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Consumer preferences and market potential for sorghum based clear beer in Tanzania

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This paper assessed the influence of consumers on sorghum based clear beer (Eagle) value chain in Tanzania. The specific objectives were to assess consumers' preferences and market potential of Eagle beer in Tanzania. The study areas were Moshi Rural and Karatu Districts in Kilimanjaro and Arusha regions respectively in Northern Tanzania. In these regions, the Eagle beer was launched for the first time by the manufacturers, that is, Tanzania Breweries Limited (TBL) in 2007. The respondents were selected purposely from different drinking outlets in Moshi Rural and Karatu districts. The findings show that the majority of the Eagle consumers were males, 87% in Moshi Rural and 93% in Karatu districts, respectively and their mean age was 36 years. The educational level of most of the consumers was primary education that is 63% for Moshi Rural and 67% for Karatu districts, respectively. The majority of consumers were married that is 73% in Moshi Rural and 60% in Karatu districts respectively. Most consumers shifted to Eagle due to reasonable price followed by its taste. The mean beer consumption was 20.5 bottles (500 ml) per week for Moshi Rural district consumers and 32 bottles per week for Karatu district consumers. Most preferred drinking outlet in Moshi Rural was bar (43%) followed by grocery stores (33%) whereby in Karatu, the most preferred outlet was grocery store (53%) followed by bars (43%). Most Eagle consumers shifted from drinking other beer brands and very few shifted from drinking spirits and locally produced beer or wines. However, 83% of Eagle consumers in Moshi Rural and 86% in Karatu districts respectively were consuming TBL products before switching to Eagle beer. The remaining were consuming non-TBL products and local drinks. The logistic regression analysis whereby consumers' willingness to buy (WTB) Eagle beer was a dependent variable, showed that consumers' taste of Eagle beer, consumers' preference, grocery stores and bars were statistically significant. Log-linear regression analysis results whereby Eagle beer weekly consumption was a dependent variable showed that consumers' taste and preference of Eagle beer and household income were statistically significant. Therefore, it is concluded that price, taste, preferences and household income had influence on Eagle beer consumption in Moshi Rural and Karatu districts respectively. It is therefore recommended that more marketing and promotion should be done in order to capture the market share that is still enjoyed by locally produced drinks and non-TBL products. However, care should be taken as this might cannibalize other TBL brands. Hence, as long as Eagle market is there, TBL will continue to buy sorghum from farmers and therefore farmers' income will be improved.

Key words: Consumer preference, market potential, Sorghum based clear beer.

INTRODUCTION

Sorghum and millet are important cereals for food security in the central Tanzania (Dodoma and Singida), Western Zone (Tabora, Shinyanga and Mwanza) and Southern Zone (Mtwara, Lindi and Ruvuma), (Monyo et al., 2002). Due to its importance, sorghum technologies in terms of improved seeds were introduced in Tanzania under Sorghum and Millet Improvement Program (SMIP) in collaboration with the International Centre for Research in Semi-Arid Tropics (ICRISAT). Despite all these efforts, the challenge becomes where to sell surplus sorghum in case

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Table 1. Sorghum requirements estimate by major sorghum buyer in Tanzania.

Organization/Company	Requirement (t) per year
DarBrew (Opaque beer)	2200
Storage (SGR up to 16 October 2006)	1900
Fidahussein (Export)	>1000
Tanzania Breweries Limited (TBL)	1040
Human Foods (Power Foods, Nyirefami Ltd)	600
Animal Feed	300
Small scale sorghum based weaning foods producers	< 2.5

Source: (Mbwaga et al., 2006; TBL, 2008; Makindara et al., 2010; DarBrew, 2011).

of good weather or due to increased acreage especially from recently introduced commercial farming in Arusha and Manyara regions. It is estimated that sorghum production has increased from 380,000 ha in 1986 to 890,000 ha in 2005 with production ranging to 0.61 million tons of grains per year and productivity being 0.9 t per ha (Mbwaga et al., 2006). Despite the increase in sorghum production, commercial sorghum consumption has been low as presented in Table 1.

