

CONSUMER ATTITUDES TO SORGHUM FOODS IN BOTSWANA

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Sorghum is the main crop grown in Botswana, but despite this, its consumption seems to be declining. In order to identify constraints and opportunities for enhancing utilisation of the crop, socio-economic and market surveys were carried in selected urban and peri-urban areas. These studies showed that sorghum still remains the most consumed cereal in peri-urban areas, accounting for 74% of total cereal consumption in these areas, but only 47% in urban areas. Consumption of sorghum on daily basis declined from 89% in 1982 to 75% in 1998 in selected villages of the Southern District. The crop is consumed mainly as sorghum meal, prepared as fermented or non-fermented soft (*motogo*) and semi-stiff porridge (*bogobe*). Other common sorghum products are traditional and commercial sorghum beer (*Chibuku* and *Power*), *Morvite*, and extruded sorghum-soy meals (*Tsabana* and *Tsabolthe*). Preference for these products is dependent on the age, place of origin, household size, educational level, residential area and gender of the consumer.

Generally, traditionally pound sorghum flour is preferred over the commercial sorghum flour. Several commercial sorghum flour brands are available throughout the country, but their quality is very variable. Consumers defined quality in terms of colour, texture and taste, and these parameters were linked to sorghum varieties and the type of milling process. Studies revealed consumers' desires for "modern" products formulated from sorghum. Typical products named include bread, biscuits, pasta, "rice", breakfast flakes and fermented beverages (*mageu*). This is the first study to identify consumer attitudes to sorghum foods in Botswana. The findings suggest that sorghum formulated products would be acceptable if they are nutritious, healthy, affordable, and could maintain traditional flavours.

INTRODUCTION

Domestic production of staple sorghum has significantly declined over the past three decades due to inadequate or erratic rainfall and prolonged droughts. This has in turn led to rapid urbanisation¹, as people became increasingly reliant on cash employment². Associated with urbanisation were increased imports of sorghum and other cereals such as maize, rice, wheat and their worked products, and most likely, changing consumer habits in favour of the more refined and easily available exotic cereals.

The relative tolerance of sorghum to the adverse climatic conditions (semi-arid) of Botswana make it an important food crop for the local people. It is therefore logical to focus efforts on encouraging domestic production, processing and utilisation of sorghum in the country. It is for this reason that an EU sponsored project entitled “Collaborative Project to Investigate Consumer Preferences for Selected Sorghum and Millet Products in the SADC Region of Africa” was implemented to identify constraints and opportunities for enhanced utilisation of the crop in the country. This paper reports mainly on the study which was undertaken under this project to identify consumer attitudes to sorghum products, in relation to other cereal products, in selected urban and peri-urban areas of Botswana. The report also captures some findings about consumer preferences for sorghum products revealed by other studies undertaken through the stated project.

