

## **BAMBOO WINE BUSINESS AND RURAL LIVELIHOOD OF SONGEA DISTRICT, TANZANIA**

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### **ABSTRACT**

*This paper presents the impact of bamboo wine business on improvement of rural household income and livelihoods in Songea district, Tanzania. The area is largely rural, with 91 percent dominated by subsistence farming. It is the only area of Tanzania growing *Oxytenathera Braunii* bamboo species which produces bamboo wine.*

*The study adopted both quantitative and qualitative methods. A survey was conducted in 50 households using semi-structured questionnaires. Participatory Rural Appraisal (PRA) involving 10 participants was conducted for detailed information.*

*An appreciable contribution of bamboo wine to household income, and which is inversely proportional to variations in production levels was observed. Bamboo wine prices conceded with the law of “demand and supply”. Bamboo wine business was noted to improve livelihoods through utilization of the income generated in the acquisition of basic items and services such as shelter, school fees, food stuffs, bicycles and motor cycles. Despite the noted contribution, the crop was not a focus of the Agricultural Extension Service (AES), hence undermining its role.*

*We recommend that bamboo wine business be improved through AES, which is critical for improved bamboo wine productivity; storage and processing for expanded market and higher profitability.*

**Keyword:** Bamboo wine, Household income and rural livelihood

## INTRODUCTION

Bamboo is a monocotyledon plant with a hollow trunk. There are many species of bamboo depending on the geographical location. In Tanzania, bamboo grows on low altitudes and in montane forests covering a total area of 123,000 ha (Lupangile, 1990). The species *Bambusa vulgaris*, which is, golden yellow-green and striped is found around Lake Victoria, while the *Oxytenathera braunii* is common in Southern highlands of Tanzania where this study was based (Leonardo, 2010; Plant Images, 2010). Bamboo is propagated by shoots and suckers, an aspect referred to as vegetative reproduction. Bamboo is an evergreen plant growing in normal, to well drained moist sandy to loam soils and partial shades (Plant Images, 2010; Black, 2008). There are many uses of bamboo e.g. furniture making, baskets, trays, food (soup, wine etc.).

Of many uses of bamboo, the purpose of this study was to look at the impact of bamboo wine business on improvement of rural household income and livelihoods in Songea district, Tanzania.

This study was conducted in Songea district which is located along longitude 35° 35' East; and latitude 10° 41' South. Villages covered by the study are located in the *peri*-urban sections of the Songea Municipality. This area was selected because it constitutes the major market for most of the bamboo wine produced in the district. In fact, it is the biggest and nearest town centre located within the vicinity of the villages that produce bamboo wine.

The district receives rainfall for one season in a year, particularly from November to April. Naturally, the rain season coincides with the production of bamboo wine as it is tapped from young shoots that emerge at such times only. The Songea Rural district has the total population of 156,930 out of which 76,898 are males while 80,032 are females. Sex ratio is 96, with dependency ratio of 86. The average household size is 4.7. The literacy rate (>5 years) is 75 percent with the net enrolment of 81 percent (URT, 2002: 19).

In Songea district, agriculture engages 91 percent of the population and 67 percent of them use a hand hoe. Elementary occupations involve 3 percent, office work 3 percent and 2 percent were

dealing with business operations. Running water is supplied only to 36 percent of the population. Firewood is the main source of domestic energy for 97 percent who used it mainly for cooking. Wick lamp is the main source of lighting energy for 59 percent. Eight percent of the main material for walls construction is baked bricks while 65 percent of roofing is grass and 82 percent of flooring is mud. Traditional pit latrine is the main type of toilet facility (97%). In the area, the average number of persons per room is 1.7 (*ibid*: 20 pp).

In Southern Tanzania, bamboo plants are mainly grown in small farms that surround rural homesteads and in the river valleys. Bamboo plants, which are grown in the farms surrounding homesteads, produce bamboo wine only during rainy seasons while those which are grown in the river valleys produce bamboo wine throughout the year. Most of the bamboo wine tapping is done from December to May and from May to November in the lower and higher areas respectively (Leonardo, 2010; Pilliere, 2008). Despite the continuity of bamboo farming, a significant decline of bamboo plants was observed in Ileje district, and this is attributed to poor harvesting methods (Mbonile, 2008). This calls for the need to appraise the status of bamboo growing for improved productivity and conservation initiatives.