Thus, linking sorghum farmers to markets becomes necessary in order to ensure market for excess sorghum produced. This in turn will increase assurance on household income obtained by farmers in order to meet food and other non-food requirements such as health and education of their family members especially children. Recently, Tanzania Breweries Limited (TBL), based on their experiences in Zambia and Uganda, introduced sorghum based clear beer Eagle as one way of diversifying their raw materials from barley to sorghum which is also produced locally. This is also due the fact that sorghum has been found to be one of the alternative substrate that can be used in larger beer brewing beside barley (Owuama, 1997). Thus, TBL becomes one of the potential consumers of the sorghum produced by small scale farmers in Tanzania. Despite the opening of TBL market for sorghum producers, its sustainability also depends on whether the product produced, that is, Eagle beer fetches good market or fairing well in the Tanzanian market. This is due to the fact that Tanzanian beer market is very competitive not only from other popularly competing brands such as *Serengeti* Lager but also from locally produced alcohol, wines and spirits. Thus, this study therefore assessed consumer preferences and market potential for sorghum based clear beer (Eagle) in Tanzania.

METHODOLOGY

Theoretical framework

Supply side constraints, increasing production costs and new shift to value addition processes among producers in agricultural based food products and agribusiness firms in Tanzania have led these firms to increase research on new products which will be using cheap raw materials as well as being readily available in their vicinity (Parker, 2009). Besides, the current growth rate of urban population which is associated with changing in food consumption habits and preferences such as eating already cooked food or eating away from home is becoming a common phenomenon among workers of many cities in developed world (Byrne et al., 1996). This shift in consumption habits is also happening in developing countries such as Tanzania. Thus, Tanzania Brewery Limited (TBL) a beer producing company in Tanzania was not left behind and therefore decided to research on the use of sorghum as an alternative raw material for its beers in Tanzania. Besides, TBL was pushed by its successful experience in their sister breweries in Zambia and Uganda (Kapstein et al., 2009), whereby the breweries have managed to reduce dependence on barley and use sorghum to produce their clear beers. Therefore in May 2007, TBL launched Eagle beer whose major component is sorghum in Tanzania market. However, launching a new product which will be successful in the market is not an easy task without proper market and consumers' preferences assessment. Moreover, the situation is more challenging especially when the target product is not in the market, even when such product has succeeded in other market niches. This study therefore planned to assess consumers' willingness to buy (WTB) Eagle beer in Tanzania market based on non-market valuation (Whittington, 1998) and hedonic influences (Ahtola, 1985). The target group were the beer consumers in the TBL market areas of Kilimanjaro and Arusha Regions in the Northern Tanzania. However, when the study was underway, TBL launched the products in Kilimanjaro and Arusha and hence the study was slightly modified into assessing the potential WTB Eagle beer. That is, the study assumed the current Eagle price during the study as a border line such that those consumers who set their WTB prices below the market price were considered as non potential and those who set their WTB prices equal or higher than the market price were considered as potential Eagle customers. Then the WTB Eagle was regressed against consumers' preferences of the beer, household income, price of other beers and the nature of the outlet as independent variables. The outlet variable was included based on the argument that there were 'contextual' factors which may influence peoples' consumption of food hence its acceptability (Petit and Sieffermann, 2007) and according to Meiselman (1992), four contextual factors have been argued to influence food consumption and ultimately its acceptability. These factors are whether the consumer evaluates the food as part of a meal, effects of social interaction during food consumption, the environment in which the food is consumed and the ability to make choices regarding the food that is being consumed (Meiselman, 1992). Therefore the regression model for the potential WTB sorghum based clear beer (Eagle) was as follows:

$$PoteWTP = \alpha + \beta_1 SBTaste + \beta_2 Preferences + \beta_3 PriceSB + \beta_4 PriceOB + \beta_5 IncCons + \beta_6 OutLet + \sum$$

Where; PoteWTP = is the potential WTB sorghum based clear beer; SBTaste = Is the consumer tastes scores for the sorghum

Table 2. General characteristics of the consumers.