METHODS

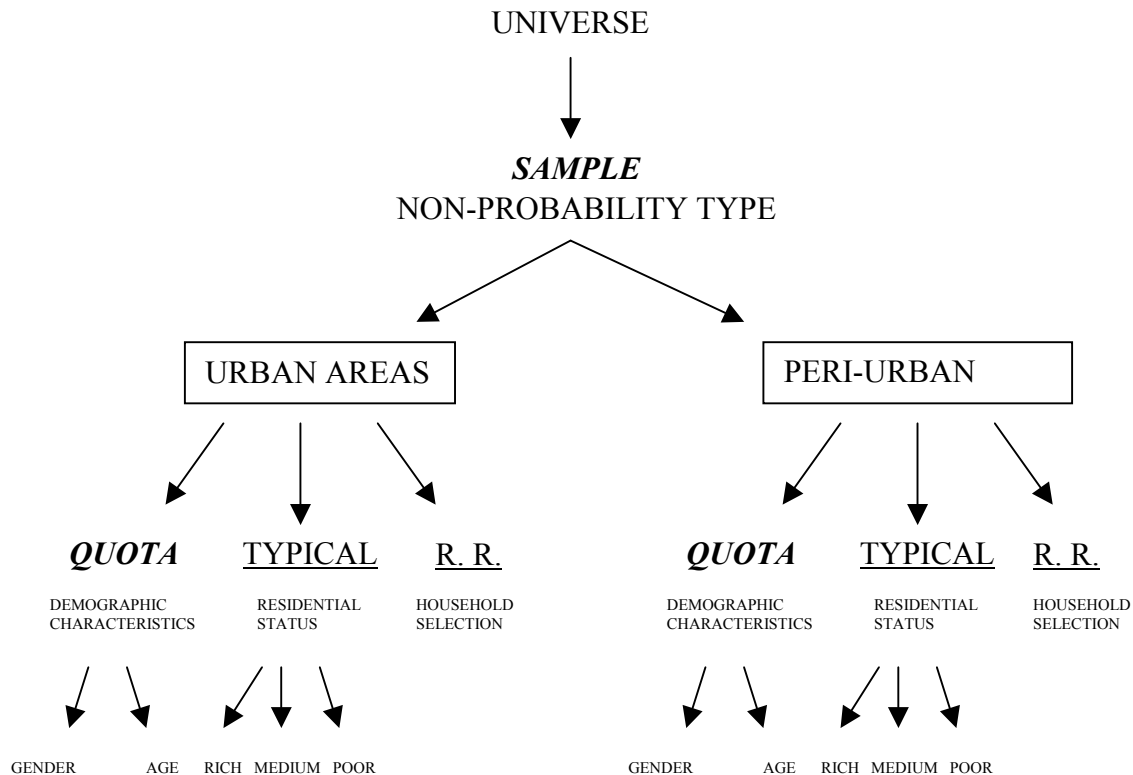
The study utilised a questionnaire that was designed to quantitatively capture information about (i) the demographic and socio-economic background of the respondents (profession, educational level, ethnic group, area of residence and sex), (ii) cereal consumption patterns of the households, (iii) consumption patterns of sorghum (and sorghum products) in relation to other cereals, and (iv) qualities valued by consumers in food products made from sorghum and millets. The former (i) represented the independent variables while the rest were the dependant variables.

Two urban (Gaborone and Francistown) and two peri-urban (Kanye and Masunga) centres were chosen for the study. These areas were classified based on their demographic and socio-economic information as contained in the Botswana 1991 census report, and were assumed to be representative of the urban and peri-urban centres of Botswana in general.

The sample population (universe) consisted of respondents aged 15 years and above, resident in the selected areas. A non-probability sampling method, which employed a quota sample technique, was adopted. Overall, 300 and 200 respondents were sampled for urban and peri-urban centres, respectively. The sample totals were apportioned in ratios proportional to the census figures for the areas selected. The respondents were further segmented into age groups of 15-19, 20-29, 30-39, 40-49 and above 50 years, to capture the influence of age on cereal product choices. Moreover, the quotas were split between gender groups to evaluate gender influence on the food choice.

The questionnaire was administered in the field using a random routing technique. Interviewers would start from a common point then proceed in different directions, each skipping five households between the interviewed households. Change of direction could be made after every interviewed household.

The data was processed using SPSS statistical package. The sampling technique employed nullified the importance of calculating the standard error.



R.R. = Random Routing

FIGURE 1: DIAGRAMMATIC ILLUSTRATION OF THE SAMPLING SCHEME

RESULTS AND DISCUSSIONS

Cereal Consumption Patterns

Sorghum was found to be the most frequently consumed cereal in both the urban and peri-urban areas, followed by maize, wheat, rice and millet respectively. The overall sorghum consumption frequency accounted for 47% of the cereal consumption in urban areas and 74% in peri-urban areas. In the latter areas 79% of the respondents ate sorghum everyday, while in urban centres 52% ate sorghum products daily. An earlier study conducted in some Southern and South-Eastern villages of the country showed that 96% of the respondents ate sorghum, 89% of whom ate it daily⁴. This change in statistics could be hinting a decline in national sorghum consumption.