The study is an effort towards appraising the impact of bamboo wine business to people of Songea district. This was a significant step in understanding the contribution of bamboo wine business to the household income and in improving livelihoods so as to establish possible means and ways to improve processing and selling of bamboo wine at local and international markets basing on *in situ* perceptions.

The main research question the study strived to answer was: “what is the role of bamboo wine business to socio-economic well-being of local communities of Songea District? In addressing the question, the study identified the main types of bamboo plants that produce bamboo wine and analyzed the seasonal trends in bamboo wine output and price. Such information was used in determining the contribution of bamboo wine business in enhancing household income and improvement of livelihoods in the area. Furthermore, the study investigated bamboo wine processing and determined how the processing can be improved to produce quality bamboo wine for local and international markets.

## **Significance of the study**

Songea District in Southern Tanzania is characterized by widespread cultivation of *Oxytenathera Braunii* bamboo species which is instrumental to bamboo wine business. However, the contribution of bamboo wine business to the local communities in the area remains largely unknown; hence, this paper strives to address this knowledge gap.

Evaluation of bamboo production, processing, physical and chemical characteristics, consumption and other uses of bamboo resources in Tanzania is largely missing (FAO, 2007; Chihongo *et al.*, 2000).

The fact that people in the rural and *peri*-urban Songea have improved their livelihood through bamboo cultivation and selling of bamboo products cannot be contested, hence necessitating for the appraisal of the impact of bamboo wine business on the socio-economic development of local communities of the area (Haule, 2010). What highlights the ‘knowledge gap’ further is on determining the extent bamboo wine business is crucial in improving livelihoods. Such knowledge is considered important to shed light on the significance of bamboo and bamboo wine business which is more considered as ‘a way of living’ than as an economic activity.

The significance of bamboo cultivation and the resultant bamboo wine production and selling as part of on-farm activity which contributes to peoples’ development remains implicit. This calls for establishing avenues for the promotion of quality production of bamboo wine and other bamboo products both at local and international levels. In other countries, bamboo is increasingly recognized as an important asset in improving livelihoods, economic development and environmental conservation (FAO, 2007; Gangopandhyay, 2003).

The current study investigates a far less researched area so as to generate knowledge on bamboo crop that would put the area in the national and world spotlight as an effort towards raising people’s income and promotion of their standard of life. As growing bamboo plants, for the purpose of wine tapping, has been practiced and regarded by many inhabitants of Songea district as “a way of life” and not economic activity, therefore pinpointing the need to transform this standpoint deems necessary for more productivity and farmer profitability in the bamboo wine

sector (Haule, 2010). Documenting benefits of bamboo wine farming and bamboo wine business is therefore thought to be critical in this respect.

The findings of the study will enable bamboo wine producers to chart ways aimed at large scale bamboo wine production and improve its processing to meet national and international standards. This necessitates a shift from considering bamboo and bamboo products as a resource for location-specific sub cultures to a world-wide resource that is linked to international business endeavours.

The main tenet which the study underlines is that the development of appropriate technology for bamboo wine farming, tapping and processing should begin with changing the mindset of local communities into perceiving bamboo wine as a significant economic activity. Currently, applicable technologies on bamboo wine production, such as, farming, tapping, processing and selling are largely not evaluated and are un-documented leading bamboo wine to remain a local drink which mainly targets the lower cadre people (Chihongo *et al.*, 2000; Kwaku, 2006; UNEP-WCMC, 2004).

The above model enables one to underscore the significance of bamboo wine and bamboo wine business in terms of interlinks with various aspects of value chain towards improved livelihoods. The bamboo wine sector has its sub-sectors with different characteristics which need to be articulated in the analysis of the contribution of bamboo wine business. This model is meant to explain the dynamics involved in bamboo wine sector, whereby understanding of changes in the bamboo sector affects the outpour hence influencing the volume of business, price, income, relations of production and contribution to supporting livelihood.