Variable description		District			
		Moshi Rural		Karatu	
		Response	Percent	Response	Percent
Sex of the respondents					
Females		4	13.3	2	6.7
Males		26	86.7	28	93.3
Total		30	100.0	30	100.0
Marital status					
Single/Under age		3	10.0	12	40.0
Married		22	73.0	18	60.0
Divorced/Separated		1	3.3	0	0.0
Widowed		3	10.0	0	0.0
Single parent		1	3.3	0	0.0
Total		30	100.0	30	100.0
Educational levels of the respondents					
None/Kindergarten		1	3.3	1	3.3
Primary		19	63.3	20	66.7
Secondary		10	33.3	7	23.3
Tertiary		0	0.0	2	6.7
Total		30	100.0	30	100.0
	Unit	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Age of respondents	Years	36.00	7.10	36.00	14.70
Household size	Count	4.00	1.50	4.30	5.10

beer; Preferences = Consumer preference scores for the sorghum based clear beer; PriceSB = Is the price of sorghum based clear beer; PriceOB = Is the average price of other beer brands; IncCons = Consumers' income; OutLet = Type of beer outlet and ∑ = Disturbance term.

In this model, the dependent variable is PoteWTP and the independent variables were taste parameters, consumers' preferences, the price of the alternative beers (substitute beers), income of the consumer and location of the outlet. The consumers' taste and preference parameters were obtained using a Likert scale whereby the consumers were asked on their likeness of the taste parameters and rate them in a scale of 6 to 1 whereby 6 being like very much and 1 being dislike very much.

Selection of study areas

Consumer surveys were conducted in Moshi Rural and Karatu Districts, in Kilimanjaro and Arusha Regions respectively. Arusha region is one of the unique regions in Tanzania. It has both highlands and lowlands climatic conditions. The lowland areas are the hottest and dustiest while the highlands are good for agricultural production. Administratively, Arusha has six districts namely, Arusha, Arumeru, Karatu, Longido, Monduli and Ngorongoro. Longido is the latest district to be formed after splitting of Monduli. According to the 2002 population census, Arusha region had a population of 1,288,088. The average growth rate is estimated to be 4% p.a. The main ethnic groups are Iraqw, Arusha, Maasai and Meru. Others include, Sonjo, Gorowa, Rangi, Chaggas and Pare. There is no current household incomes data however, based on Household Budget Survey that was done in 2000/2001 the mean household income and expenditure per capita for Arusha region is 20,596 and 10,323 respectively (NBS, 2003).

Kilimanjaro region has been named after the highest mountain in Africa, Mount Kilimanjaro. The mountain has two peaks, the snow capped Kibo and Mawenzi. The highest pick is 5,895 m above sea level and is covered by snow throughout the year. Kilimanjaro region covers an area of 13,209 sq km or 1.4% of the area of the entire Tanzania Mainland. Administratively, Kilimanjaro has seven districts namely, Moshi Urban, Moshi Rural, Rombo, Same, Mwanga, Hai and the newly formed one Siha which was split from Hai district. Kilimanjaro region had a population of 1,381,149 according to the 2002 population census and an average annual growth rate of 1.6%. Mean household incomes and expenditures for Kilimanjaro region according to HBS of 2000/01 is 17,544 and 11,173 TAS, respectively (NBS, 2003).

The research design was cross sectional and non-probability sampling that is snowballing whereby consumers were asked to identify their fellow Eagle drinkers/consumers who were then selected for the survey in their drinking outlets in Moshi Rural and Karatu districts respectively. Consumers: The actual sample size is 60, whereby 30 respondents were from Moshi Rural and the other 30 from Karatu districts respectively. Structured questionnaire was used to assess consumers' preference for Eagle beer and the price they were willing to pay. Hedonic assessment was done based on consumers' preference on Eagle appearance (presentation), colour, taste, colour, smell (aroma) and body (texture). The consumers' data obtained was entered and analysed for descriptive statistics using an SPSS. Regression analyses were done using STATA statistical programme.

RESULTS AND DISCUSSION

General characteristics of the consumers

The study assessed socio economic characteristics of the respondents in terms of sex, marital status, age educational level and household size. The findings are presented in Tables 2 and 3.

Table 3. Consumers' income earned (US$) and beer consumption per week.

Variable	Descriptive statistic	District Moshi Rural	Karatu
		Moshi Rural	**Karatu**
Income	Range	2117	2706
	Minimum	353	118
	Max	2470	2824
	Mean	835	1094
	Std. Dev.	547	794
	Range	67	137
	Minimum	3	3
Consumption	Max	70	140
Per week	Mean	20.5	32.0
(500ml bottle)	Std. Dev.	13.6	28.5
	N	30	30

Table 4. Consumers' favourite drinking outlet.

