



Socio-Economic Role of *Sha* (Corn Beer) in the Livelihood of Value Chain Actors and Consumers in Cameroon

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Sha is an alcoholic beverage made by brewing and fermentation of cereals, usually germinated maize. In some parts of Africa, maize malt and grains are used to produce a lighter colored beer with a mellower flavor and it is given different names depending on the sub-region. In Cameroon, *sha* is produced in rural and urban areas and play an important role in the livelihood of the value chain actors and consumers both socially and economically. It is much consumed during moments of joy and sadness. This review reveals that there are two principal methods used for preparing *sha* in Cameroon from the main ingredient- germinated maize. Reward of cooperate work, means of communication, entertainment, friendship pacts, and easing stress and depression are some of the social role of *sha* while income generation, employment creation, increased economic activities and generation of taxes to the nation are some of the economic role of *sha* in Cameroon. However, poor processing and storage facilities, limited market, high temperatures, adulteration, lack of support and disunity of brewers among others limits the achievement of these roles. The paper concludes that *sha* plays an essential role in the livelihood of the value chain actors and consumers in Cameroon. It is therefore, recommended that the government and well-wishers should improve on this sector and that brewers should work as a team.

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1. INTRODUCTION

Sha is a brown cloudy traditional alcoholic beverage of vinegar-like flavours, with suspended solid produced from maize and consumed in many parts of Cameroon especially in the Northwest region. Maize (*Zeamays*) is a starchy and small grained cereals crop belonging to the grass family, *Graminae* and account for about 15-56% of the total daily calories in diets of the people in Africa [1,2]. It is ranked second in terms of the World production [3] and mostly grown and used as a major food crop in Cameroon and many African countries. Cameroon producing an estimated amount of 2,000-2,500 tons of maize yearly as of 2015-2017 [4]. On the nutritional point of view, raw maize contains high levels of starch and also valuable proteins and oils [5]. It also contains a number of vitamins B, folic acids, vitamins C, pro vitamin A [6] and minerals like phosphorus, magnesium, copper and zinc depending on the variety [7]. According to [8], the losses of this valuable food crop in Africa stand at 14-36% due to poor post-harvest processing, preservation and storage techniques.

However, there are many types and colours of maize kernel cultivated in maize producing African countries but the ones mostly grown in Cameroon are the white and yellow types from which an indigenous drink called *sha* is produced. In Cameroon, *sha* is made for both home and commercial purposes in some parts of the Northern, Littoral, Centre, Southwest and the entire Northwest region. According to [9], the *sha* sector employs about 30,000 people who are involved in the processing and retailing of *sha* throughout the country from where they generate income for their livelihood.

Historically, according to [10], the Bantu-speaking tribes carried the art of brewing maize with them as they migrated southward from Sudan. Women were the traditional brewers of African beers and men the traditional consumers. Men consumed it during heavy duties like building of bridges, roofing of houses and construction of roads, since many of these activities were done at community levels. Notwithstanding, today more women prepare the traditional brews for the market, weddings, ceremonies and other celebrations. Corn beer beverage has different names in different countries and regions where it is produced:

Kenya has *chang'aa*, Botswana *khadi*, Central Africa Republic *hydromel*, Ethiopia *talla*, Uganda has *tonto*, Ghana has *pito*, *burukutu* [11] and in Cameroon it is called *sha* and *bilibili* [12]. In Cameroon, the production of *sha* varies from one region to another but essentially include malting, brewing, and fermentation of maize and sometimes a combination of maize and sorghum [10]. According to [9], in the Northern region of Cameroon, traditional corn beer brewers uses sorghum malt to achieve a slightly sour and darker finished beer. The manufacturing process of *sha* essentially involves malting, drying, milling, boiling, mashing and alcoholic fermentation, but variations may occur depending on the method applied and culture of the region [13].