## LITERATURE REVIEW

Literature identifies various uses of bamboo plant ranging from provision of construction material, piping, furniture making, handicraft a source of energy to the production of a sap tapped from sharp sliced young canes and which are used as a drink, that is, bamboo wine (Pilliere, 2008; UNEP-WCMC, 2004; WHO, 2004). A study by Mbonile (2008) revealed that bamboo is related to retaining water and restoring soil fertility. Bamboo wine is tapped from young plants; thus, irrigation, rainfall or watering the plants becomes necessary for increased output (Plant Images, 2010). Bamboo wine can be used as a soft drink when freshly tapped or as alcohol when left for some hours to ferment (Kwaku, 2006; Plant Images, 2010; Pilliere, 2008; Chihongo and Kishimbo, 2000; Kigomo, 1988). The longer the sap is out of the plant the higher the alcohol content (WHO, 2004).

Leonardo (2010) and Haule (2010) generalized on the potential contribution of bamboo wine business to the well being of the respective local communities. The same authors, like others, have failed to quantify the contribution of bamboo wine business to the well being of these communities (UNEP-WCMC, 2004). Mbonile (2008) looked at the significance of bamboo trade in improving rural livelihoods in Tanzania particularly in the 1980s, while focusing on other products of bamboo excluding bamboo wine; hence, underlining the existing knowledge gap. It has been generally observed that the plethora of available literature on bamboo wine is silent on the number of people involved in the bamboo sector and on the contribution of the sector to the household's economy. In Mufindi and Njombe districts, it is estimated that between 30 percent and 50 percent of the people have their economies linked to bamboo (Sakafu, *per. Comm*; in Leonardo, 2010).

Trends in the changes of bamboo wine prices indicate that during dry season bamboo wine becomes scarce and expensive (WHO, 2004), as only small quantities are availed from irrigated farms in river valleys. Literature reveals that bamboo tapping is the task which is mainly been undertaken by males. The impact of the male bias on the activity and on the utilization of accrued household income needs to be established. Mbonile (2008) observed lack of full integration of bamboo sector to the economy of people of Ileje district. Bamboo is generally

perceived as an important crop for the poor for it is cheap to produce as it involves no farm inputs (Pilliere, 2008; UNEP-WCMC, 2010; Chihongo and Kishimbo, 2000; Kigomo, 1988).

Forestry staff and government authorities categorize bamboo as a minor forest product occurring in natural forests and agricultural lands; thus, controlled under forest policy and legislation. This keeps the significance of bamboo and bamboo products in a hiding and to a threatened status (UNEP-WCMC, 2004). In essence, this relegated bamboo to not being considered as “a crop” despite its potential and actual economic significance (Haule, 2010). The evident lack of agricultural and/or forestry extension service on bamboo sector supports the hypothesis. Versatility in terms of uses of the bamboo plant suggests the need for promoting bamboo farming for economic gains and sustainable natural resources conservation (Pilliere, 2008; UNEP-WCMC, 2004). It is our profound conviction that the efforts towards enhancing household income and in improving livelihoods cannot be pragmatic and successful if the situation on the ground is largely neglected (UNEP-WCMC, 2004).

The Tanzania Country Profile Report (2004) appreciates the abundance and cheap availability of bamboo wine, locally known as *ulanzi* during the wet seasons in Southern Tanzania (WHO, 2004). Whilst local people were supposed to gain more income during high bamboo wine tapping season, the price of the product tends to decrease to the minimum; denying farmers the income which is highly needed for livelihoods and development. What leads to such state of affairs, and which mechanisms can be used to reverse the adverse trends need to be charted out.

Cheapness of bamboo wine is also closely associated with early age consumption of the alcoholic drink by women aged 13-14, thus increasing the percentage of drunkards and harlots in rural areas (WHO, 2004). This becomes detrimental to the status of livelihoods as young men and women are diverted from engagement in productive activities to engagement in antisocial behaviours, leaving the burden of production and improving community livelihood to the aged, underlining poverty levels.

According to Mbonile (2008), the relationship between poverty and resource utilization exists but cannot be easily quantified. Ehrlich and others (1992) link poverty to the depletion of natural resources such as land and soil, water, forests and food as responsible for disturbing livelihoods.

The United Nations Conference on Environment and Development (UNCED) at Rio de Janeiro identified poverty as both a cause and an effect of environmental problems (WCED, 1987). Poverty is defined differently by different scholars using different indicators which are based on one's gender, age, culture and other socio economic contexts (Laderchi *et al.*, 2003). This reality complicates the analysis of both poverty and poverty issues. For the purpose of this study, socio-economic indicators associated with improved livelihoods are regarded as more appropriate for the analysis. Location specific analysis of property acquired through bamboo wine selling is considered more practical for the analysis and for pragmatic aspects towards improving rural livelihoods.

