

Understanding Consumers' Attitudes: The Key to Increased Intake of Traditional African Vegetable in Tanzania

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Abstract

The contribution of Traditional African Vegetables (TAVs) to reduction of malnutrition, stunting and poor health among consumers in Sub-Saharan Africa cannot be overemphasized. This is due to high contents of vitamins, essential minerals and a source of dietary fiber. Although TAVs forms a significant component of many families' diets in Tanzania, consumption is still below the recommend by WHO and FAO in most regions. This paper aims at assessing attitudes towards TAVs and how they influence the intake of these nutrient-dense vegetables in Arumeru District, Tanzania. Cross-sectional design was used during the study. Pre-tested semi-structured questionnaire was used in the survey for face-to-face interview with consumers (n=262). Descriptive statistics were used for data analysis and Principal Components Analysis to show the interrelation among a set of attitudinal statements in order to identify the underlying structure of those attitudinal statements. From factor analyses scores, increasing intake of nutrient-dense vegetables (TAVs) was found to depend on Taste, Health, Freshness and Perception. The results showed that, the likelihood of consuming TAVs tend to be highly dependent on their taste among consumers. Next, Health benefits of TAVs was of high importance to consumers. Also, fresh TAVs were preferred than dried ones. Perception was least important attribute to consumers of TAVs. Consumers with a high awareness on the health benefits from TAVs attached more importance to consumption of these vegetables. In order to increase consumption of traditional African vegetables, promoting positive attitudes of consumers towards these vegetables as well as targeting to change the negative attitudes could play a significant role in encouraging consumers to increase the amounts and varieties of TAVs in their diets.

Keywords: Consumer attitude, traditional African vegetables, principal component analysis, Arumeru District

1. Introduction

Consumers in many parts of the world derive a major portion of their diets from vegetables which have been found to play a significant role in human nutrition, especially as important sources of vitamins, essential minerals, dietary fiber, and various phytochemicals (Liu et al. 2001). Traditional African vegetables (TAVs) form a significant source of food in both rural and urban areas of Sub-Saharan African (SSA). However, most SSA countries have not prioritized these TAVs in their crop research, training and development programs (Onyango A. & Onyango C., 2005; Adebooye & Opabote, 2005; Ngugi et al, 2007).

In Tanzania, consumption of TAVs is on the decline leading to a high prevalence of malnutrition, stunted growth and general poor health. Also, as noted by Odhav et al., (2007) the decline in use of TAVs by many rural communities has resulted into poor diets and increased incidence of nutritional deficiency disorders and diseases. In recent years, consumption of TAVs has gained little improvement (Keding et al., 2007). Several studies have noted that the frequency of intake of TAVs has been low over the years (Abukutsa-Onyango, 2007; Keller et al., 2005; Masayi & Netondo, 2012). Hence more efforts are needed to increase consumers' intake due to the health and nutritive values of TAVs.

TAVs such as amaranth, African nightshade and African eggplant, Spiderflower and Ethiopian mustard contain more nutrients compared to global vegetables such as white cabbage and spinach (Weinberger & Msuya 2004). However, introduction of global vegetables has become a threat to TAVs as noted by Chweya & Eyzaguirre (1999) particularly for consumers in urban areas. Low consumption of TAVs could be due to the negative perception held by some consumers. In this respect, Vorster et al., (2007) point out that, some people view these traditional vegetables as 'poverty food' or 'food for the backward'. This notion explains why some consumers are not positively inclined to them. Consumers' attitude toward TAVs appear to be associated with knowledge about them which in turn affect the extent of their consumption. Despite many people being aware of the benefits of TAVs, literature suggests that a lot of people have negative attitudes toward these vegetables. As Vorster et al., (2007) noted, positive perceptions about TAVs is more among older and rural consumers while negative perceptions are more common among younger and urban consumers.

