Consumer perception and acceptance of foods of African tradition

K. Tomlins*[a], A. Bechoff[a] and M. Monteiro[b].

[a] Natural Resources Institute, University of Greenwich, Central Avenue, Chatham Maritime, Kent, ME4 4TB, UK

[b] Escola Superior de Biotecnologia, Universidade Católica Portuguesa | Porto

Edifício de Biotecnologia, Gabinete HU122/10, Rua de Diogo Botelho, 1327, 4169-005 Porto, Portugal

*Corresponding contributor. E-mail: k.i.tomlins@gre.ac.uk

Abstract

7.1 Introduction

Foods in sub-Saharan Africa (SSA) are diverse, varied and reflect a wide range of traditions and cultural tastes. The top ten agricultural produce in Africa in 2016 (by gross production value)(1) were, in order of value, cassava, yams, meat (indigenous, cattle), maize, milk (cow), rice, groundnuts, bananas, sorghum and plantain and this gives an indication (by proxy) of the most popular types of food. Cassava and yams are mostly consumed in the West and Central African regions while maize and rice are widely consumed in all regions. Of these top ten agricultural commodities, sorghum, millet, and yams are thought to be indigenous while the remainder were introduced from other parts of the world. Consumer attitudes and behaviours change over time because of many factors (e.g., consumer demographics, new product

introductions, economic trends, media influences, and food environment) evolve. Climate change may lead to a decline in some crops and an increase in others which could lead to changes in price. As food trends evolve over time, sensory and consumer research is important in re-evaluating liking, product characteristics, purchase intent, attitudes, beliefs, and habits within the food environment.

There is a paucity of information about consumer perception and acceptance of foods of African tradition, and in particular with respect to consumer trends. In order to explore consumer perceptions and acceptance, in this chapter, consumer demographics, agricultural production, sensory evaluation, and consumer preference approaches are explored, with each theme revealing different levels or types of information (**Error! Reference source not found.**). Consumer demographic trends (including marketing), while not usually specific to any given food product, can give an indication of macro changes - such as population growth, urbanisation and migration, changes in purchasing power and changes in food product marketing. The value of agricultural produce in Africa, over time, can give an indication of which food commodities are the most important and which ones are changing, particularly when compared with earlier time periods. Published research on sensory evaluation and consumer preference offers specific insights into new food products and testing methodologies.

[Figure 7.4.1 near here]

7.2 Consumer Demographics

SSA has a rapidly expanding population, which has increased by 63%, from 0.67 billion people in 2000 to 1.09 billion people in 2018(2). The population is projected to further increase to 1.7 billion by 2030. This fast population growth is anticipated to lead to expanding markets and increases in people's spending. Africa currently ranks third among the world's regions in terms of market growth behind East-Asia and the Middle-East(2). SSA comprises 51 nations and there is a wide variation in population size and gross domestic product (nominal and total) (**Error! Reference source not found.**). Six nations in Africa (Nigeria, Ethiopia, Côte d'Ivoire,

Tanzania, South Africa, and Kenya) constitute 50% of its population, and their consumer preferences are hence important. Total national wealth (GDP), however, equally influences consumer perception and choice. Just two nations (Nigeria and South Africa) represent 50% of Africa's total wealth. The nations with the highest individual spending power (GDP per capita), further differs and tends to comprise small to medium sized nations with those of higher GDP per capital above US$5,000 being Seychelles, Mauritius, Equatorial Guinea, Botswana, Gabon, South Africa, and Namibia. The differences by population size, national wealth, and individual wealth and also geography illustrate the diversity within Africa with respect access to food types.

[Figure 7.4.2 near here]

While populations are rapidly growing, income levels in Africa have not kept pace and household spending in the region has remained relatively stagnant. Nonetheless, consumer spending is expected to increase to nearly $1 trillion by 2020(3, 4) and if so, this will lead to changes in food purchases and eating behaviour. The African population is relatively young compared to other continents (about 60% are under 25 years old), and this suggests a potential sustainable consumer base for a wide variety of goods and services. In addition, democracy and rule of law are spreading which gives consumers more confidence in their future(4).

