educational levels, among other factors. However, this budget share analysis did not answer the question of whether the disparities arose from varying economic conditions faced by the households or whether they were the consequence of systematic differences in their economic behaviour due to different preferences. Yam demand elasticities for the selected urban centers and households in the various income groups which reflect this economic behaviour were also investigated in this study.

Consumer behaviour theory provides a useful theoretical framework for analysing food consumption. In the basic setting, income, prices, and preferences (which are shaped by household socio-demographic factors) are the factors that determine food demand. In order to choose a suitable model for this study, a detailed review of the body of literature on theoretical and applied demand systems for consumer behaviour analysis was provided. Comparative assessment led to the selection of the Almost Ideal Demand System (AIDS) and Quadratic Almost Ideal Demand System (QUAIDS) because of their flexibility, theoretical consistency and ability to depict non-linear Engel curves. However, effort was made to estimate the semi-log and double-log functional forms of the model to allow for comparison of parameter estimates.

Among others, the following specific findings were made from the study.

Yam variety, substitute and processed product preference

Majority (>80%) of yam consumers in Ghanaian urban communities prefer white yam to yellow yam and water yam. The most important reason for consumers' preference for yam varieties was taste. Varietal preference was found to be statistically independent of household income.

The most preferred yam product in Ghanaian urban centers was found to be boiled yam (ampesi) followed by pounded yam fufu). The null hypothesis of independence between yam product preference and income level was rejected statistically at the 1% level. A high proportion of low income households prefer yam in pounded form (fufu) while high income households prefer yam in the boiled form (ampesi).

Rice was identified as the most important substitute for yam in urban communities. Relatively more (41%) urban households purchase and consume rice when yam is unavailable or too expensive on the market. Preference of particular commodities as yam substitutes was found to be statistically independent of income level at the 5% level.

The study showed that average monthly household recurrent and food expenditures are lowest in Kumasi and highest in Accra. For the pooled sample, 51% of total household budget was spent on food in a typical urban community. Apart from households in Accra whose food budget share forms 42% of total household budget, households in the other urban centers spend between 51 and 59% of their total household budget on food.

On the average, 12% of the food budget of a typical urban household is spent on yam products. Yam budget shares are highest in Kumasi and Techiman (14 - 15%) and lowest in Accra where 8% of food budget is spent on yam. A typical urban household spends at least 10% of its food budget on meat, cereals, fish, and fruits & vegetables as individual commodities.

Low income households spend a larger proportion of their food budgets on yam. High income households spend less than 10% of their food budgets on yam compared with low income households who spend between 12 and 16% of their food budgets on yam. The study found out that there are statistically significant differences among households in different income groups as far as yam budget share is concerned.

Yam constitutes about 13% of average household away-from-home food expenditure budget which was estimated at GH0 6.80/month. Yam budget share of away-from-home food expenditure was highest in Techiman (19%), the least urbanized with lowest incomes, and lowest in Accra (6%), the most urbanized with highest incomes.

Food budget shares that households allocated to yam generally increased during the peak harvest season and dropped during the lean season across all urban centers in Ghana. This could imply that during the lean season when yam is relatively scarce, households rather increase their budget shares for other substitutes like cereals and 'low cost' roots and tubers like cassava and cocoyam.

The principal determinants of yam expenditure in all the consumer locations combined (pooled data) were identified to include consumer location, gender, number of active females in household, own price of yam and prices of substitutes (rice, maize, and cocoyam), household expenditures on fruits & vegetables, meat, fish, and yam away- from-home, and per capita household expenditure.

Gender, religion, and educational level of household head were among the significant determinants of household food budget share spent on yam in purely yam consuming urban centers (Accra and Kumasi) but not in the yam producing urban centers (Techiman and Tamale). Tribe of household head and household size were, however, significant determinants of yam budget shares in Techiman and Tamale but not in Accra and Kumasi. The magnitudes and directions of influence of these variables were mixed depending on the location of the household.

The number of active females (15 - 65 year olds) in the household was found to have a significant positive effect on yam budget shares in Ghanaian urban communities.

Household expenditures on yam substitutes (such as cassava, plantain, and cereals) and complements (e.g. fruits & vegetables, fish, and meat) were found to significantly influence the proportion of household food budget allocated to yam in all the urban centers. Household expenditure on the substitutes had a negative effect on yam budget shares; and due to their high prices, expenditures on the 'supposed' complements also had negative effects on yam budget share.

Yam expenditure elasticity's

Yam expenditure elasticity was found to be positive, implying that yam is not an inferior food commodity in Ghanaian urban communities. Yam expenditure elasticity for the pooled sample was found to be inelastic (0.76), suggesting that yam is a normal food commodity in a typical Ghanaian urban center. However, yam expenditure elasticity's for households of all income groups in Accra were estimated to be greater than unity (elastic), implying that yam is a luxury food commodity in Accra.

Yam expenditure elasticity was lowest for Tamale (0.64) and highest for Accra (1.01). This implies that Tamale households are least responsive and Accra households are most responsive to changes in household expenditure/income as far as yam budget share is concerned.

Generally, yam expenditure elasticity was found to be higher for low income households as compared to high income households in all urban centers. This implies that low income households are more responsive to changes in income levels as far as yam budget shares are concerned, ceteris paribus.