Type of the outlet	Moshi Rural Response	Percent	Karatu Response	Percent	Average Percent
Bar	13	43.3	13	43.3	43.3
Grocery store	10	33.3	16	53.3	43.3
Restaurant/Hotel	1	3.3	0	0	1.7
Home	0	0.0	1	3.3	1.7
Bar and Grocery	5	16.7	0	0.0	8.3
Home, Grocery and Bar	1	3.3	0	0.0	1.7
Total	30	100.0	30	100.0	100.0

The majority of sorghum based on clear beer (Eagle) consumers were males, which was 87 and 93% in Moshi Rural and Karatu districts respectively. The females were 13 and 7% in Moshi Rural and Karatu Districts respectively (Table 2). The mean age of consumers was 36 years for both districts with standard deviation of 7.1 years for Moshi Rural and of 14.7 for Karatu (Table 2). The survey indicates that 73% of the consumers in Moshi Rural and 60% in Karatu were married; while 10 and 40% were single in Moshi Rural and Karatu districts respectively (Table 2). The survey data indicates that the majority of the consumers' respondents have attained primary education (7 years) that was, 63% in Moshi Rural and 67% in Karatu districts respectively (Table 2). However, 33 and 23% of the consumers have attained secondary education (12 years) in Moshi Rural and Karatu Districts respectively (Table 2). The mean household size of consumers in Moshi Rural and Karatu districts were 4.0 people with standard deviation of 1.5 and 4.3 people with standard deviation of 5.1 in Moshi Rural and Karatu districts respectively (Table 2).

The study assessed consumers' incomes and beer consumed per week. The results are presented in Table 3. The mean consumers' income is US$ 835 with standard deviation of US$ 547 for Moshi Rural and of mean income of US$ 1094 with standard deviation of US$ 794 for Karatu consumers respectively (Table 3). It was found that the mean value of beer consumption per week was 20.5 (500 ml) bottles with standard deviation of 13.6 and 32.0 with standard deviation of 28.5 for Moshi Rural and Karatu districts respectively.

The most favoured drinking outlets in Moshi Rural were bars (43%) followed by grocery stores (33%) while in Karatu were grocery stores (53%) followed by bars (43%). Seventeen percent of the consumers preferred both bars and grocery stores. Very few consumers in both districts preferred hotels, restaurants or drinking at home (Table 4).

Consumers' classification and drinking patterns

The study attempted to classify consumers based on their drinking frequencies per week and group them as regular, occasional or seasonal drinkers (Table 5). From the drinkers' classification, eighty three percent (83%) of consumers in Moshi Rural and 80% in Karatu were regular drinkers, while 17% are occasional drinkers in both districts and only 3% were seasonal drinkers in Karatu district (Table 4). The study categorized drinkers / consumers as low, medium or high income earners (Table 5).

Table 5. The consumers' drinking classification and income category.

Consumer category	Moshi Rural		Karatu		Average
	Response	Percent	Response	Percent	Percent
Regular drinker	25	83.3	24	80.0	81.6
Occasional drinker	5	16.7	5	16.7	16.7
Seasonal drinker	0	0.0	1	3.3	1.7
Total	**30**	**100.0**	**30**	**100.0**	**100.0**
Consumer income level	**Response**	**Percent**	**Response**	**Percent**	**Mean Percent**
Low income	15	50.0	13	43.3	46.6
Middle income	14	46.7	12	40.0	43.4
High income	1	3.3	5	16.7	10.0
Total	**30**		**100.0**	**30**	**100.0**

Table 6. Consumers' drinking classification vs. beer consumed per wk (500 ml bottle).

Consumer category	Moshi rural				Karatu			
	No. of beers consumed per week (%)				No. of beers consumed per week (%)			
	<14	15-34	≤ 35	Total	< 14	15-34	≤ 35	Total
Regular drinker	26.7 (8)	40.0 (12)	16.7 (5)	83.3 (25)	23.3 (7)	23.3 (7)	33.3 (10)	80.0 (24)
Occasional drinker	16.7 (5)	0.0 (0)	0.0 (0)	16.7 (5)	6.7 (2)	6.7 (2)	3.3 (1)	16.7 (5)
Seasonal drinker	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	3.3 (1)	0.0 (0)	3.3 (1)
Total	43.3 (13)	40.0 (12)	16.7 (5)	100.0 (30)	30.0 (9)	33.3 (10)	36.7 (11)	100.0 (30)