It is worthy to note that in Cameroon, *sha* is much consumed both during moments of joy like festivals, traditional weddings, success in examinations, football matches and also during moments of sadness like funerals and job losses [9]. The sale of *sha* is a significant source of revenue for the owners of the small quarter bars, restaurants and joints. It is therefore, a creative activity for employment. In the Northwest region of Cameroon, some people believe that because of low temperatures during the mornings and evenings (12-17°C), drinking *sha* at these times can help increase body temperature and revitalize the organs. It is for these reasons that one could find people drinking *sha* during the very early hours of the day at quarter bars or joints. According to [10], the alcoholic content of traditional brews ranges from 1-8% by volume depending on fermentation time. Indeed, spontaneous fermentation in corn beer improves nutritional value of the beverage that contributes significantly to improve the diet of consumers. It also improves its sensory quality which is very important in the beverage acceptance [14].

Despite the important role of *sha* and the fact that it curbs post-harvest losses of maize in Cameroon, the sector is still underdeveloped due to some constraints such as lack of improved processing techniques and equipment, lack of regulatory authority, adulteration by unscrupulous producers, lack of government support and recognition of the sector, and limited market due to the influx of sachet whisky at very reduced costs among others. It is important to point out that no effort has been made by the government and Non-Governmental

Organizations to improve on the production and retailing of *sha* in Cameroon. Nevertheless, the absence of processing equipment in the country has forced many brewers into processing this drink traditionally in order to enhance their socio-economic wellbeing. Therefore, it is necessary to examine the role it plays in the socio-economic life of the actors and propose ways of improving its production in order to enhance its socio-economic role in the producing regions of the country.

2. DIFFERENT STEPS / METHODS OF PRODUCTION OF SHA IN CAMEROON

2.1 Step 1: General Preparation

2.1.1 Selection of maize grains

First the grains are sorted by hand picking to remove the ones that are physically damaged, mouldy or rotten. The aim of this stage is to have healthy grains and grains that will germinate under normal conditions [15]. Mouldy or rotten grains may not germinate but will impart off odour and mycotoxins that will affect the taste, microbial load and organoleptic properties of the drink [16].

2.1.2 Malting

Malting is the germination of cereal grains in moist air under controlled conditions, the primary objective being to promote the development of hydrolytic enzymes, which are not present in the ungerminated grains. The malting process essentially involves steeping, germinating and limiting cereal seedling growth once enzymes have been produced for the degradation of starch and proteins in the cereal grains, but before the exhaustion of the polysaccharide [17].

Steeping or soaking:

According to [17] and [18], the steeping or soaking of cereal grains in water is widely acknowledged as the most critical stage of the malting process. The initiation of germination is so consequential due to the modification of the endosperm structure which usually progresses at a rate producing malt of the desired quality. Maize grains are soaked in water for one day.

Germination of grains:

After steeping or soaking, the grains are spread on fresh banana leaves or plastic papers and are

covered with other banana leaves or plastic paper to form a layer, and the grains are left to stand for 2-3 days at ambient temperature [19]. The layer of grains is sometimes turned over twice a day and the initial moisture level is maintained by occasionally spraying with water. Within 2-3 days, maize grains become sprouts.

Drying:

In the traditional corn beer brewing process, the germinated or sprouted maize grains are dried under the sun and are stored under protection during the night to avoid rehydration; this drying step takes 2-3 days depending on sunlight intensity [20].

It should be noted that maize grains to be germinated are usually obtained from old maize grains that had been stored for at least six months after harvest. Fresh maize grains do not guarantee sufficient alcoholic fermentation and bring strong alcoholic taste, and therefore, the use of aged maize is necessary. During the storage of maize grains, the yeast in the atmosphere probably adheres to the surface of the grains. Therefore, by adding aged maize gains to the mush, the yeasts may have been inoculated into the mush thus, leading to an alcoholic fermentation. For this reason, it is supposed that aged maize is the source of the yeast for the fermentation [21].