The philosophy behind this standpoint is that both poverty and inequality are basically caused by factors occurring at a specific location; hence calling for location specific solutions. The use of local environment, towards solving poverty related problems engender elements of sustainability to both the environment and livelihood. Despite the significance of bamboo and bamboo wine, still the bamboo plant remains associated with threatened plant species (UNEP-WCMC, 2004; Black, 2008; INBAR, 2006). Something has to be done to address the ailing situation through appreciating the reality that guarantees sustainable utilization of the resource and which justifies the grounds for effective conservation.

This paper is therefore set to address the knowledge gap on the contribution of bamboo wine business to rural livelihoods.

### **Conceptual Framework**

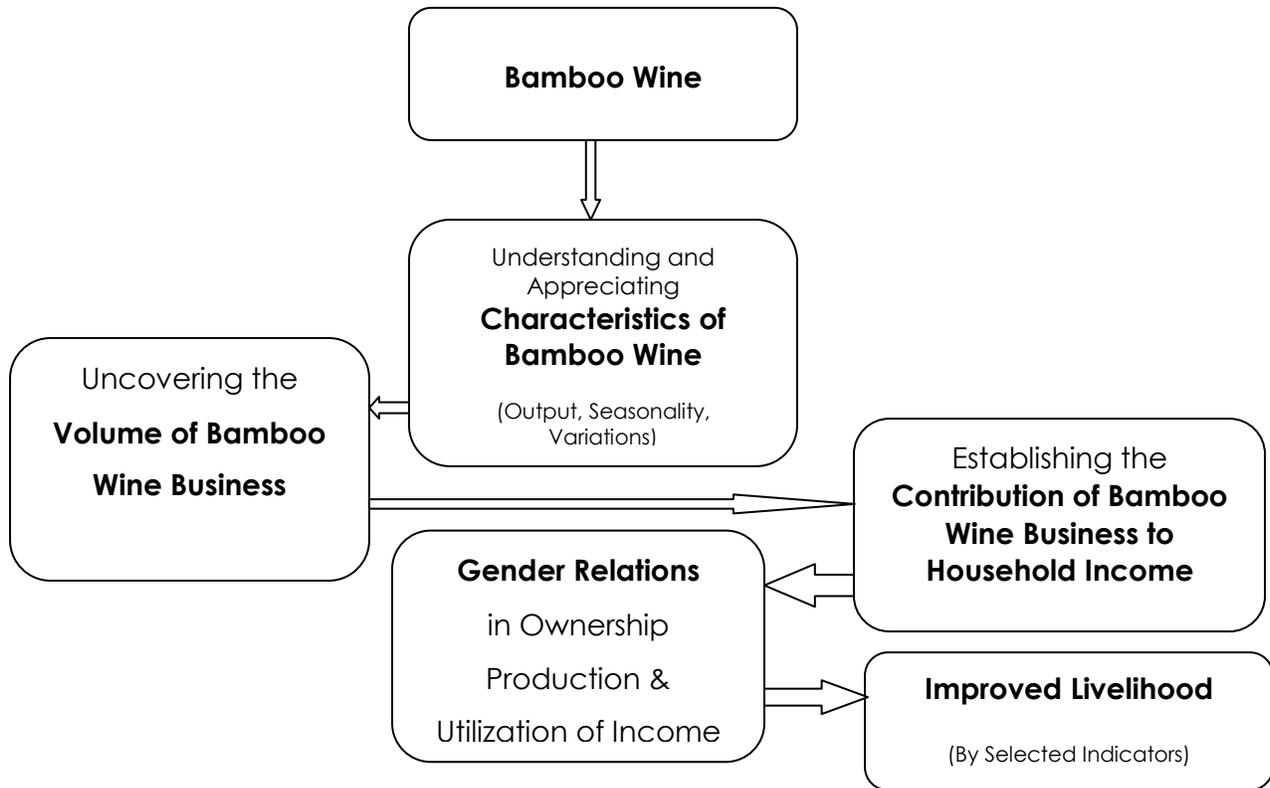
The author visualizes that to be able to determine the contribution of bamboo wine business; it is important to appreciate the characteristics of bamboo plants with regard to its seasonal behaviour that impacts on both the intensity and duration of bamboo wine production. These are important aspects to seasonal variations in output levels and supply and demand which determine the price. This information is critical and a precondition for the assessment of the contribution of this business to household income which is used in improving rural livelihoods. The information involves both the amount of income expected within a production cycle and its periodization.