Fifty percent of consumers in Moshi Rural and 43% in Karatu districts were low income earners; 47% in Moshi Rural and 40% in Karatu were middle income earners and the higher income earners were only 3% in Moshi Rural and 17% in Karatu districts respectively (Table 5). The cross-tabulations between the type of consumers and the amount of beer consumed per week showed that the majority of regular drinkers in Moshi Rural (40%) drunk about 15 to 35 bottles of beer per week; 27% drunk less than 14 bottles and 17% drink 35 bottles or more. In Karatu district, the majority of regular drinkers (30%) had drunk more than 35 bottles of beer per week; while 23% drunk less than 14 bottles and another 23% between 15-34 bottles each. For the case of occasional drinkers, 17% in Moshi Rural drunk less than 14 bottles while in Karatu district, 17% of the occasional drinkers took about 15-34 bottles (Table 6).

The study also assessed the amount of beers drunk based on the income (Table 7). The low income earners in Moshi Rural and Karatu districts drunk more beers than the middle and higher incomer earners (Table 7). Among the regular drinkers in Moshi Rural district, the majority were middle income earners, that is 43% follo-wed by low income earners (37%), while in Karatu district, the majority of regular drinkers are low income earners (37%) followed by middle income earners (30%). In addition, the regular drinkers in both districts were the low incomer earners as well (Table 7).

The study assessed the age of the consumers and the consumer category as well as the number of beers drunk per week. The findings show that the younger consumers (aged between 19-35 years were regular drinkers, that is 47% each for both districts, followed by 27% in Moshi and 20% in Karatu districts respectively who were regular drinkers aged between 36-45 years. However, in Karatu district, 13% of old people (56 years and above) are regular drinkers (Table 8).

When cross-tabulating the age of consumers versus the amount of beer consumed per week, consumers aged between 19-35 years drunk between 15-34 bottles of beer per week, that is 30% and 23% in Moshi Rural and Karatu districts respectively. For the consumers aged between 36-45 years, 13% in Moshi district drunk 14 bottles or less while in Karatu 13% drunk 35 bottles of beer or more. Surprisingly, Karatu had older people who consumed 14 bottles or less while in Moshi there was none (Table 8).

Consumers' preferences for sorghum based clear beer

The study assessed the consumers' preferences for sorghum based clear beer and the reasons for the consumers to shift from their previous beer preferences (Table 8). The majority of surveyed consumers claimed

Table 7. Consumers' income category vs. beer consumed per wk (500 ml bottle).

Consumer income level	Moshi Rural				Karatu			
	No. of beers consumed per week (%)				No. of beers consumed per week (%)			
	<14	15-34	≤ 35	Total	< 14	15-34	≤ 35	Totals
Low income	26.7 (8)	16.7 (5)	6.7 (2)	50.0 (15)	16.7 (5)	10.0 (3)	16.7 (5)	43.3 (13)
Middle income	16.7 (5)	23.3 (7)	6.7 (2)	46.7(14)	10.0 (3)	16.7 (5)	13.3 (4)	40.0 (12)
Higher income	0.0 (0)	0.0 (0)	3.3 (1)	3.3 (1)	3.3 (1)	6.7 (2)	6.7 (2)	16.7 (5)
Total	**43.3 (13)**	**40.0 (12)**	**16.7 (5)**	**100.0 (30)**	**30.0 (9)**	**33.3 (10)**	**36.7 (11)**	**100.0 (30)**

	Consumer category				Consumer category			
	Regular	Occas	Season	Total	Regular	Occas	Season	Total
Low income	36.7 (11)	13.3 (4)	0.0 (0)	50.0 (15)	36.7(11)	6.7 (2)	0.0 (0)	43.3 (11)
Middle income	43.3 (13)	3.3 (1)	0.0 (0)	46.7(14)	30.0 (9)	6.7 (2)	3.3 (1)	40.0 (30)
Higher income	3.3 (1)	0.0 (0)	0.0 (0)	3.3 (1)	13.3 (4)	3.3 (1)	0.0 (0)	16.7 (5)
Total	**83.3 (25)**	**16.7 (5)**	**0.0 (0)**	**100.0 (30)**	**80.0 (24)**	**16.7 (5)**	**3.3 (1)**	**100.0 (30)**

Table 8. The consumers' age group vs. consumer category and consumption per week.