2.1.3 Milling/pulverization/pounding of dried germinated grains

The dried germinated maize is turned to flour by pounding in a wooden mortar or by pulverization using a special stone called saddle quern or by grinding or milling in an attrition mill (usually dry milling). During the dry milling process, the germinated maize is milled into a medium to finely ground meal with a pin, a hammer or disk mills, without adding water. These (mainly manual) mills can be found in villages and market squares [15].

2.2 Step 2: Production Proper

There are two principal methods of traditional corn beer production by the people of Cameroon.

Method 1:

According to [22], much water (20L) is added to 3 kg of milled sprouted maize and mixed

vigorously. It is allowed to stand for five hours so that a slurry settles at the bottom leaving almost a clear liquid on top. The clear liquid on top is carefully removed and kept. The slurry at the bottom is heated while being stirred until turned brown in colour. Here, fermentable sugars, amino acids, vitamins, minerals etc, are extracted into solution from malt. The clear liquid that is removed is turned back to the slurry and stirred until uniformly mixed. The mixture is then allowed to cool and stand overnight and then it is sieved using a 5mm aperture sieve followed by a 2mm sieve. The sieved mixture or mush is boiled for two hours and allowed to cool. A starter culture (previously fermented *sha*) is added to initiate fermentation. The final product is *sha*

(Fig. 1). Fermentation increases with days of storage and this also affects consumers' preference.

It should be noted that malt normally provides most of the potential fermentable materials and sufficient enzymes to generate a well-balanced fermentation medium. Traditional corn beer is unique as a fermented beverage in requiring starch, not only as a source of sugar, but as a thickening and suspending agent. Gelatinized starch gives the beer its characteristic creamy body and keeps in suspension the particles of grain and malt that are essential constituents of beer [18]. This constitute the gelatinization step for starch.

