Sorghum and millet processed products availability in retail supermarkets: Bulawayo, Zimbabwe

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ABSTRACT-Research looking into the availability and range of sorghum and millet products in the formal market of Bulawayo city was conducted in 2015. A self-administered survey on utilization, form of product availability, price of products both imports and locally produced was carried out; it appeared that the most prevalent form of sorghum and millet utilization in the production of meal and a ready to drink (Maheu) product was the most appearing product in shops surveyed. Most of the products found on the retail supermarkets of Bulawayo central business district (CBD) and surrounding townships were from sorghum followed by pearl millet and few finger millet products. Meal flour products of the small grains were concentrated in the CBD than in the townships with the prices of finger millet products higher than sorghum and pearl millet products. The price gradient of available products steeped as one moves from CBD to the surrounding townships. Most products were in processed form like porridge flour and ready to drink form.

Key words, sorghum, millet, processing, retailing, productivity

I. INTRODUCTION

The dry land areas are largely neglected sectors in agriculture. Technology for these areas has been limited or lacking; yet paradoxically, the future of the expansion of food production is in these areas. Despite this, the dry land areas have become concentrations of rural poverty [1].

These challenges underscore the need for interventions in marketing and grain quality to ensure that small-scale farmers or traders can engage in a profitable and sustainable small grain business. The technologies for making traditional sorghum beverages largely remain as they were. Sorghum grains have traditionally been processed into flours and local beers, although traditional processing of flour by stone mill has largely been replaced by the use of modern mills, which can be found all over the country.

Sorghum is the most amenable grain to different processing technologies; three methods exist. The primary processing involves fermentation, malting, wet and dry milling, boiling, roasting and popping. The second one corresponds to brewing, beverage and drinks production, balking and confectionary making, steaming and extrusion (for pastes and noodles). Finally, the tertiary processing involves composite flours, bio fortification and chemical fortification with additives. [2].
Sorghum and millet grains are largely uncompetitive on industrial markets, except in a few specialized areas. The major reasons for this lack of competitiveness are high prices, limited quantity traded and variability in the quality of small grains. The greatest potential for increasing the use of sorghum and millet in industrial market under low production and productivity situation lies in a few production processes for which no competitive inputs are readily available. If productivity improves, in the long run the stock feed industry represents the major source of industrial demand [3].

Strategies are needed to aim production gains toward particular end uses. There is scope for exploiting market niches in milling and baking, brewing and stock feed industries. In addition, there is scope for expanding grain flows through intra-rural markets [3]. Most SADC countries have no strategy for the development of their sorghum and millet subsectors. The lack of a strategy limits interest in sorghum and millet research.

The lack of a commercial market has limited farmers’ interest in improving the management of these crops and even growing them. As a result, average sorghum and pearl millet yields have changed little over the past years, affecting the sorghum and millet value chain. However, the area planted to these crops is still increasing. Addressing the challenges that are there in small grains (sorghum and millet) utilization will go a long way in expanding the production by farmers in low rainfall areas where small grain thrive better than maize and wheat [4].

One of the most common industrial uses of sorghum in southern Africa is in the manufacture of opaque beer. The South African brewing industry, for example, uses at least 70,000 t of sorghum per year in the production of sorghum malt. Zimbabwe’s opaque beer industry uses about 17,000 t of sorghum, and the smaller opaque beer industry in Botswana uses about 4000 t [4].

Despite the ready market in the brewing industry, sorghum production remains low because of low utilisation options. An understanding of available products could be useful in encouraging utilisation to spur demand and subsequently increase production South Africa and Botswana has a well-developed value chain for sorghum compared to Zimbabwe with most of the products coming from South Africa to Zimbabwe as finished products. While Botswana imports grain for further processing into Flour and flour products are plenty.