Consumer age groups	Moshi Rural				Karatu			
	Consumer category				Consumer category			
	Regular	Occas	Season	Total	Regular	Occas	Season	Total
19-35 years	46.7 (14)	13.3 (4)	0.0 (0)	60 (18)	46.7 (14)	6.7 (2)	3.3 (1)	56.7 (17)
36 - 45 years	26.7 (8)	3.3 (1)	0.0 (0)	30 (9)	20.0 (6)	6.7 (2)	0.0 (0)	26.7 (8)
46-55 years	10.0 (3)	0.0 (0)	0.0 (0)	10 (3)	0.0 (0)	3.3 (1)	0.0 (0)	3.3 (1)
56 years and above	0.0 (0)	0.0 (0)	0.0 (0)	0.0(0)	13.3 (4)	0.0 (0)	0.0 (0)	13.3 (4)
Total	83.3 (25)	16.7 (5)	0.0 (0)	100.0(30)	80.0 (24)	16.7 (5)	3.3(1)	100.0 (30)

Consumer age groups	No. of beers consumed per week				No. of beers consumed per week			
	<14	15-34	≤ 35	Totals	< 14	15-34	≤ 35	Total
19-35 years	23.3 (7)	30.0 (9)	6.7 (2)	60 (18)	13.3 (4)	23.3 (7)	20.0 (6)	56.7 (17)
36 – 45 years	13.3 (4)	10.0 (3)	6.7 (2)	30 (9)	6.7 (2)	6.7 (2)	13.3 (4)	26.7 (8)
46-55 years	6.7 (2)	0.0 (0)	3.3 (1)	10 (3)	3.3 (1)	0.0 (0)	0.0 (0)	3.3 (1)
56 years and above	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	6.7 (2)	3.3 (1)	3.3 (1)	13.3 (4)
Total	43.3 (13)	40.0 (12)	16.7 (5)	100.0 (30)	30.0 (9)	33.3 (10)	36.7 (11)	100.0 (30)

Table 9. Consumers' reasons for shifting to sorghum based clear beer.

Consumers reasons for shifting to Eagle beer	Moshi Rural		Karatu		Average
	Response	Percent	Response	Percent	Percent
Reasonable price	13	43.3	9	30.0	36.6
Good taste	11	36.7	6	20.0	28.4
Alcoholic content is tolerable	3	10.0	7	23.3	16.6
No hangover in the morning	2	6.7	6	20.0	13.4
Eagle is an appetizer	0	0.0	2	6.7	3.4
Availability	1	3.3	0	0.0	1.6
Total	30	100.0	30	100.0	100.0

that they shifted to Eagle beer due to reasonable price (43% in Moshi Rural and 30% in Karatu districts respectively); thirty seven percent (37%) in Moshi Rural and 20% in Karatu districts claimed that they had shifted to Eagle beer due to its taste and 10% in Moshi Rural and 23% in Karatu district claimed that its alcoholic content was tolerable (Table 9).

In addition, other consumers claimed that the hangover

Table 10. Consumers preferences for Eagle beer based on quality parameters.

Quality parameter	Moshi Rural				Karatu			
	Response				Response			
	5	4	3	Total	5	4	2	Totals
Appearance	90 (27)	10 (3)	0 (0)	100 (30)	90 (27)	7 (2)	3 (1)	100 (30)
Colour	83 (25)	17 (3)	0 (0)	100 (30)	83 (25)	13 (4)	3 (1)	100 (30)
Taste	90 (27)	10 (3)	0 (0)	100 (30)	97 (29)	3 (1)	0 (0)	100 (30)
Smell	90 (27)	10 (3)	0 (0)	100 (30)	80 (24)	17 (5)	3 (1)	100 (30)
Body/Texture	87 (26)	13 (4)	0 (0)	100 (30)	87 (26)	10 (3)	3 (1)	100 (30)

Table 11. Consumers' WTB sorghum beer if presented for the first time and price.