Yam expenditure elasticity was found to vary across seasons; yam was expenditure elastic during the lean season and expenditure inelastic during the harvest season. Yam expenditure elasticity for the pooled data ranged from 0.69 in August-September to 1.15 in the May-June period when yam was scarce. The implication is that yam is a necessary food commodity during yam abundant periods of the year and becomes a luxury food commodity during the lean season when yam prices are high.

Price elasticity's:

Own price elasticity (both compensated and uncompensated) for yam budget share was found to be positive and elastic in a typical urban center; implying that increases in yam price will cause household yam budget share to increase more than proportionately, all other things being constant at reasonable levels.

According to the magnitudes of cross-price elasticities for the selected related food commodities (cassava, plantain, cocoyam, maize, and rice), only substitution relationships were observed in a typical Ghanaian urban community. Except cocoyam, the relationships between yam budget share and the prices of these commodities were found to be elastic. However, household yam budget share was more responsive to changes in the price of rice, indicating its position as the most important substitute for yam in urban Ghana.

The own-price elasticity of yam budget share for the pooled sample (which was greater than unity) was higher than the expenditure elasticity (which was less than unity), implying that households react elastically to changes in own price of yam and in elastically to changes in household expenditure/income. So as far as yam budget share is concerned, households in a typical Ghanaian urban center are more responsive to changes in yam prices than household income.

Effect of women's income share and household size on household yam consumption

Women's share of household income was found to be positively related to household yam budget share; in Accra, a 10% increase in women's share of household income would warrant an 8% increase in the proportion of household food budget spent on yam, all other things being constant at reasonable levels.

Using the whole sample (pooled data), the study did not support the hypothesis of economies of household size with respect to household yam budget share. A positive and elastic or near-elastic relationship was observed between household size and household yam budget share in a typical Ghanaian urban center. However, in the seasonal analysis, household size had a significant effect on yam budget share during the yam 'abundant' (harvest) season. Households enjoyed economies of size in respect of yam consumption expenditure during the August - December period.

5. Recommendations

From the findings of the study, the following recommendations are made to improve the performance of the yam sector and food consumption at the household level in urban centers.

5.1 Yam production and distribution

High yam expenditure elasticity implies that with increasing income the consumption of yam will increase in urban centers. Policy should, therefore, focus on measures to improve the production of yam at the producing areas and its distribution to the consuming centers to forestall the possibility of any escalation in yam prices as consumers' incomes improve. Such possible price escalation could have negative nutritional effects especially on poorer households. The yam distribution system in Ghana could be improved through improved road network leading to the hinterlands where yams are produced. This would partly reduce and/or even out prices of yam and make them affordable in urban centers. This will not only increase household consumption of yam but will also reduce the seasonal glut and spoilage that are experienced in major yam producing regions in Ghana during the harvest season.

5.2 Improvement in household income

Household income levels in urban centers should be improved through job creation to empower households to meet not only their yam needs but their total household food requirements. Women in Ghanaian urban communities should engage in income generating activities/businesses and/or take up paid work so they can augment household income and thus ensure that household food requirements are met. This will reduce the incidence of malnutrition and its associated ailments at the household level.

5.3 Yam processing or value addition

The possibility of processing yam, especially less preferred yam varieties like water and yellow yams, into other forms like chips, flour, wasawasa and industrial starch should be explored by the central government through the Ministry of Food and Agriculture, research institutions, private business initiatives and non-governmental organisations that are interested in food security at the household level. Yam processing will not only reduce the quantum of yam spoiled every year during the harvest season, but it will also even-out the supply of yam products throughout the year to reduce the price differential between harvest and lean seasons and, therefore, make yam more accessible to low-income households, especially during the lean season.

5.4 Domestic food policy

Food policy (especially, rice import and yam export policies) should take account of the seasonal variations in the behaviour of consumers in order not to cause potential nutritional difficulties for consumers and/or income of producers. In this regard, the government should reduce export tariffs during yam abundant periods to increase yam exports, and increase export tariffs during lean season to reduce yam export. The government should also increase the production of yam substitutes (especially rice and maize) and embark upon buffer stock

programmes to store excess supply of these substitutes for use during yam-scarce periods of the year. Part of the huge rice import bill could be channelled into the production of local rice to make substitute food products available during the lean season of yam. Alternatively, import duties on rice could be reduced during the lean season of yam to encourage more supply of rice on the domestic market to ensure food availability and security at the household level.

5.5 Further research

The potential demand for processed products from yam in urban areas as well as the income earning potential (profitability) of yam processing businesses should be the focus of future research in Ghana. This is important for any policy that aims at adding value to the crop.

Future research on the effect of seasonality on household demand for other staple food commodities should be considered. This will help in fashioning out a comprehensive food security strategy for Ghanaian urban households.

Future food consumption studies should address the rural-urban dichotomy to establish whether there are differences in the factors that affect food consumption patterns in urban and rural areas.

When the above recommendations are carefully considered and implemented, among other strategies, Ghana's yam sector will improve and yam (as well as general food) requirements at the household level in Ghanaian urban centers would improve.

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