II. RESEARCH OBJECTIVES

The overall objective of the studies is to identify level of small grains product availability on formal market and possible intervention options needed to increase smallholder productivity in order to improve the incomes and food security of smallholder farmers, and to increase agriculture’s contribution to an overall economic transformation that enhance varietal grain food supply in the whole country.
III. METHODOLOGY

A survey was carried out in Bulawayo city in the year 2015 to collect data on the availability of sorghum and millets products in retail shops. A purposive sample of retail shops located within the CBD and townships of Bulawayo was surveyed. In this research the target population for the study was the leading large retail supermarkets in Bulawayo city. The data were collected from 22 townships of Bulawayo and 14 leading supermarkets in the CBD of Bulawayo city.

Bulawayo is the second-largest city in Zimbabwe after the capital Harare, with, as of the 2012 census, a population of 653,337 and an important industrial, commercial, and railroad centre. It is located in Matabeleland, 439 km (273 mi) southwest of Harare.

The primary data collection was complemented by a review of secondary data and literature relating to sorghum and pearl millet in Zimbabwe. Kumar, Reference [5] motivates that purposive sampling is extremely useful when constructing a historical reality, describing a phenomenon or developing something about which only a little is known. Hence, owing to the nature of the study, the decision was taken to use the non-probability purposive sampling technique. The study focuses on the defined purpose of determining the availability and range of sorghum and millet products in the city.

Data collected

The data collected in the survey included the brand or name of the small grains product, name of township, price, details of product form e.g. porridge, beer etc., and whether the product was from sorghum or millet. A data collection form was designed and used in the self-administered survey.

Data Analysis

The data collected were analysed using a computer package SPSS 21. Frequencies of data captured from survey were determined. The frequencies were used to determine factors like product category, distribution, price and place of product production.

IV. RESULTS AND DISCUSSION

The survey revealed that 16.6% of the sorghum and millets brand products on the market in Bulawayo retails shops are imports with the remainder being local products. The imports are in processed form, ready to use form of porridge formulation and meal.

There were four import brands on the market that is morvite, shonalanga, purity mabele and bokomo, only the morvite product was found in the townships with the other three more concentrated in the CBD of Bulawayo.
The most of the products are those which are produced in Zimbabwe. The imported products are mainly in the form of porridge and sorghum meal coming into Bulawayo market from mainly South Africa.

The prices of the products on the market ranged from US$0.40c for a 500ml bottle of maheu, which is an opaque drink to US$6.89 for a 5kg pack millet meal, generally the products of millet were of higher prices as compared to similar sorghum product and weight. The price of a 5kg pack of millet meal was within the average price of a 10kg maize mealie meal, showing that processed small grains products double their value compared to maize products of the same form and quantity.
The Fig 2 shows the average prices of imported porridge, local porridge and sorghum meal. The local porridge has higher price than that of import and the price rise marginally as one move from CBD to the surrounding townships. The products revealed from the survey ranged from opaque beer, bird seed, millet meal, opaque drink (maheu), porridge and sorghum meal. The pie chart below shows the number of sorghum and millets product brands in each being traded on the market in each product category.

![Pie chart showing product distribution](image)

**Fig. 3.** The range of sorghum and millets products categories in Bulawayo and product distribution in the city.

A high number of product brands are in the form of both sorghum and millet porridge (32%) which come in various pack weight. The following number of brands products found on the market by the survey were sorghum products (20%) of milled grain for cooking of thick porridge (sadza) in weight ranging from 2kg to 5kg packs. Few products or brands were those marketed in the form of whole grain for feeding birds, constituting about 6% of the brands available on market.

![Pie chart showing product distribution](image)

**Fig. 4.** The product distribution of sorghum and millets products in Bulawayo and product distribution in the city.
All the townships surveyed showed the presence of sorghum and millet products. More sorghum and millets products were found in townships where there is a leading large supermarket brand. In terms of the product distribution of the identified products 51% of the products were in the CBD and the townships sharing the remainder.

The widely found product both in the CBD and townships was the opaque ready to drink *maheu*, about 34% coverage on the market, almost every shop had the product on its shelves. The porridge products followed the ranking with 26%, in the most distributed product on the Bulawayo market, few shops in the periphery of the town had no product in their stock. The least distributed product with 1% distribution was the bird seed products which were only confined to the central business district of Bulawayo city.