Challenges though persist for key-stakeholders involved in food production and distribution such as policy makers, businesses, farmers, and consumers. For example, there is a significant lack of infrastructure (particularly transcontinental linkages via road or rail), poor governance and localised fragile security and occurrence of conflicts(4). Africa remains highly divided with respect to wealth and prospect. The share of Africans living in extreme poverty though, has fallen substantially from 54% in 1990 to 41% in 2015. However, high population growth during the same period, means that the number of poor people in Africa has substantially increased from 278 million in 1990 to 413 million in 2015. If circumstances remain the same, the poverty rate is expected to decline to 23%, by 2030(5). Of the people living in extreme poverty in Africa, 82% live in rural areas and earn this primarily from subsistence farming. It

is anticipated that their food preferences will change more slowly than in urban areas and this may hinder access to more nutritious diets.

The pace of urbanisation in Africa is without precedent in its history(6),(7). For example, in 2015,Kenya had more urban dwellers than the entire African continent combined in 1950; Africa's urban population in 2015 was 567 million, compared to 27 million in 1950. Africa is expected to continue to have the fastest urban growth in the world and two-thirds of the future growth is predicted to be absorbed by urban areas. This means that by 2050, Africa's cities will be home to an additional 950 million people(6). This urban transition is likely to profoundly transform food preferences and consumption along with food chains and food production. This is illustrated by research on food preference that explored the effect of migration in Dar es Salaam, Tanzania(8, 9). Migration and urbanization were shown to impact staple food consumption which was influenced by their region of origin. After migrating to Dar es Salaam, consumers typically adopted the food culture and behaviour of the city over time. There were differences in consumption by gender. The research suggested that changes in staple food habits in urban areas may also illustrate a wider change in cultural identity and this is gender based.

A significant proportion of consumer spending in Africa current takes place in informal markets (i.e., street market, itinerant vendors) which accounts for about 40%(10). Large urban poor populations still rely heavily on the informal economy for accessible, affordable food; most eggs, meat, fish, and milk sold to the urban poor are from informal markets(7). Africa's formal consumer markets such as shopping malls, supermarkets, and e-commerce are currently the least developed in the world, offering substantial potential for future growth as the region's emerging markets undergo a process of economic modernization and demographic transformation(11).

The shift of African consumers from the informal markets toward more formal forms of consumption is already underway in all but the most fragile and underdeveloped countries. Within SSA, the largest consumer markets in terms of total volume is Nigeria, followed by

South Africa and Kenya(11). In urban areas, consumers tend to have a smaller family, are better educated, have higher earnings, and are move likely to use digital media(12). The growing popularity of fast food, coupled with the growing trends for convenience and value for money, have opened up opportunities within the African fast food market and have achieved global penetration with international fast food chains such as Nando's that originated in South Africa(13) while Mr Biggs, a Nigerian food chain is expanding in West Africa. The African fast food market is still in the early stages of development. There has been a significant increase in international fast food brands such as KFC, Burger King and McDonalds which have established franchises in South Africa but also in Kenya, Nigeria, Ivory Coast, Ghana, Malawi, Mozambique among others(13). This is shaping and responding to consumer demand but also contributing to the double burden of malnutrition in low income areas, especially in urban areas(14). Obesity in Africa in increasing(15) which is in part thought to be the result of urban consumers switching to foods that are high in calories, fat, sugar and salt. Food advertising is also in increasing demand for these foods and is thought to be associated with increased childhood obesity(16).