Figure 2: Cereal Consumption Patterns In Urban Areas (% Frequency)

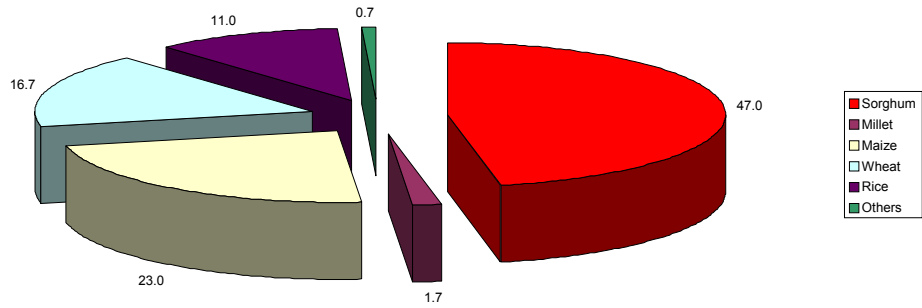


Figure 3. Cereal Consumption Patterns in Peri-Urban Areas (% Frequency)

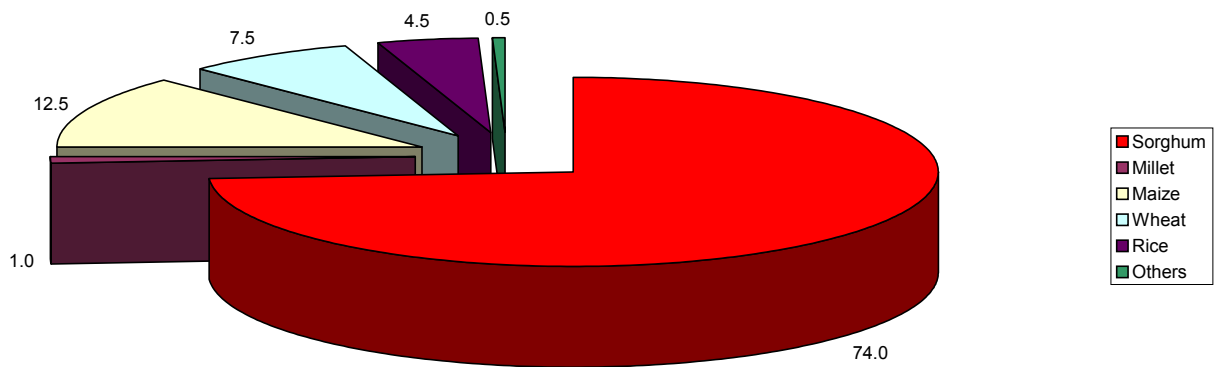


Figure 4. Consumption Frequency of Sorghum

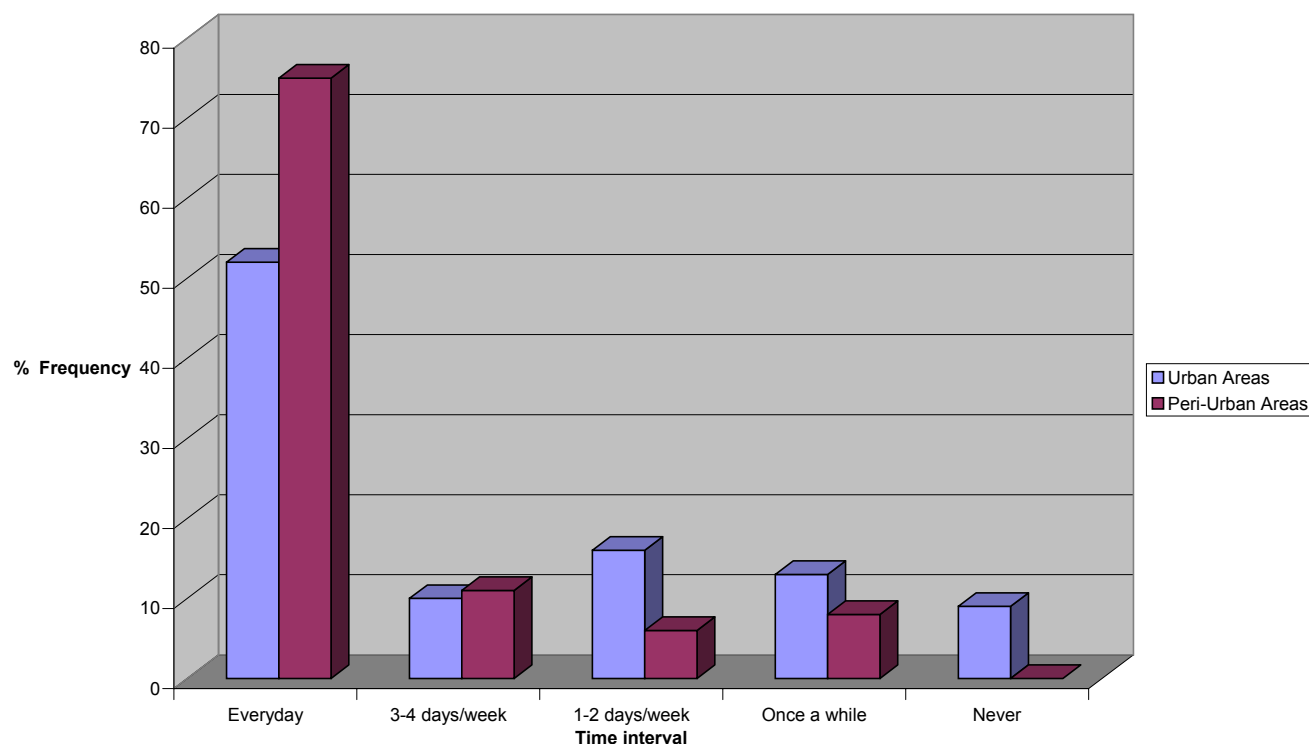


Table 1. Comparison of consumption frequencies of sorghum and other cereals

Consumption frequency	Sorghum (%)		Maize (%)		Wheat (%)		Rice (%)	
	Urban	Peri-urban	Urban	Peri-urban	Urban	Peri-urban	Urban	Peri-urban
Everyday	52	75	17	17	61	29	6	6
3-4 days/wk	10	11	34	29	13	30	33	31
1-2 days/wk	16	6	29	38	15	26	48	32
Once a while	13	8	17	16	10	15	16	30
Never	9	-	3	1	1	1	1	1

Perhaps in explaining the observed 9% for “Never” (ie never eat sorghum) in table 1 one should note that urban centres have cosmopolitan populations and therefore some of the consumers could likely be expatriate residents whose traditional diets do not incorporate sorghum.

Sorghum products consumed

Consumer preferences were assessed for common cereal products available in the market. For sorghum, the crop is consumed mainly as sorghum meal, prepared as fermented or non-fermented soft (*motogo*) and semi-stiff porridge (*bogobe*). Preparation of the porridge requires that the grain be dehulled first and then milled

into a semi coarse meal, before it is cooked with boiling water. Soft porridge is popularly consumed, eaten as breakfast and/or supper. This porridge typically contains solids at a ratio of 1 : 8-10 parts water. Recent studies carried out in the Southern District of Botswana by NFTRC, aimed at assessing the nutritional quality of common household dishes, showed that sorghum soft porridge, by itself, offers little in terms of nutrition. The porridge was shown to contain $90\pm 2\%$ water, $1.1\pm 0.8\%$ protein, $0.12\pm 0.06\%$ ash, $0.09\pm 0.03\%$ fibre and $8\pm 3\%$ carbohydrate. The analysis was as per AOAC methods and the results reported on wet weight basis.

To produce the sorghum flour, traditional milling is still practised, but mechanised milling has now become popular throughout the country at a commercial level. Several commercial sorghum flour brands of variable quality are available. Flours with lighter colour and moderate texture were considered good. Traditionally pounded flour remains the preferred choice, as it was said to give superior tasting porridge.