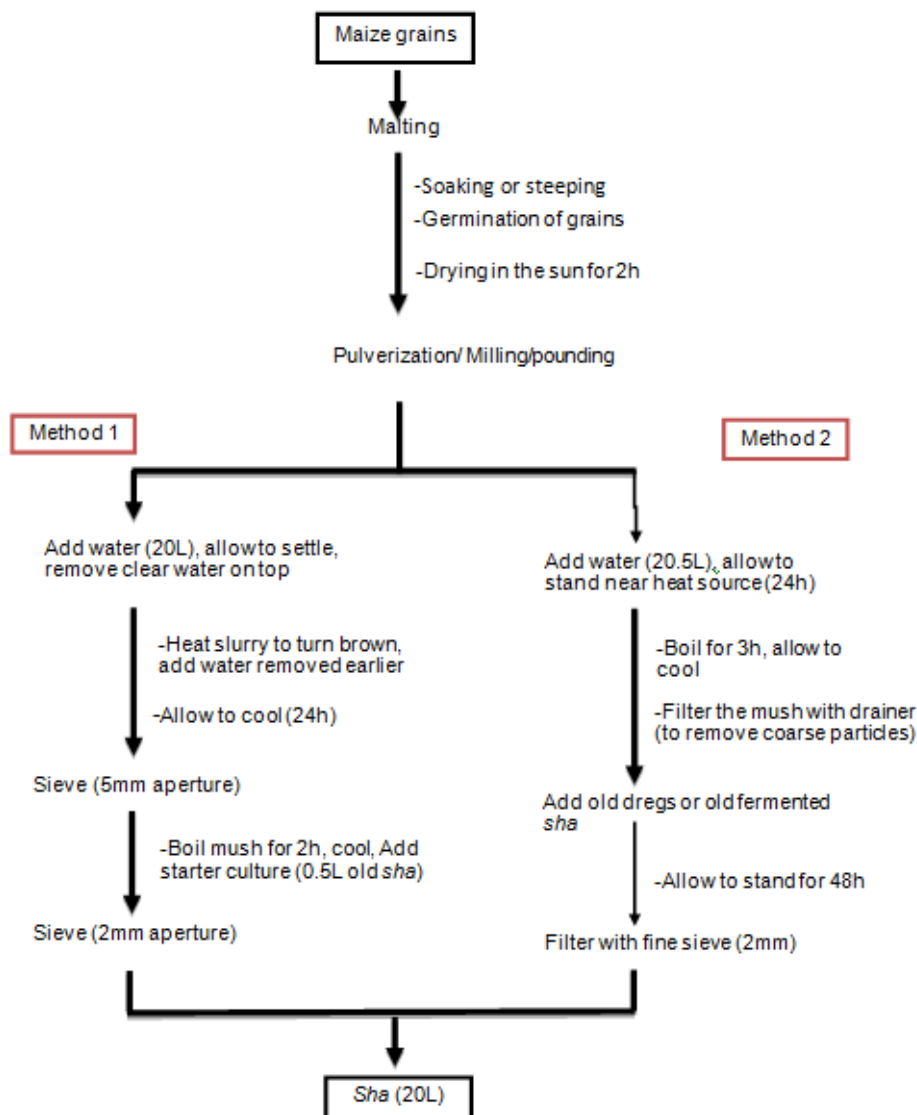


Fig. 1. Flow chart for Sha production
Source: Adapted from [12,22,23]

Method 2:

In another demonstration, according to [12] and [23], the germinated maize flour (3.2kg) and water (20.5L) are mixed and kept in a metal or rubber container at a warm location (kitchen) for one day. On the second day, the mixture is transferred into a pot and boiled for three hours and then allowed to cool. This cooling may take 4-5 hours. After cooling, the mush is filtered by the use of a drainer. This is coarse sieving to remove heavy particles or dregs. Either the dried dregs from previous filtration or a small quantity of the previous production is added after filtration of the mush. This serves as the source of yeast for the fermentation process. It is also common to use an old fermentation tank containing remaining beer from previous fermentation. Fermentation last between 12-24h, and sometimes when the temperature is low, it can last for two days, especially the beer brewed in December for consumption during Christmas festivities. The mush is allowed to stand for two days to complete the fermentation process and then consecutively filtered through a coarse wooden sieve as well as a fine metal sieve. Bubbling is usually observed, and an alcoholic odour detected. Glucose in the mush appeared to be converted to ethanol through the action of yeasts during these two days. The final filtrate is *sha* (Fig. 1).

Dried old dreg and wooden filter usually harbor a good quantity of harmful microorganisms usually bacteria and fungi which automatically start contaminating the fresh *sha*. Consequently people who drink sweet fresh *sha* tend to complain of stomach upset or constipation but as the rate of fermentation increases alcohol is produced which tend to make the medium more acidic and hostile for pathogenic spoilage microorganisms to thrive. Thus, fermented *sha* is very healthy for the stomach but for alcoholic content [24,25].

3. THE ROLE OF *SHA* IN COMMUNITIES AND TOWNS IN CAMEROON

Sha, an alcoholic beverage, plays an ubiquitous part of everyday life in Cameroon, cutting across the rural/urban, gender and class divides [26]. Its presence is prominent in several life domains, including religious, social, psychological and economic spheres.

3.1 Social Role of *Sha*

3.1.1 Reward for cooperate work

Sha is utilized in the community as a reward for cooperative work such as opening of fields, wedding, building and roofing of houses or construction of local bridges and roads, among others. In Nso and Kom societies of the Northwest region of Cameroon, people seek help from other neighbouring villages to hold cooperative works after which *sha* is offered in appreciation. Also, during the labour on field or community work in the villages, this indigenous alcoholic drink is used as an energy source, because it contains easily digestible saccharides and vitamins [27].

3.1.2 Means of communication

In the course of drinking *sha* at restaurants, bars or joints, stories are told and information is passed. Community activities programs are easily communicated to the villagers through drinking spots which serve as important meeting places for people to exchange vital and current information. However, it is important to note that traditional brews have always played a central role in African traditional religion as a medium for communicating with ancestors, even in societies heavily influenced by Christianity and Islam [28,29].