Gender issues, with regards to ownership of the bamboo wine business, involvement in the bamboo wine production process, and distribution of income obtained from bamboo wine selling are considered to be important aspects in analyzing the impact of bamboo wine business on improving livelihoods. Issues of gender are critical as the income generated at a household level should fundamentally be used equitably to benefit the entire household. If this is not taken into account, the income accrued may end up into the hands of a few household members who are the beneficiaries of the imbalance of social positions and power relations. In such instance, men are likely to benefit from the production activity hence adversely affecting the lives of women and children within the bamboo wine sector.

The emphasis is that location-specific indicators need to be identified as they are critical for the appropriate measurement and evaluation of the improvement levels of households in question in terms of availability of basic goods and services. The indicators conceived by this paper are as included in the FAO (2003) definition of livelihood. The indicators include capabilities, assets and activities that rural people require as a means of living that is, building a shelter, purchasing means of transport such as a bicycle or a motor cycle, and acquiring various types of household items which ease or sustainably support life systems at household and community levels. Improved livelihood condition as defined and adopted by this study simply means obtaining any items that results in better life standards of a household; and enhances the possibility for boosting productivity. The indicators are measured through the role and utility of household items acquired through monies obtained from bamboo wine sales. How such households were better improved through acquisition of such important items.

## Conceptual Model

Figure 1: PLANT UTILIZATION: A FACTOR FOR SUSTAINABLE DECISIONS ON PRODUCTION AND ITS CONSERVATION AND IMPROVED RURAL LIVELIHOODS



Source: Researcher's Own Construct, 2015

## METHODOLOGY

### Study Design

This study employed both quantitative and qualitative techniques of data collection, processing and analysis. While quantitative data were to demonstrate the magnitude of studied phenomena, qualitative data provided detailed descriptions and explanations for the findings portrayed by the quantitative data. Issues addressed by qualitative approach were the importance of bamboo wine business, techniques used in bamboo wine tapping and source, change and continuity of the same techniques, and areas of improvement on bamboo wine business. Quantitative approach involved seasonal variation of bamboo wine output, bamboo wine price variations basing on low and high production periods.

### Sampling

The selection of participant households for the study was based on *simple random sampling* technique. A total of 50 household heads from households which grow bamboo plants and tap bamboo wine were interviewed in the four villages considered the main bamboo wine producers in the district namely, Lipaya, Lahirakati, Lihwena, and Mwengemshindo. Table 1 demonstrated the distribution of respondents by villages. The four villages covered by the study are located within the range of 5 to 15 kilometres from Songea Municipality, the main market for bamboo wine.

Table 1: Distribution of Respondents by Villages

SN	VILLAGE	NUMBER OF RESPONDENTS
1	Lipaya	15
2	Lahirakati	15
3	Lihwena	10
4	Mwengemshindo	10
	TOTAL	50

Source: Field Survey, 2014

A total of ten (10) bamboo wine pub owners were randomly selected and interviewed to obtain in-depth information on the dynamics and profitability of bamboo business in Songea district. In each pub, the pub owner was interviewed on the contribution of bamboo wine selling to the development and livelihood of the local communities in the study area.

For qualitative data *purposive sampling* was employed in obtaining participants for PRA discussions. This was meant to ensure *maximum variation* of participants for obtaining detailed explanation that guarantee reliability and validity of the study findings. A total of 10 participants from each of the four villages covered by the study were involved in PRA group discussions. Four bamboo wine selling pubs, one from each village, were visited for spot observation.

### **Data Collection and Instruments**

Quantitative data were collected from both bamboo wine producers, that is, first line sellers and bamboo business people, that is, second line sellers through household survey, whilst qualitative data were obtained through PRA.