Consumers WTB Eagle beer	Moshi Rural		Karatu	
	Response	Percent	Response	Percent
Yes	27	90	30	100
No	3	10	0	0
Total	30	100.0	30	100.0
WTB Price (US$)				
0.47	7	23.0	4	13.3
0.60	22	73.0	25	83.3
0.70	1	4.0	1	3.3
Total	30	100.0	30	100.0
Amount to Spend for Eagle (US$)				
≥1.76	11	36.7	14	46.7
2.12 - 3.50	17	56.7	7	23.3
3.90	2	6.7	9	30.0
Total	30	100.0	30	100.0

effect was low that is 7% in Moshi Rural and 20% in Karatu district respectively. Other reasons included beer availability and those who claimed that they drink it as an appetizer (Table 9). The study also assessed consumers preferences of sorghum based clear beer based on quality parameters and the findings are presented in Table 10.

Based on the quality parameters the consumers' preference scores for sorghum based clear beer were higher for appearance, taste and smell that is 90% in Moshi Rural followed by body/texture 87% and the last being colour which scored 83%. In Karatu district, the quality parameter that scored high was taste that is 97% followed by appearance 90%, then body/texture 87%. Colour and smell scored low, that is 83 and 80% respectively (Table 10).

Consumers' WTB for sorghum based clear beer

The study assessed whether the consumer were willing to buy sorghum based clear beer assuming that they heard about it for the first time. Ninety percent (90%) of consumers in Moshi Rural claimed that they were willing to buy it while in Karatu 100% claimed they would (Table 11). When solicited about the price they would pay for a 500 ml bottle of sorghum based beer, 73% in Moshi Rural and 83% in Karatu claimed that they would be willing to buy for US$ 0.60, while 23% in Moshi Rural and 13% in Karatu districts claimed that they would buy for US$ 0.47. Only 4% in Moshi Rural and 3% in Karatu districts respectively claimed they would buy for US$ 0.70 (Table 11). The consumers were also asked about the amount of money they would spend per week for Eagle beer. Thirty seven percent (37%) of consumers in Moshi and 47% In Karatu were willing to spend US$ 1.76 or less, 57% in Moshi Rural and 23% in Karatu were willing to spend between US$ 2.12 to US$ 3.50 and 2% in Moshi Rural and 30% in Karatu were willing to spend US$ 3.90 or more (Table 11).

Sorghum based clear beer market potential

The study assessed the consumers' switching pattern from the brands they were drinking to the consumption of

Table 12. Consumers' beer consumption switching pattern.

Beer/drink taken before Eagle	Moshi Rural			Karatu		
	TBL product	Non-TBL product	Total	TBL product	Non-TBL product	Total
Safari	57.0 (17)		57.0 (17)	63.0 (19)		63.0 (19)
Kilimanjaro	17.0 (5)		17.0 (5)	20.0 (6)		20.0 (6)
Tusker	3.0 (1)		3.0 (1)	0.0 (0)		0.0 (0)
Castle	3.0 (1)		3.0 (1)	3.0 (1)		3.0 (1)
Serengeti		10.0 (3)	10.0 (3)		3.0 (1)	3.0 (1)
The kick		7.0 (2)	7.0 (2)		3.0 (1)	3.0 (1)
Konyagi	3.0 (1)		3.0 (1)	0.0 (0)		0.0 (0)
Local brews	0.0 (0)		0.0 (0)	7.0 (2)		6.7 (2)
Total	83.0 (25)	17.0 (5)	100.0 (30)	93.0 (28)	7.0 (2)	100.0 (30)

Table 13. Consumers' source of information about Eagle beer.

Source of Eagle information	Moshi Rural		Karatu	
	Response	Percent	Response	Percent
From other Eagle consumers	2	6.7	1	3.3
From Eagle adverts and promotions	21	70.0	21	70.0
Sales ladies convinced to taste it	6	20.0	1	3.3
From the outlet I used to drink	1	3.3	7	23.3
Total	30	100.0	30	100.0

Eagle beer. The study grouped the 'before' brands as either Tanzania Brewery Limited (TBL) brand or non-TBL brand. The majority of consumers in Moshi Rural district, that is 83% were drinking TBL brands while only 17% were drinking non-TBL products before switching to Eagle. In Karatu district 86% of the consumers were drinking TBL products, 7% were drinking non-TBL products and 7% were drinking local brews (Table 12).

The consumers were also asked as to how they got to know sorghum based clear beer and the findings are presented in Table 13.