3.1.3 Easing stress and depression

People believe that after a tiring day at work place, settling on a bottle or two of *sha* helps to relax and prepare the body for the next day, and also that financial, family and individual problems push them to consume *sha* and when they do, stress is released at least temporally. According to [29], an important social value lies in the fact that drinking of alcohol in Africa serves as a unifying leisure activity across the class spectrum, especially among men, and demarcates the separation of leisure from work. According to [30] ethanol (C₂H₅OH) is the main ingredient of the fermented *sha* and after drinking, ethanol is absorbed in a stomach and through the blood streams, it reaches the brain and suppresses its function. A decline of brain function is the basis of drunkenness that brings refreshing feeling [30]. Many people who feel depressed and stressed up always find solace in consuming some few liters of *sha*.

3.1.4 Friendship pacts

Among equals in a village gathering, the presenting of *sha* is a mark of esteem and affection. A jar will be served for a close friend, and institutionalized friendship among male contemporaries is by means of a named drinking society. Friends or lovers frequently drink together simultaneously from the same calabash. However, corn beer is also given during courtship by a man to a woman, and public exchange of this beer is synonymous to marriage proposal [31].

3.1.5 Entertainment

Some families prepare *sha* and keep to entertain their visitors especially on occasions like Christmas, New Year and other important feasts. It is also offered at marriage ceremonies and death anniversaries. However, some families usually accompany *sha* with dinner.

3.1.6 Source of nutrition

Sha in Cameroon like other societies in Africa is taken as food by many especially due to its thick nature. Also, *Sha* is a good source of vitamin B₁. This is because vitamin B₁ is synthesized during fermentation process of *sha* [32]. More so, studies have revealed that people who consume *sha*, ingest larger amount of calories because of the incorporation of maize into this alcoholic beverage [33].

3.1.7 Cultural and traditional identity

Sha in Cameroon like other societies in Africa, is used as a symbolic item in religious and royal ceremonies [32]. At the beginning of each planting season, the traditional authorities pour libations to their gods and ancestors by using *sha* and palm wine because they believe from the earth they originated and from earth life is born.

3.2 Economic Role of *Sha*

3.2.1 Income generation

The brewing of *sha* is an important income earning activity for women [34]. It is the most important source of income for women in the Wimbun and Kom society of the Northwest region of Cameroon as well as women in other

parts of Cameroon [35]. Brewing is basically regarded as a precious activity for women especially singles and widows who do not have men to provide the needed labour force for other income generating activities. However, most of other activities for earning income are classified as men activities.

3.2.2 Employment creation

According to [22], the sector has employed 30,000 people along the value chain. Some people produce the *sha* and distribute it to retailers but majority of producers are retailers. Indirectly, some people are involved in the purchase and sale of materials needed for the production and retail of *sha*. These materials include rubber containers of various sizes, silver and aluminum pots of various sizes, rubber cups and other accessories. Totally, the number of people employed by the sector is far more than the number mentioned above thus, signifying the important role it is playing in the economy of the country.

3.2.3 Generation of taxes to the state

The state of Cameroon levies an amount of tax on vendors or retailers of *sha*. In some council areas, a token is collected daily or weekly while in some areas an annual tax of 12,500 FCFA (about 25 USD) is levied on the retailers. This figure multiplied by the number of people involved in this business gives a huge amount of money collected by the councils from this sector [22].

3.2.4 Increased economic activities

Historically, it has provided a medium of exchange, facilitating economic exchange within the communities in the form of barter [36]. Traditionally, brewed alcoholic beverages were used as a currency in exchange for other goods and even labour recruitment. Today, apart from the people involved in the purchase and sale of material needed for production and retail of *sha*, some others are involved in the trading of maize. In Cameroon, mainly the Northern regions, West and Northwest region produce maize that is utilized for the production of *sha* in the entire country [37]. Thus, maize need to be carried to other regions producing *sha* and this entails lucrative business for both the buyers and sellers.