Over the past years, consumers have become gradually more aware of the medicinal as well as nutritive value in TAVs. Ngugi et al. (2007) and Lewu & Mavengahama (2011) noted that organized markets including supermarkets and, local and regional markets as well as street vendors are controlled by TAVs' consumers. Consumers' attitudes such as taste, health, freshness and perceptions have dictated the standards set by supermarkets and, local and regional market. For the case of taste attitude, it is important to improve taste in vegetable species that have a bitter taste. Various TAVs varieties are mixed and cooked together, a practice that

improves the taste of the relish (Lewu & Mavengahama 2011). Furthermore, TAVs are only accepted if they are healthy and fresh (Ngugi et al., 2007). Also Smith & Eyzaguirre (2007) noted that urban dwellers prefer freshly harvested TAVs than dried ones. In the view of increasing consumption of TAVs in Tanzania, there is a need to understand consumers' attitudes toward these vegetables. Increase in consumption of TAVs can help to reduce the problem of malnutrition and promote healthy diets in both rural and urban communities in Sub-Saharan Africa.

2. Problem statement

Traditional African vegetables represent a diverse and widespread set of vegetables that are consumed across Tanzania. Leaves, fruits, and roots from over 1,000 species of TAVs form the backbone of traditional diets (Muhanji et al., 2011) but in many cases have been ignored at the expense of introduced vegetables like spinach and cabbage (Weinberger & Msuya 2004). A greater understanding of consumers' attitude towards TAVs would help address the consumption gap. It is only recently that the importance of TAVs has been recognized by researchers (Vorster et al., 2007) while studies on consumers' attitude towards TAVs have generally been few (Yang & Keding 2009). There is therefore lack of information on attitudinal views and perceptions of consumers on TAVs. In an effort to increase the role of TAVs in the nutrition of vulnerable communities in Tanzania, there was need to study consumers' attitude toward consumption of this group of foods. This study endeavored to provide more information in this area and bridge the existing knowledge gap.

This study was part of a project 'Improving Income and Nutrition in Eastern and Southern Africa by Enhancing Vegetable-based Farming and Food Systems in Peri-urban Corridors (VINESA)' led by AVRDC-The World Vegetable Center, Eastern and Southern Africa (AVRDC-ESA) and funded by Australian Center for International Agricultural Research (ACIAR).

3. Research methodology

This study was conducted in Arumeru District located in Arusha Region in Tanzania. It is one of the districts where VINESA-AVRDC project is being implemented. It is composed of three major ethnic groups which are the more sedentary, the Wameru and Waarusha and the pastoralist Maasai. The study was undertaken for about five months from July to November 2015. A cross-sectional survey of producers, traders and consumers of TAVs was carried out in the district. The study utilized purposive sampling technique to determine the respondents for the survey due to unavailable consumers' record in the study area. A total of 262 consumers were interviewed. A structured questionnaire was developed and administered to the respondents.

Respondents were asked to rate their agreement with 11 attitudinal statements on a five point Likert-type scale labelled strongly agree, agree, not sure, disagree and strongly disagree. The scales were scored so that 1=strongly agree to 5 = strongly disagree. A total of 11 statements were chosen in order to be able to determine the attitudinal views of the participants on the various attributes of TAVs. The statements were developed from ideas generated during these qualitative interviews with key informants and were then put into the questionnaires for this particular group. These statements were also developed in recognition of the local beliefs and attitudes of the people in relation to their consumption of TAVs.

The questionnaire was pre-tested, modified and refined before starting the fieldwork. After editing and coding the questionnaires, the data were analyzed by means of Stata 13 (StataCorp 2013). Responses to the 11 attitudinal statements were subjected to a Principal Components Analysis (PCA). Principal component factoring started with extraction of principal components, but then retained only those that meet criteria of importance, those with eigenvalues above 1. The principal axis factoring was used to extract the components, and this was followed by a Varimax orthogonal rotation (George & Mallery 2003). This method uses PCA by eigenvalue analysis and it explains correlations via explaining common variance. Varimax method runs an orthogonal rotation method which minimizes the number of variables that have high loadings on each factor. This method simplifies the interpretation of the factors.