The following figure shows the distribution of sorghum and millets brands products in the surrounding township of Bulawayo city.

![Distribution of sorghum and millets products in city townships](image)

Nkulumane and Northend shopping centre supermarkets had the highest number of sorghum and millet products while Thorngroove had only one product on shelf in its supermarket.

Virtually no sorghum or pearl millet among the products identified, is used in the commercial milling industry for the production of flour used to make baked products. The survey did not interview the small-scale hammer mill operators providing service milling in and around larger business centres and urban markets.

Product development of traditional staples like sorghum and millet has some distance to go, on the market there is little value addition beyond milling with the typical product being porridge and some ready to drink products like maheu and beer. The following figure compares the prices of the ready to drink products between the CBD and the townships.
The ready to drink products had the lowest prices on the market than all other sorghum and millets products. Prices were generally lower in the CBD than in the townships for most of the sorghum and millet products captured in the survey.

V. DISCUSSION

Sorghum and pearl millet producers are caught in a subsistence production trap. The lack of a commercial market for these crops encourages farmers to maintain a subsistence level of technology and production. Yet the development of a commercial market is discouraged by the lack of a consistent marketable surplus. As with cash crops like maize, cotton, and tobacco, markets are most likely to be built on the foundation of a demand for the product. Traders and grain processors first need to contribute to the improvement of production incentives. Farmers will respond by shifting resources to expand production of crops with favourable markets. [4].

Some farmers’ groups are now engaging in processing, thus combining farming and processing e.g. Hwange group of farmers in Jambezi. Their current challenge is to obtain certification, without which they cannot sell freely within or outside the country. These farmers produce the needed grain to input in the processing of sorghum and millet meal which they sell to the rural and urban consumers. The prices of small grains products are able to attract increased crop production in such a time of climate change. However modalities need to be worked on to allow local products to be competitive in the face of small grains products imports from the neighbouring countries because imports are comparatively cheaper hence in the long run may affect small grains crop production and its value chain in Zimbabwe. The suppliers target the CBD retailers in delivering their products than the outskirts of city resulting in comparative price difference where price is on the higher in the townships.
Sorghum and pearl millet remain main staples for the country’s farmers in the dry areas. It is unlikely that urban migrants from these production zones will simply change their taste preferences upon arrival in a new environment. However, there may be social pressures to consume city foods, or the staple grains of higher income groups, such as maize and rice [4].

Nkulumane one of the largest high density residential area of the city showed that there are a high number of products on market probably due to the high demand by the local people who are used to the consumption of sorghum and millets traditional products.

Marketing sorghum offers low financial return and the market opportunities are limited because of the lack of connection between producer, industries and national markets. The market information is weak preventing producers from being aware of prices and market needs and opportunities and production level is not rapidly increasing because farmers opt for maize production despite a strong potential demand of sorghum and millet from the milling and brewery industry. There are limited chances though of farmers in the dry areas of Zimbabwe being able to harvest maize yields sufficient for food security without irrigation, however sorghum and millets crops are better alternatives since they are good survivor crops in these dry regions.

The value chain is not well developed because sorghum is mostly self-consumed and there is a lack of exploring markets opportunities, producers are not being well interconnected to the market. In most years, sorghum should be highly competitive as an input for the manufacture of animal feed. Feed processors may benefit from the dissemination of information about the nutritional value of this crop. Uncertainties about grain supply can be resolved both through investments in grain stockholding, and by encouraging production specifically targeted at this market. A substantial opportunity clearly exists for the production and sale of sorghum [4].

A second major factor limiting the commercial milling of sorghum and pearl millet is the limited and inconsistent availability of clean grain. This problem is partly explained by the limited historical market demand for these crops. Whereas maize and wheat are broadly identified as cash crops, sorghum and pearl millet are known as subsistence crops. Few traders look for these grains, so farmers have little incentive to produce a consistent surplus.