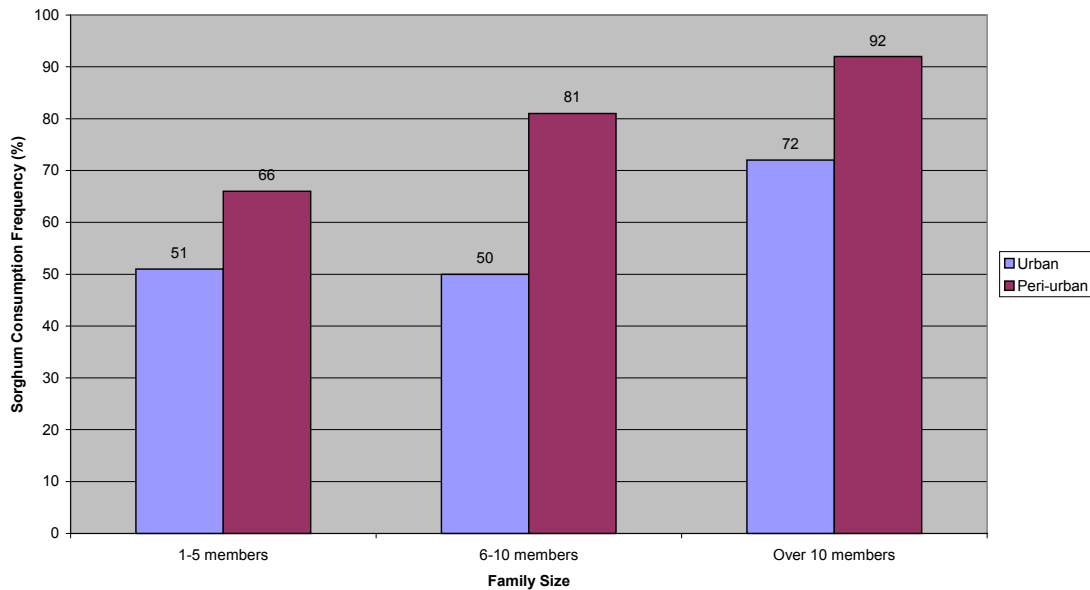
What constitutes good taste in the Setswana context is not well understood. Consumers' attempts at defining the parameter were very complex, combining the factors texture, consistency, sweetness and flavour of the porridge. It is known that these factors are determined by the chemistry^{5,6} of the grain, which in turn is controlled by the genetic makeup^{3,7,8}, and to some extent the agro-environment⁸ of the particular variety. Traditional varieties were considered superior in quality, while the recently introduced and improved varieties, most of which are exotic, were not favoured much.

Other common sorghum products consumed were traditional and commercial sorghum beer (*Chibuku* and *Power*), *Morvite*, and extruded sorghum-soy meals (*Tsabana* and *Tsabolthe*). The degree of preference for these products varied with age, place of origin, household size, educational level and the residential area of the consumers.

Influence of age group

Sorghum consumption frequency increased with age group. In peri-urban areas about 87% of the respondents aged above 50 years consumed sorghum everyday, while only 62% of the group aged 15-19 ate sorghum everyday. This correlation was more pronounced in urban areas where 81% of the older age category preferred consumption of sorghum on daily basis, as opposed to 43% of the younger age group. The study also revealed that the latter preferred modern worked products such as *Morvite* and *Tsabana* than the older group, who favoured less refined and/or processed cereal products. This trend was not peculiar to sorghum products only; a similar trend was observed for other cereal products. Most youths favoured products like corn-flakes, biscuits and pasta than the simpler products made from the same cereals; for example, 86% of the respondents aged 39 years and below liked *Morvite* while only 14% of those aged 40 and above preferred the product. Similarly, 48% of the age group 15-19 years liked corn-flakes whereas only 15% of those aged 40 and above liked the product. Based on these findings, perhaps consumption of sorghum could be increased by introducing a variety of convenient processed sorghum-based products that could be targeted for the youth.

Figure 6: Household Family Size Vs Sorghum Consumption Frequency



Influence of place of origin

Interviewees who were raised in rural areas had a higher preference for sorghum than those who grew up in urban areas. For urban area consumers, 56% of the respondents with rural origins consumed sorghum everyday while 36% of those from urban centres did the same. This variation could be explained by the fact that for a long time sorghum was a common food reserve for the rural population, and therefore even after migrating to urban centres consumers maintained their family consumption patterns and/or taste for sorghum. Perhaps urban raised respondents grew up on a wide choice of cereals and therefore developed taste preferences for other cereal products other than sorghum.