4. Results and discussion

4.1 Respondents' personal characteristics

Table 1 shows demographic characteristics of the respondents. The results show that most of the respondents (74%) were females, which reflects the fact that women were mostly responsible for doing the household food shopping in keeping with most African customs. More than 80% of respondents were married, out of which more female (58%) were married than male (22%). This suggest that females are responsible for food purchasing within the household.

With respect to education, almost 76% of the respondents had primary level education, females with primary education were 55% while 21% of male respondents had primary education. In general, females had basic education which influences purchases decision as well as consumption of TAVs. Nearly 63% of the respondents had agriculture as their main occupation. This implies that more than half of respondents were

consumers engaged in on farm agricultural activities. This also mean that they grow crops other than TAVs varieties including spinach, white cabbages and cauliflowerer.

The results in Table 2 shows the mean age of the respondents was 39.6 ± 16.9 years. This means that participants in the study were middle-aged group. The mean annual household income was $1,411,663 \pm 1,097,182$ Tshs while mean amount spent to purchase TAVs per week was $6,328 \pm 4,500$ Tshs. These imply that consumers have set budgets to purchase in spite of their perception towards TAVs varieties.

4.2 Respondents attitudes towards TAVs

The results of the analysis of responses to the 11 attitudinal statements are as shown in Table 3. The results show that 69.85% and 27.86% of consumers` agreed and strongly agreed respectively that consumption of traditional African vegetables (TAVs) was important to women and children as well as to men and 24.43% and 70.61% positively agreed and strongly agreed that intake of TAVs improves eyesight and boost body immunity. 41.98% and 40.08% of respondents believe and strongly believe respectively that fresh TAVs contain more nutrients than dried ones while almost 100% of the respondents agreed that TAVs are best consumed when fresh. 51.91% and 44.66% of the respondents positively agreed and strongly agreed respectively that it was important to choose daily diet accompanied with TAVs while 45.80% and 44.27% agree and strongly agreed respectively that consuming TAVs variety each day provides all the vitamins and minerals required by the body.

About 39.69% and 52.67% of the respondents disagreed and strongly disagreed respectively that traditional African vegetables are inferior foods or food for the poor. 53.82% and 34.73% disagreed and strongly disagreed respectively that TAVs take time to prepare. Nearly 45.42% and 46.56% disagreed and strongly disagreed respectively that TAVs are not good to their health. Almost 30.53% and 29.77% disagreed and strongly disagreed that TAVs are tasteless and bitter. During focus group discussion, these observations were confirmed by respondents that "African nightshade and spider plants were bitter and tasteless if not mixed with other TAV varieties during consumption." Nearly 100% of the respondents were committed and willing to use their own resources especially time to safeguard and preserve TAVs for the coming generation by continuing to grow as well as to consume them.

4.3 Principal components analysis

In order to identify underlying factors for consumers` attitudes, factor analysis was performed based on the important scores of TAVs` consumption. Hence Bartlett`s test of sphericity was performed and results were found statistically significant ($\chi_{255} = 397.864$; P-value < 0.001). This indicates that sufficient correlations exists among the attitudinal statements to proceed with analysis. The Kaiser-Meyer-Olkin's (KMO) overall measure of sampling adequacy (MSA) from this data was 0.667, which adequately borders on the recommended threshold of 0.7, suggesting that the data was appropriate for Principal Component Analysis.

The results of the factor analyses with determination based on Eigenvalues>1 are shown in Table4. Four factors were reduced from the PCA. The first factor, 'Taste', consisted of questionnaire item related to taste. 'Health' indicated how respondents perceive their TAVs in relation to health. 'Freshness' related to respondents` preference toward either dried or fresh TAVs. 'Perception' related to how generally respondents perceive TAVs in terms of being good to them or not.