In addition, incentives to develop the market for sorghum and pearl millet are reduced by the variability of grain production. Rains may be favourable one season, leading to a significant surplus, and then unfavourable over the next two to three seasons, causing a deficit. In any given year, traders are uncertain about the location and level of marketable surpluses. The variability of grain surplus reduces incentives to invest in building grain trading infrastructure in semi-arid zones. Marketing costs are further raised by the low population density in many semi-arid areas [4].

Sorghum and Millet are high-energy, nutritious food, especially recommended for children, convalescents and the elderly. Several food preparations are made from millet, which differ between countries and even between different parts of a country. These consist primarily of porridge or pancake-like flat bread. Sorghum and millets based health foods can be prepared for creation of demand. If demand for sorghum and millet is created, market will develop. Sorghum and millet production can be promoted through clusters, that is making farmer interest groups and further the clusters into farmer producer companies for ensuring marketing and other supports.
The main constraint limiting the use of sorghum and pearl millet in feed industry is the perceived lack of grain at prices competitive with maize. Few players in the beverages industry have expressed a willingness to look for sorghum or pearl millet grain in the rural market, and to promote the development of production to support the industry.

According to specialists in the Zimbabwe animal feeds industry [6], white sorghum can replace 100% of the maize used in poultry and ruminant diets. Pearl millet can replace 50% of the maize in these same diets. Red sorghum can be used up to 15% in poultry rations, and 30% in ruminant rations, without substantial reduction in feed quality. White sorghum could readily replace 5% of these imports without affecting the quality of most bread products, but the baking industry appears unfamiliar with this opportunity [4].

The availability of sorghum and millet products in Bulawayo city shows that the crop has good economic returns for players, which should include the small holder farmers, in the value chain. One part of processed sorghum and millet products sells nearly double as maize part of the similar product category. The demand of non-alcoholic opaque drink *maheu* is very high resulting in a number of producers supplying too many retailers and the product being the most well distributed in the city.

VI. CONCLUSION

Farmers in dry regions of Zimbabwe should produce sorghum and millet grain for supplying the processors who make various products. Farmer tend to benefit by tapping into the high prices benefits of sorghum and millets products on the market.

Market infrastructure, including the process of grain assembly and transport, is not well developed in many sorghum and pearl millet production zones of Zimbabwe. Even if roads are in good shape, farmers and traders are not oriented toward delivering large quantities of grain to the national market. Grain processors interested in using sorghum or pearl millet will need to invest in the development of these trading linkages. This requires improvements in communication to rural communities regarding industry demand for these crops. Companies concerned about reducing grain delivery risks may formally contract for the supply of grain of specified quality. Alternatively, a rural community may be encouraged, prior to the planting season, to supply a given quantity of grain to a particular trader or end user.

The limited sorghum and millet commercialization has affected expansion in small grains crop production. The adoption of agronomic crop production technologies are therefore affected by the level of sorghum and millet utilization in the community.
VII. RECOMMENDATIONS

Investments in testing urban demand for sorghum (and pearl millet) meal could offer large payoffs. In Botswana, for example, retail purchases of sorghum meal have rapidly increased with the expansion of the sorghum milling industry. Fifteen years ago, less than 10,000 t of sorghum meal was annually sold through retail shops. According to early 1999 estimates, more than 60,000 t of sorghum meal is now commercially sold [7]. This growth is attributed to many factors, including the ready availability of sorghum grain, and government support for development of the milling industry.

The sorghum development plan should focuses on the increasing of sorghum and millet crop production by farmers in dry regions of Zimbabwe for use in food security, stock feeds as well as fortified food products and ready to eat products targeting the health conscious consumers.

There is need to have an interrelationship between the crop agronomists to the chain of sorghum and millets production and utilization.

Food nutritionist in the health and food industry need to recommend and encourage the use of sorghum and millets products due to their nutritional benefits. More government support need to be directed to sorghum and millets millers and processors as they incur more milling cost compared to maize millers but purchasing the grain from Grain Marketing Board at the same grain price.

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REFERENCES