3.3 Constraints toward Achievement of these Roles

3.3.1 Poor processing and storage

The processing and storage of *sha* still involve the use of old and primitive methods. The equipment used are still traditional in nature. These include jute bags, plastic papers and banana leaves for germination of grains, clay pots and rubber buckets for fermentation, wooden sticks for stirring, firewood for heating, and calabashes wooden and rubber containers for storage. These artisanal equipment and methods reduces the quality of *sha* and this causes some people to start considering the consumption of other choices of drinks.

3.3.2 Limited market and modernization

The presence of sachet whiskies of different brands with high alcoholic contents and lower prices has a negative effect on the market of *sha*. It is very common nowadays to see sachet whiskies/wine in most remote communities in rural areas not to talk of semi-urban and urban areas. These are communities where the livelihood of many women depends on the sale of *sha*. The increase importation of sachet drinks therefore, poses a serious threat to the market of *sha* since the prices are relatively lower though with a high effect on consumers. Also, the increase production and distribution of different brands of beer to various communities in Cameroon has made *sha* to be considered by many as a drink of poor people thus, lowering its consumption and the income of the value chain actors.

Moreover, the increasing development of rural communities and the frequent movement of people to and from towns and cities, nationally and internationally is gradually leading to the loss of some social aspects of *sha*. It is becoming common in some communities in Cameroon to see people instead of providing five calabashes (5 containers) of *sha* in an occasion (traditional marriage), one or two calabashes will be provided and the rest converted to crakes of beer, sachets of drink or money. Some people feel that providing the so call modern things (drinks) in occasions makes it special which however, may not be the case because *sha* has a unique social role that cannot be replaced.

3.3.3 High temperatures, poor preservation and packaging techniques

Sometimes, temperatures can increase to 40°C and above and this is not good news for the producers of *sha*. High temperatures lead to increase rate of fermentation and high spoilage (in terms of quality). Cooling facilities are generally absent thus, in most cases, producers depend on the weather. The microbial load may reduce as fermentation increases but the customer preference for the drink reduces as well. Since fermentation is not controlled, packaging now remains a serious problem as *sha* is never corked. Any attempt to cork it breaks the container as more carbon dioxide is constantly produced as fermentation increases. The shelf life of the drink is reduced by this fact thus, occasional spoilage may occur leading to loss in finances.

3.3.4 Producers' pedigree and adulteration by unscrupulous producers

People who have been producing *sha* for commercial purposes and those that have a family history of always producing good quality *sha* will tend to have more customers. However, in order to keep their queue of customers they try to produce much quantity of *sha* and by so doing some of the preparatory stages like soaking, germination and drying are not properly followed. The result is *sha* of low quality as adulteration will set in. More to that, because of high demand for the product and the quest for more income, some producers or retailers add some chemicals and tree barks to the *sha*. Some common adulterants used are table sugar (usually when the germination time was shortened) and water. Tree barks are equally added usually to increase the alcoholic content of the *sha*. Most recently, some producers have introduced sodium benzoate- a chemical preservative to increase the shelf life of *sha*. However, adulteration may lead to intoxication, drunkenness and loss of quality.

Unfortunately, there are few or no food safety regulatory bodies to ensure proper hygienic practices in this sector. The Ministry of Public Health has some specific guidelines in the management of breweries especially those related to hygiene and health but they are not usually implemented. The Councils pay little attention for ensuring good quality production of *sha*. *Sha* of good quality attracts more costumers because their health is guaranteed and thus,

growth in the business. Poor sanitary inspection leads to negligence by unscrupulous producers thus, reduced quality while compromising the health of the consumers.

3.3.5 Lack of support and disunity of brewers

There is lack of support from government to develop the local brewery industry because it is viewed as an activity for untrained and uneducated people who are not united. Support in terms of reduction in taxes, provision of sanitary equipment, education of the producers and retailers on basic hygiene practices are important. This lack of encouragement reduces producers' zeal to improve on the existing techniques of production. More so, *sha* producers are not operating in groups and this makes it difficult for them to be able to share their ideas and solicit for aids from national and international donors.