The "Taste" factor explained most of the variance (18.55%) on consumption. Four attitude variables concerning taste of TAV varieties loaded on Factor 1 with the cross-correlation coefficients of 0.460, 0.514, 0.790 and 0.783 respectively. This factor was termed 'Taste' of TAV varieties because these variables involved taste of TAVs by local consumers, and also it loads higher in this factor compared to other statements. Higher scores and positive responses on this factor revealed a general opinion that it was important to consider how TAV varieties taste. It was also found that African nightshade and African eggplant when cooked alone taste bitter. But if they are cooked mixed with other TAV varieties for example amaranths will increase their consumption. Willingness to preserve TAVs for the next generation had the highest load (0.78) indicating a promising future of TAVs by consumers. In general, consumption of TAVs is associated with taste. In order to increase consumption, there is a need for innovative recipes that would be able to attract consumers` attention.

The "Health" factor had cross-correlation coefficients of 0.740, 0.772, and 0.410 respectively. These statements focused mainly on health values. This factor accounted for 15.31% of the total variance. Consumers are persuaded that TAVs have medicinal properties and hence are important for human health. African eggplant has been used as treatment for blood pressure, African nightshade for increasing blood and jute mallow was also used for stomach ulcers as well as cure for pain in the joints. Previous studies have also reported the use of TAVs for medicinal purposes in the study area (Chweya & Eyzaguirre 1999; Keller 2004). Consumers use these foods due to their knowledge of the crop medicinal properties in them. For example, African nightshade was reported to cure stomachache while spider plant was reported to aid constipation (Onyango n.d.).

The findings agree with previous research in the study area which reported that communities consider amaranth and pumpkin leaves to be good for the eyes when eaten (Keller 2004). This implies that the health

value in these TAVs influence their consumption positively.

The “Freshness” factor had three attributes loaded and had cross-correlation coefficients of 0.646, 0.640, 0.450 respectively (Table 4). These attributes focused on the importance of consuming fresh TAVs. Hence Factor 3 was termed ‘Freshness’ of TAVs. This factor accounted for 14.36% of the total variance. Generally, TAVs are consumed for their freshness (Maundu et al., 2009; Neergaard et al., 2009). In the study area, dried vegetables are not commonly found compared to other areas in Tanzania due to the fact that Arumeru District receives rain almost throughout the year. This may also imply that respondents have less familiarity with dried vegetables due to less exposure to them. In other countries, for instance Southern and West Africa, drying of vegetables is common (Maundu et al., 2009) due to long seasons without fresh vegetables. This indicated that, fresh TAVs were preferred than dried ones.

The “Perception” factor had cross correlation coefficient of 0.899. This statement was labeled ‘Perception’ and accounted for 10.0% of the total variance. There is a negative perception towards TAVs particularly associated with men that these vegetables are not good for them. It has been in the communities for years. However, some little change of attitude has also been observed. For example, in Meru tribe, men do not eat traditional food ‘kitalolo’. Kitalolo is a mixture of cooked banana, sour-milk and TAVs like amaranth and African nightshade. Men aged above 18 years are not allowed to eat ‘kitalolo’. Other studies have noted that consuming vegetables particularly TAV is more appropriate for women only, and that meat is the food for men. This mindset; has been seen in other cultures as well (Sobal, 2005). Negative perceptions toward TAVs hinder their consumption. The cumulative percent of variance for all the four factors (Taste, Health, Freshness, Perception) explained was 58.22%.

5. Conclusion

In an effort to increase consumption of nutrient-dense vegetables, should target to change attitudes of consumers that are responsible for current low intake of TAVs. This was shown by the finding that the “Taste” factor had the highest loading in the factor analysis. However, a small number of consumers argue that some of the TAVs were tasteless and others were bitter as to be unpalatable. It was also found that African nightshade and African eggplant when cooked alone taste bitter. However, when mixed with other TAV varieties for example amaranth when cooking their consumption increases. In order to achieve this aim, VINESA project should develop and promote recipes that improve taste of TAV varieties. Further, the medicinal properties significantly influenced consumption of TAVs. Thus, there is need to increase medicinal knowledge of these crops to a larger population. Fresh TAVs were preferred highly than the dried ones. There is need to promote drying of TAVs knowledge with a focus of increasing consumption. There is also need to improve preparation and cooking of these vegetables to maintain their taste and nutrient contents. The findings also showed that the perception factor loaded high. This implies that a change of attitude is important because TAVs play an important role in human health. In view of increasing intake of nutrient-dense vegetables (TAVs); innovative ways of mixing various TAV varieties during consumption could improve taste. Further propagating the health values that can be obtained from TAVs via posters, campaigns, road shows and cooking demos at the organized and unorganized markets where consumers come across. Also, storage technology which will preserve freshness as well as nutritional contents of TAVs. Culture and food taboos influence consumers’ perception, this might take a long time to change. There is still need for researchers to closely interact with people so as to clearly understand consumers’ attitudes.