7.3 Food Production

Changes in agricultural production can indicate changes about what people consume and therefore can be a proxy for food preferences. The authors have used the United Nations Food and Agriculture database (FAOSTAT) to explore such changes in SSA. This was explored by a comparison of the ranked gross production values (constant 2004-2016 1000 I$)(1) between 2016 and 2000. The ranks were used so that this was less biased by changes in value and exchange rate over time. It should be noted that the information in FAOSTAT is based on estimates and hence there is a margin of error and also, not all of these commodities will be consumed locally as much will be exported or used for non-food use. The use of gross production values is only an indicator of preference changes because gross production can be affected by a range of factors including price, trade agreements and policy.

Commodities were ranked by total gross production value for 2000 and 2016 and the change in rank position during this time was plotted against gross production value (**Error! Reference source not found.**). The agricultural commodities which had the highest gross production values (cassava, yams, beef, maize, milk, and chicken) did not significantly change their rank positions between 2000 and 2016 which implies that probably overall preferences did not change significantly.

[Figure 7.4.3 near here]

Changes in preference can be explored by determining commodities that that changed most in rank position since 2000 but many of these did not have the highest gross production values (**Error! Reference source not found.**) and therefore will be discussed separately. The agricultural products that had the largest increases and decreases in rank position are indicated in Table 7.4.1 and
Table 7.4.2 respectively. The change in rank of these commodities can suggest changing consumer preferences and also possibly response to national and donor programmes.

Of the commodities that that increased their rank in gross production value since 2016 (Table 7.4.1), rice was already a key commodity but has further increased its rank position by two places. This may in part be due to the emergence of national programmes to reduce reliance on imported rice in Africa and as a response to the global food crisis in 2008(17). In particular, rice production increased significantly in Tanzania, Mali, and Sierra Leone. Rice is a popular component of many local dishes (for example in the fast food sector and traditional dishes such as Jollof rice, rice, and beans, waakye, palm oil rice etc). Beans has increased in rank position by eight places with the main producers being Tanzania, Uganda, and Kenya. The largest increases were in Ethiopia (increase by 229%) and Angola (increase by 329%) which are thought to be driven by increases in export and home-use, respectively. Part of the switch to beans may be because they can better cope with climate change but the evidence is not clear. Similarly, cowpeas have also increased in use both as a food and a feed. Beans are commonly seen as a more nutritious food being a good source of protein and iron; they have been widely

promoted by HarvestPlus in recent years(18). Tomatoes have risen substantially in rank by nine places. They are widely consumed in Africa with the largest producers being Nigeria and Cameroon. The increase in value probably reflects the growing demand for more nutritious salad items and as a component in many dishes, including fast foods. The increase in rank for mangoes, cashew nuts and sesame seeds is largely export driven. Sweet potatoes have also increased in rank and hence value and use since 2000 and has the benefit of being a crop that is resilient to climate change and new biofortified varieties have been introduced to reduce vitamin A deficiency(18). The dominant producers of sweet potato in Africa are Nigeria and Tanzania and the value of production in Ethiopia has also increased markedly. HarvestPlus has been actively promoting biofortified sweet potato which are high in pro-vitamin A(18-20). While the focus has been its promotion in areas where vitamin A deficiency is high, it is increasingly popular with fast food outlets.

Conversely, some agricultural commodities such as plantains, millet, sheep, and taro have declined in rank position since 2000. It is thought that plantains have generally declined because of hotter and dryer weather conditions and higher prices(21) and millet is struggling to complete with other grains because of its relatively low yield and is considered to be a 'lost crop'(22). The decline in sheep meat is due to changes in the cost of production and low demand for wool(23). The decline in taro (cocoyam) is probably due to the high cost of production and increased labour costs(24).

[Table 7.4.1 near here] [Table 7.4.2 near here]

Changes in food imports over time can also act as a proxy for changes in consumer preferences and consumption. Africa's food imports have risen sharply over the past couple of decades (from around US$ 10 billion in the early 2000s to US$ 35-40 billion in 2019)(25). Productivity of farmers who grow staple crops on small plots of land, but also other crops and livestock has also improved. By value, the main imported agricultural produce are cereals, vegetable oils, rice, oil palm and sugar. These products are common ingredients in processed foods and are

probably increasing due to changes in consumer demand through urbanisation and increased incomes.