3.3.6 Lack of enzyme β -amylase in maize malt

There is usually a high level of sugar content in *sha* due to absence of the enzymes β -amylases in maize malt. The consequence of this is an increase and uncontrollable rate of fermentation which leads to the reduction in the consumption and shelf life of *sha* and if the consumption rate is not high enough, the retailer is bound to incur financial losses.

3.4 Prospects for Future Improvement

3.4.1 Provision of improved processing equipment

The introduction of modern processing machines for *sha* can be a welcome relief to producers to reduce the incidence of post-harvest losses and to add value to maize. The government and Non-Governmental Organizations (NGOs) should assist *sha* producers by providing modern brewing techniques to replace the artisanal methods. With this, the cost and the duration of production will be reduced and therefore, producers will be able to meet the needs of their consumers without adulteration.

3.4.2 Encouragement of the consumption of *sha*

The livelihood of many rural women in Cameroon depend on the sales of *sha*, thus, government and the local councils should stop the proliferation and sale of sachet whiskies/wine

especially in rural areas owing to the fact that sachet whiskies discourages this local industry and contain very high percentages of alcohol which are unhealthy especially to the youths that are already addicted to it. More to that, most of these sachet drinks are smuggled into the country with little or no taxes. If this is done, more *sha* will be consumed thus, the livelihood of the rural and urban women enhanced. The value of this sector can also be made known by advertising it in community radios and agricultural newspapers especially the 'Farmers Voice' news paper [38].

3.4.3 Provision of cooling and storage facilities

Electricity, cooling and storage containers need to be introduced to the producers and retailers of *sha* in order to reduce the rate of fermentation and formation of alcohol in the drink. Also, improved modern and natural preservatives should be encouraged with good trainings on how to use them. This will go a long way to increase the shelf life of this drink thus, reducing losses.

3.4.4 Intensification of proper regulatory measures

Adulteration remains a serious problem in the quality of *sha*. However, the Councils under the Ministry of Health should set up measures/standards to be used to bring perpetrators to book. In order to achieve this, a regulatory team should be set up in each council area to easily facilitate the implementation of these measures. These teams should be trained to oversee that the set standards are respected in the processing and retailing of *sha*. These standards may include the quality of utensils used in the production of the beverage, the attire worn by processors and sellers, quality of storage and retail containers. The council should also organize training workshops for producers and retailers to educate them on good manufacturing practices (GMP) and good hygienic practices (GHP) so as to ensure good quality product.

3.4.5 Formation of groups

Producers/retailers should be encouraged to form Common Initiative Groups (CIGs) and Cooperatives. Belonging to groups enables their voices to be heard hence, empowering them to be able to source and apply for national and

international aids. More so, this will enable them to be able to easily receive support from the government and also bring their resources together and improve on their production and retailing. It also make them to be able to borrow money from financial institution at a lower interest rate.

3.4.6 Importation of barley

Government may also come in to solve the problem of lack of β -amylase in maize malt by allowing or encouraging the importation of barley malt from temperate countries so that farmers can associate it with maize or better still, maize should be associated with other cereals during the production of *sha* in order to augment the quality. However, only 10% of barley is required for a good combination.

4. CONCLUSION

The process of *sha* (corn beer) production is still very artisanal in the rural and urban parts of Cameroon. However, *sha* plays a very important social and economic role in the lives of many people (mostly women) in the parts of the country where it is produced and consumed especially in the North West region where maize is produced as a staple food. This beverage, through taxes contributes to the GDP of Cameroon and generate income to all the people involved in its value chain, directly or indirectly. However, the methods of production, and processing and storage equipment remains a course for concern. Therefore, this study recommends the provision of improved techniques, facilities and training of brewers on improved production practices in order to ameliorate the sector.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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