Influence of household size

Families with more than ten members consumed sorghum more frequently than smaller families in both urban and peri-urban centres. While this finding could be suggesting choice of sorghum for its favourably lower price (see Table 2), it could also be reflecting sustenance of cultural dietary choices, such as preference of sorghum for long-term satiety. Sorghum is by and large a traditional crop and is still highly regarded as such. Households with large families are typically very traditional and still maintain strong cultural norms and practices, and perhaps the reason for their choice of sorghum as the frequently consumed cereal. In addition to the forgoing, sorghum would be the preferred choice because of its versatility in preparation of soft and semi-stiff porridge. It is an “all-times” meal.

Table 2 Average Prices of Common Cereal Products in Kanye Village

Cereal type	November 1998			March 2003		
	2 or 2.5kg	5 kg	10 or 12.5 kg	2 or 2.5 kg	5 kg	10 or 12.5 kg
Rice	P7.95	P21.10	P41.85	P8.40	P26.50	P40.95
Maize	P3.98	P7.62	P18.08	P7.88	P15.65	P33.40
Sorghum	P3.68	P10.80	P13.92	P7.42	P15.69	P32.22

Influence of Educational Level

In general, the higher the educational level of the consumer, the lower the consumption of sorghum on daily basis. Table 3 below gives percentages of respondents, having different educational levels, who ate sorghum on daily basis in both urban and peri-urban areas.

Table 3: Educational Level Vs Sorghum Consumption

Educational Level	Urban Areas	Peri-urban Areas
“Read and Write”	70 %	79 %
Completed Primary School	62 %	81 %
Completed Junior Secondary	48 %	75 %
Completed Senior Secondary	38 %	55 %

This study was not designed to find out why these trends were observed. However, several arguments can be tossed to explain the observed correlation. Firstly, the decline in preference for sorghum as the educational level rises could be influenced by the school feeding programs available at the different school levels. Respondents who fell within the “Read and Write” category were those who missed out on formal education and hence had to enrol for non-formal education to just gain basic skills of reading and writing. These are typically individuals who lived most of their youth in rural areas engaged in agricultural activities. Their passion for sorghum remained untarnished. As for primary school leavers, Government provides sorghum as the main meal for primary school pupils. Because of this, primary school leavers could still be maintaining their school time feeding patterns. Secondary school students are offered menus that introduce them to a wider food variety. This in turn influences their post-school food choices, and perhaps diminishes their preference for sorghum. The second argument could be that as the students progress higher in their educational level they gain better understanding of nutritional information about food products and begin to make informed decisions about their food choices. A lot of available literature has placed sorghum in bad light regarding its nutritional benefits, especially the availability of its protein to the body^{9,10,11,12}, and hence, it could be considered nutritionally inferior by the students. Another possible and very likely argument is that the higher the schooling level the more the school work load of the students. This means that students become more pressed for time and therefore start recognising convenient cereal foods such as corn-flakes, and begin marginalising less convenient foods like sorghum porridge. One other possible reason is that sorghum could be considered food for the rural uncivilised by the educated.

Influence of residential area

In urban centres there are three distinct residential area classes which could be interpreted as reflecting the financial status of consumers residing in those areas. These areas were classified as “high cost” (rich), “medium cost” (medium income) and “low cost” (poor). Small but significant variation was observed for daily sorghum consumption statistics between these areas. For the high-cost areas 40% of the respondents ate sorghum everyday while 52% and 55% reported the same consumption frequency for medium-cost and low-cost areas respectively. This finding indicates that in Botswana sorghum cannot be regarded as food for the poor.

Factors that would influence the consumer choice for developed sorghum products

This study also wanted to identify parameters that consumers would value in choosing new sorghum-based products. In both urban and peri-urban areas consumers generally indicated that nutritional qualities, price, health benefits and preserved traditional flavour were very important considerations when choosing products made from sorghum. It is however important to note that for the old age group, 50 and above, priority was placed on preserving the traditional flavour. For the younger age (15-29 yrs), traditional flavour was ranked least important while health benefits were ranked highly. Globally, consumers are progressively becoming health conscious and therefore this finding indicates that local consumers, in particular the dynamic youth, have caught up with global trends.

CONCLUSIONS

Sorghum is the most consumed cereal in the urban and peri-urban areas of Botswana. Its consumption varies with age, place of origin, educational level, and household family size. Consumption of the grain can be increased if convenient products that are nutritious, healthy, affordable, and have traditional flavours could be developed.

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