7.4 Sensory Evaluation and Consumer Preference

Eating and drinking should be pleasurable. The sensory experiences evoked by foods and beverages are key to the delivery of pleasure and crucial to commercial success and health initiatives and driving food production. Advertising and branding motivate consumers to try products the first time, but if they do not like a product's appearance, aroma, flavour, or texture, they will not repeat the purchase. Sensory evaluation and consumer preference research techniques are available to measure, understand, and optimise consumers' experiences, so that food and drink products can be designed and marketed to meet consumers' sensory needs, thus reducing the risk of product failure in the market. The application of sensory evaluation and consumer preference is growing in SSA.

The use of sensory evaluation and consumer preference methodologies with respect to African products is fairly recent in scientific journals as indicated in a search in the Web of Science between 1975 and 2018. The Web of Science was used for the bibliographic search because while it might be less comprehensive than Google Scholar, it has a stronger quality control process and fewer duplicates(26). In Africa, there are probably many other examples of consumer and sensory testing by the commercial sector but these are often unpublished. Search terms included 'sensory', 'consumer', 'preference' or 'willingness to pay' with 'Africa' or 'name of African country'. Duplicates were removed and only publications that related to food and drink products were included in the authors analysis. A list of 227 publications were identified. The number of publications increased over time as illustrated in **Error! Reference source not found.Error! Reference source not found.** showing increased interest and relevant of the methods. The fitted curve indicated that the number of journal publications has increased exponentially over time, doubling every eight years or so.

[Figure 7.4.4 near here]

The testing of food and drink products in sensory and consumer preference is often driven by many factors(27). One factor is the value of production which can be compared by relating the rank of number of sensory and consumer preference publications by the rank gross production values(1) of commodities in Africa (Table 7.4.3). The comparison indicates that commodities such as cassava, meat, maize, rice, and banana that were among the highest in gross production value were also the ones that most appeared in publications involving sensory and consumer research. Exceptions were fruit and vegetables, bread, and tea/coffee/cocoa. Of these exceptions, tea/coffee/cocoa are high commercial value . Some common commodities such as yams, milk, sorghum, and plantains were ranked highly by gross production values (**Error! Reference source not found.Error! Reference source not found.**) but seem to be rarely explored in sensory and consumer research. These commodities may be neglected by researchers and warrant future investigation, in particular yams. Sweet potato was not ranked very high in terms of gross production value but has been subject to more intensive research in the area of sensory evaluation and consumer preference. This is because biofortified sweet potato containing pro-vitamin A is seen as an effective approach to improve health and reduce vitamin A deficiency(28).

[Table 7.4.3 near here]

Sensory evaluation and consumer has evolved into a complex, multi-disciplinary field and developed recently in SSA. The publications identified in the bibliography cover a broad range of areas being classified as those relation to ingredients and formulation, quality, shelf-life and storage and nutrition and health. Within each of these areas, various methodologies could be applied including sensory evaluation(29), consumer preference (hedonic)(30), consumer preference (willingness to pay)(31) and food choice(8). Food choice research is a new approach in the African context: it is an approach that provides insights into consumer preferences for a product in the context of the wider context of how people make choices in relation to other foods they consume(8). The counts of publications in relation to the above

combinations with respect to research in Africa is illustrated in Table 7.4.4. The majority of publications used sensory evaluation methodology and in relation to quality and then ingredient and formulation(32). Sensory evaluation publications relating to nutrition and health were mainly concerned with biofortified crops such as sweet potato(28, 33), cassava(34, 35) and maize(36). Consumer preference (hedonic) has focused on quality and nutrition and health, in particular in relation to more nutritious crops, in particular biofortified crops containing vitamin A(35, 37, 38). Consumer preference in relation to willingness to pay has been increasingly used in recent years for sweet potato(39), maize(40) and cassava(41). Shelf-life testing is less common but has been applied to a number of products including peanut butters(42). A recent approach has been to explore food choice which refers to how people decide on what to buy and eat. This has been explored in relation to migrants living in Dar es Salaam, Tanzania(8) and can have an impact on food diversity, health and obesity. It also relates to increased urbanisation in Africa(6) discussed earlier. This research indicated that while consumers consumed a diverse range of staples when in rural areas, the staple mostly consumed in Dar es Salaam was maize.