Data collected from households growing bamboo included the household members' demographic information, quantity of bamboo clumps (*vitindi*) each household owned, methods used in bamboo tapping, the acquisition of such techniques and their change and continuity through time. Other data were on improvement in bamboo cultivation, tapping and processing, quantity of bamboo wine tapped daily during low and high seasons and prices of bamboo wine in different tapping seasons, that is, first low, high, and second low. Information on the amount of income obtained through bamboo wine selling, properties developed and or bought from resources obtained through selling of bamboo wine, past and current methods of processing bamboo prior to selling, perceptions on the possible future improvement in bamboo processing methods and gender issues in the participation of bamboo wine industry, that is, tapping, processing and selling was also collected.

Data collected from bamboo wine sellers included demographic information of household members, sources of bamboo wine for their business (by location), quantity of bamboo wine purchased/sold during high season, buying and selling prices for bamboo wine during high production season; quantity of bamboo wine bought and sold during low season and buying and selling prices for bamboo wine during low season. Other data were on the profitability and gains obtained through bamboo wine business, taxes and dues paid to local authorities for bamboo wines business and any information on bamboo wine business as per interviewee's perceptions.

Semi-structured Questionnaires were used for collecting quantitative data, while PRA discussions were carried out using Interview Guide.

### **Data Processing and Analysis**

Quantitative data were processed using the SPSS package. The statistical indicators used in concluding findings were totals, averages, mean and median values. Percentages were used to determine the trends and variations in bamboo wine quantities with seasons. The bamboo wine price per litre averages and ranges were calculated and multiplied by the average number of days in a production season so as to obtain the average household income accrued from bamboo wine business. The amount obtained would shed light on the purchasing power of the household hence influencing the possibility for improving livelihood.

Qualitative data were processed manually by coding the responses and arranging them into themes and labels whereby stronger and profound statements that were repeatedly uttered and complied by PRA groups were quoted and directly used in the text. Findings from qualitative data provided detailed explanations on the behaviours of quantitative data, referring to increasing trends, decreasing trends or stasis. The main focal areas of the paper are bamboo wine, bamboo wine production levels, bamboo wine sales, utilization of income from bamboo wine and bamboo wine and how it improved livelihoods.

## FINDINGS AND DISCUSSION

### Importance of Bamboo Wine Business to the Household Economies

The study established bamboo wine business as an important livelihood and economic activity which needed attention of both the people of Songea district and the government of Tanzania in general. Bamboo wine and other products of bamboo, which could have played a profound role in enhancing national development, were observed to be neglected.

**Table 2: Respondents' Views on Contribution of Bamboo Wine to Their Income and Livelihood**

Rating	Frequency	Percent	Cumulative Percent
Very low	3	6	6
Low	13	26	32
Average	13	26	58
very high	21	42	100
<b>Total</b>	<b>50</b>	<b>100.0</b>	

The respondents' views on the contribution of bamboo wine business to household income and livelihood are demonstrated in Table 2. It is an established fact that bamboo wine business cannot be realized without bamboo farming. However, the finding that, in Songea district, bamboo farming lacked Extension Service from the Ministry of Agriculture indicates a total neglect of the crop despite its observed significant role in enhancing household income and improving rural livelihoods. This is an aspect which requires timely intervention.

### Characteristics of Bamboo and Bamboo wine Production and its Relation to Product Price

#### (i) Bamboo Wine Prices and their Variations in a Production Season

Survey data given in Table 3 indicate a change of bamboo wine prices with output levels within a production season. At the onset of the season, that is, during the months of November and December, 40 percent of the households sold bamboo wine at the maximum price of Tshs 500 per litre; while only 28 percent of the households sold it at between Tshs 250 and 300; and 16 percent sold it at between Tshs 350 and 450. This is when the production season has just begun,

and which is characterized by low output. By this period, the daily household's average output level stands at 6.1 litres.

**Table 3 Distribution of Respondents by Prices of Ulanzi in the First Low Production Season**

Price Per Litre (Tshs)	Frequency	Percent	Cumulative Percent
100-200	4	8	8
201-250	2	4	12
251-300	14	28	40
351-400	7	14	54
401-450	1	2	56
450-500	20	40	96
500+	2	4	100
<b>Total</b>	<b>50</b>	<b>100</b>	

The months of January, February and March covers the middle of the bamboo wine production season. This is the period of maximum output. In this period, the daily average household's production is 40.1 litres. Survey data in Table 4 indicate that during this period a litre of ulanzi is sold at the lowest price, that is, between Tshs 100 and 200. Being the period of highest output, lower price demonstrates lower profitability. If the sap could have been processed and stored, it would have fetched much higher price and profit during the period of scarcity.