Seventy percent (70%) of consumers in both Moshi Rural and Karatu districts knew about it from the Eagle promotions carried by the TBL in their areas. In addition, 20% of consumers in Moshi Rural district heard from the sales ladies who later convinced them to taste it, 7% from other Eagle consumers and 3% from the outlets they used to drink. In Karatu district, 23% heard it from the outlets they were used to drink, and 3% each from other Eagle drinkers and from the sales ladies respectively (Table 13).

Factors influencing WTB sorghum based clear beer (Eagle)

The study determined factors influencing potential WTB sorghum based clear beer using regression analysis in Moshi Rural and Karatu districts respectively. However, before the regression analysis was done, data reduction process using Principal Axis Factoring (PAF) was done the for taste and preference scores variables. The aim of doing PAF was to obtain a set of uncorrelated variables from a set of variables which were used to obtain the preference scores. For the taste preference scores, Principal Axis Factoring (PAF) method was employed and the Keiser-Meyer-Olkin (KMO) measure of sampling adequacy obtained was 0.815 and was significant at 99% hence allowing continuation of further data reduction processing. Furthermore, only one factor was obtained with Eigen value of more than 1 and this was sent straight to the regression model for the regression analysis. However, the variation in the taste score variable was contributed by taste (95%), appearance (94.6%) and texture (91.5%).

For the case of Eagle beer preference scores, PAF was also used for data reduction and two factors with Eigen values greater than 1.0 were obtained. The KMO was 0.665 and was significant at 99%. The variations of the first Factor of the preference score after rotation were contributed by taste (92.7%), colour (87.0%), and appearance (82.0%). The variations in the second factor after rotation were contributed by texture (93.6%) and smell (81.3%). The first factor was then used for regression analysis.

The logistic model was used since the responses were

Table 14. Estimated coefficients of consumers' WTB Eagle using logistic regression analysis.

Variable Included	Coefficient	Std. error	Z	P > |z|
Sbtaste	-1.009	0.490	-2.06	0.039**
Preference	-0.229	0.527	-0.43	0.664
Sbtaste_pref	1.120	0.969	1.16	0.248
Pricaltbeer	-0.012	0.004	-2.69	0.007***
Hhincome	1.03e-06	5.00e-07	2.05	0.040**
Dum1	-4.962	4.879	-1.02	0.309
Dum2	1.573	1.028	1.53	0.126
Constant	13.936	5.073	2.75	0.006***
Log pseudo Likelihood	-21.171			
LR ch2 (7)	22.85			
Pseudo R2	0.001			
No of obs	0.350			

*** and **Significance at 1 and 5 percent level, respectively.

binary showing the independent variable log (p/1-p) as the probability that the consumer will buy Eagle beer or not. The findings from the model shows that consumers' taste mean scores for sorghum based clear beer, price of alternative beers and household income were statistically significant. Consumer's preference, interaction between consumers' taste and preference mean scores, home consumption (Dum1) and grocery store (Dum2) were not statistically significant However, the taste scores, preference, price of alternative beer and home consumption have negative influences on the probability of consuming sorghum based clear beer in Moshi Rural and Karatu markets.

Conclusion

This study assessed consumer preferences and market potential of sorghum based clear beer (Eagle) in Moshi Rural district (Kilimanjaro region) and Karatu district (Arusha Region) markets. The study used hedonic preferences and regression model to establish the relationship between Eagle beer consumption with influencing factors of beer tastes, preference, price of alternative beer, household income and the type of the outlet the consumers prefer while drinking their beers. The findings show that the majority of sorghum based clear beer consumers were males and most of them were married. In addition, their mean age was 36 years, educational level was primary and their mean annual income was US$ 941. Most consumers shifted to Eagle beer due to its low price and taste. The regression results show that consumers taste judgement, the interactions between taste and preferences, and household incomes were statistically significant for willingness to buy (WTB) sorghum based clear beer. However, the nature of the outlet was not statistically significant. It can therefore be concluded that Eagle beer taste, the price of alternative

beer and household incomes influence sorghum based clear beer WTB for the consumers in Kilimanjaro and Arusha regions. However, for the case of market potential, it can be concluded that the consumers were mainly young, with only primary education and were of low income. Thus, the beer manufacturer that is TBL target of low income consumers in the semi urban and rural areas, as Eagle beer consumers has to some extent been achieved.

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