Research on consumer preference and sensory evaluation has been evolving over time. Some early research relating to Africa tended to rely on commercial tasters, for example in cocoa in Ghana(43). This was due to the initial absence of sensory and consumer expertise in research organisations within Africa. Published works were concerned with the introduction of sensory and consumer methodology to the food industry, for example tea(44) using commercial tea tasters scores along with production data to optimise the black tea manufacturing for quality in Malawi(45) and roasting of groundnuts in peanut butter roasters in Zimbabwe focusing on women's groups(42). New methodologies for sensory and consumer testing that can apply to people on low incomes and minimal education were evaluated using sweet potato as an example(29). Results suggested that when trained enumerators were used, quite sophisticated methods such as nine-point hedonic scales could be used as well as the ranking method and first choice. Later, consumer and sensory methods were used to evaluate preferences of sweet potato over two seasons and at several different locations(29). Preferences can differ by location as has been noted for sweet potato in Tanzania(29), fermented cassava in Nigeria(46)

and rice in Ghana(47) among African consumers. Hedonic testing in Africa has been extended to include evaluation of affordability of rice in Ghana(48), and willingness to pay using methods such as choice experiments for sweet potato in Uganda(39). Sensory evaluation and consumer preference is an important tool in helping to promote nutrition rich staples such as vitamin A rich biofortified orange fleshed sweet potato(20, 28, 31, 49-55), cassava(34, 41, 5659), maize(40, 60-62) and high iron beans(43, 63). Cross cultural preferences between African and European consumers has been explored and shown key differences which can be explained by differences in consumer knowledge and expectations(32, 64-66) for a range of products such as those made from maize and hibiscus.

[Table 7.4.4 near here]

Food systems could be characterised as being traditional or modern(67). Modern and traditional food systems and food security are primarily characterized by differences in food production, processing, and packaging of food products, retailing and distribution, and the rising influence of large numbers of urban consumers. The majority of publications (75%) on sensory evaluation and consumer preference in Africa were estimated to be related to 'modern' foods because they were concerned with new ingredients, processing, markets, and urban consumers. This indicates a strong demand for introducing new products into the market in Africa.

A gap in the analysis and interoperation of research on sensory evaluation and consumer preferences is the paucity of research published in the literature by the private sector. The private sector often spends heavily on advertising on processed foods that are higher fat, sugar and salt and is thought to be associated with increased obesity(15, 16) and potentially the double burden of malnutrition(14). Little research seems to have been undertaken in African in relation to health and food advertising. With the increasing urbanisation and purchasing power, better understanding the link may contribute to avoiding a future health crisis.

7.5 Conclusions and Trends

Foods in sub-Saharan Africa are diverse and varied. However, little is known about consumer acceptance, consumer attitudes or how behaviours change over time. This might be influenced by many factors, such as advertising, new product introductions, changes in life-style, economic trends, and climate change. Changes in consumer perception were explored by reviewing information about consumer demographics and attitudes, analysis of food production and a review of published literature on sensory evaluation and consumer preference. Sensory and consumer preference research is expected to become more important to Africa and help guide policy.

The analysis concludes that consumer trends in Africa are swiftly changing, probably as a result of rapid population growth and urbanisation along with increased purchasing power. While published literature on sensory evaluation and consumer acceptance is increasing (doubling every eight years), it lags behind research carried out elsewhere in Asia, Europe, and Americans for example. Some crops such as yams appear to be neglected by sensory and consumer research.