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Table 1: Demographic characteristics of study respondents

Demographic properties	Frequency	% of total
Gender (%)		
Female	163	73.66
Male	69	26.34
Marital status (%)		
Married	214	81.68
Single	35	13.36
Separated	2	0.76
Divorced	2	0.76
Widow or widower	9	3.44
Ethnicity group (%)		
Meru	119	45.42
Maasai	8	3.05
Arusha	53	20.23
Chagga	54	20.61
Others (Sukuma, Nyakyusa, Iraqw, Pare)	28	10.69
Main Occupation (%)		
Agriculture	164	62.60
Casual labor	19	7.25
Formal employment	8	3.06
Business	38	14.50
Agriculture and livestock	33	12.60
Level of education (%)		
None	23	8.78
Primary	198	75.57
Secondary	36	13.74
Middle-level college	2	0.76
University	3	1.14

Table 2: Demographic summary statistics

Demographic properties	Mean	Std. deviation (sd)
Age	36.645	16.892
Years in schooling	6.950	2.802
Yearly income	1,411,663	1,097,182
Weekly TAVs budget	6,328.626	4,500.913

Table 3: Respondents attitudes towards TAVs

Attitudinal views/Dimensions	Percent of households within the response				
	Strongly Disagree	Disagree	neutral	Agree	Strongly Agree
Consumption of TAVs important to women, children and men	0.76	0.76	0.76	27.86	69.85
TAVs are inferior foods, poverty food	52.67	39.69	2.29	2.29	3.05
Fresh TAVs contain more nutrients than dried ones	1.53	4.58	11.83	41.98	40.08
Intake of TAVs variety each day gives vitamins and minerals needed	0.38	0.38	9.16	45.80	44.27
Important to choose daily diet with TAVs	0.76	0.38	2.29	51.91	44.66
Eating TAVs improve eyesight and boost immunity	0.38	1.15	3.44	24.43	70.61
TAVs are best consumed when fresh	0.76	1.15	0.38	45.04	52.67
TAVs takes more time to prepare	34.73	53.82	0	6.49	4.96
TAVs are not good to me	46.56	45.42	0	0.38	7.63
TAVs are tasteless and bitter	29.77	30.53	2.29	33.97	3.44
I am committed to preserve TAVs for next generation	0.38	1.15	0	40.23	58.24

Table 4: Factor loadings from Principal Components Analysis (PCA)

Factor and item description	Factor loading*	% variance explained
Factor 1: Taste		18.55
TAVs are inferior foods (poverty food)	0.460	
It is important to choose diet accompanied with TAVs	0.514	
TAVs are tasteless and bitter	0.790	
I am willing to preserve TAVs for the next generation	0.783	
Factor 2: Health		15.31
Consumption of TAVs is important to women, children and men	0.740	
Consumption of TAVs improves eyesight and boosts immunity	0.772	
TAVs takes more time to prepare	0.410	
Factor 3: Freshness		14.36
TAVs are best consumed when fresh	0.640	
Fresh TAVs contain more nutrients than dried ones	0.646	
Eating a variety of TAVs each day guarantee vitamins	0.450	
Factor 4: Perception		10.00
TAVs are not good to me	0.899	

Note: Factor loadings and the percentage of variance explained are based on the rotated solution. Only attitudes with factor loading >0.35 were included.