While new methodologies continue to be introduced and developed, new methodologies that involve face recognition(68), social media(69), artificial intelligence and tracking of electronic food purchases (mobile phone, internet and credit cards)(70) will increasingly provide new information about preferences potentially in real time. This will support healthy eating initiatives and support the value chains that provide nutritious foods.

However, there appears to be few publications on the interaction between food behaviour, markets, and consumer demographics. This gap appears to be filled by the commercial sector who increasingly have access to big data, via mobile apps, relating to consumer attitudes, purchase behaviour, food production and retail outlets. Foods that are ultra-processed are increasing sold to consumers and promoted on the basis of price, taste, texture, appearance, and social context rather than nutrition and the impact on health. Policy makers are increasingly

aware of the importance of eating not only for pleasure and social interactions but critically for nutrition and health. However, non-communicable diseases such as obesity and diabetes are increasing in much of Africa placing a burden on the quality of life, human productivity, and on health services. Intensive agriculture, food processing and packaging also have a critical impact on climate change and the environment. Better access to big data gathered by commercial enterprises for use in research and policy appears to be a critical gap in current research.

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Table Captions

Table 7.4.1 Changes in rank position for commodities that have increased since 2000 (based on Gross Production Value; constant 2004-2016 1000 I$)

Table 7.4.2 Changes in rank position for commodities that have declined since 2000 (based on Gross Production Value; constant 2004-2016 1000 I$)

Table 7.4.3 Rank order of commodities by gross production values in Africa and appearances in journal publications related to sensory and consumer preferences. Source. (1)

Table 7.4.4 Count of publications (Web of Science) relating to Africa by areas of research and sensory and consumer methodologies.

Figure Captions

Figure 7.4.1 Factors influencing consumer preferences from demographics, food production and product testing and methodologies.

Figure 7.4.2 Nominal Gross Domestic Product verses population size for African nations Note: The size of the bubble is related to the size of the population.
Only selected countries are labelled due to space considerations.

Figure 7.4.3 Changes in rank position in Africa between 2018 and 2000 by Total Gross Production Value (constant 2014-2016 million US$) by Commodity

Figure 7.4.4 Number of publications by year on sensory and consumer preferences in Africa based on Web of Science.
Note: An exponential curve was fitted to the data to illustrate the trend

Table 7.4.1

Commodity	Rank position (2016)	Increase in rank position since 2000
Rice	6	2
Beans	11	8
Tomatoes	15	9
Mangoes	16	11
Cow peas	21	9
Cashew nuts	23	14
Sesame seed	25	24
Sweet potatoes	31	4

Source; (1)

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Table 7.4.2

Commodity	Rank position (2016)	Decline in rank since 2000
Plantains	10	-4
Millet	19	-7
Meat (sheep)	22	-9
Taro (cocoyam)	33	-11

Source: (1)

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Table 7.4.3

Rank	Food and drink commodity	
	Gross production values (constant 2004-2016 1000 I$)(1)	**Occurrences in journal publications (number brackets(26))**
1	Cassava	Fruit and vegetables (18)
2	Yams	Meat (18)
3	Meat indigenous, cattle	Tea/coffee/cocoa (17)
4	Maize	Rice (14)
5	Milk, whole fresh cow	Cassava (14)
6	Rice	Maize (13)
7	Groundnuts	Sweet potato (13)
8	Bananas	Banana (6)
9	Sorghum	Bread (wheat) (5)
10	Plantains	Beverages (5)

Note: Number of occurrences in journal publications is based on Web of Science

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Table 7.4.4

Sensory and consumer methodology	Count of publications by area of research			
	Ingredients and formulation	Quality	Shelf-life and storage	Nutrition and health
Sensory evaluation	42	65	8	24
Consumer preference (hedonic)	15	28	0	22
Consumer preference (willingness to pay)	0	7	0	5
Food Choice	0	2	0	0

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