**Table 4 Prices of Ulanzi in High Production Season (Middle)**

Price Per Litre (Tshs)	Frequency	Percent	Cumulative Percent
100-200	43	86	86
201-250	2	4	90
251-300	5	10	100
<b>Total</b>	<b>50</b>	<b>100</b>	

During the last low season, the output tends to decrease as rainfall decreases, but the price on the other hand tends to rise. The period covers the months of April and May, with the daily average household output of 3.6 litres. Survey data in Table 5 indicate that about 50 percent of the households sold a litre of bamboo wine at the price of between Tshs 450 and 500; while 22

percent sold a litre of the wine at between Tshs 350 and 400; and 16 percent sold a litre of the wine at between Tshs 250 and 300.

**Table 5 Distribution of Respondents by Prices of Ulanzi in the Second Low Production Season**

Price Per Litre (Tshs)	Frequency	Percent	Cumulative Percent
100-200	3	6	6
201-250	1	2	8
251-300	8	16	24
351-400	11	22	46
451-500	25	50	96
500+	2	4	100
<b>Total</b>	<b>50</b>	<b>100</b>	

#### (ii) Bamboo Wine Tapping and Processing Methods

The dominance of traditional method(s) of bamboo wine tapping that uses *mbeta* (a bamboo tube used for collecting bamboo wine) and a sharp knife has been maintained for generations. The method was noted to be efficient, although there are some leakages of the sap and insect bites which prompt improvement. The inter-generational training on the methods substantiates continuity of the crop; the need for more efficient methods is evident.

Data in Table 6 indicate that majority (78 percent) of the households processed bamboo wine by mere filtering of the sap to remove insects; this demonstrates non-application of chemical processing of the bamboo sap. Only 2 percent of the households used preservatives. Literature indicates that the alcohol content of bamboo wine increase with time (WHO, 2004). This nature and/or character limited the market size in terms of both expanded knowability of the product and its physical coverage. This consequently jeopardizes sustainability and stability of livelihoods.

**Table 6 Current Bamboo Wine Processing Methods**

<b>Methods</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Adding preservatives	1	2	2
Filtering to refine it	39	78	80
Keep in a clean container	1	2	82
Wash mbeta for quality product	9	18	100
<b>Total</b>	<b>50</b>	<b>100</b>	

**(iii) Gender Relations in Bamboo Wine Business**

The out-balanced gender relations (Table 7), with regard to bamboo wine tapping and selling, is indicated to be men's domain, hence calling for the efforts to reverse the imbalance. Not only that few women were involved in the tapping and whole-selling of bamboo wine, but at the same time they were also noted to be placed at the threshold of those beneficiaries of the money obtained from the selling of bamboo wine.

Survey data indicate that 82 percent of the households had males dealing with the bamboo wine wholesaling, while 18 percent of the households had both males and females. Wholesaling is the selling of the product to retailers, a process which guarantees direct availability of income as the retailers are readily known to the wholesalers.

**Table 7 Respondents' Opinions on Actual Sellers of Bamboo Wine to Retailers**

<b>Sex</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Males	41	82	82
Both	9	18	100
<b>Total</b>	<b>50</b>	<b>100</b>	

According to the survey data in Table 8, on selling to the direct consumers, majority (62 percent) of the households engaged both males and females; while 28 percent had only females involved in the business. However, 10 percent of the households had only men participants in the business. This indicates dominance of female participation in retailing. As ownership of the

bamboo wine pubs was male dominated, the profits accrued through the retail business was likely accumulated to benefit the same owners, hence constituting a gender divide.

**Table 8 Respondents' Opinions on Actual Sellers of Bamboo Wine to Direct Consumers**

<b>Sex</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Males	5	10	10
Females	14	28	38
Both	31	62	100
<b>Total</b>	<b>50</b>	<b>100</b>	

### **Bamboo Wine Selling and Its Contribution to Household Income**

Determining the contribution of bamboo wine to household income is a complex aspect to analyze without underscoring the characteristics of bamboo and bamboo wine, and its pricing explained above. However, the study established that the income obtained through bamboo wine selling was immense as compared to other economic activities undertaken in the area.

The annual household average income of Tshs 217,896/- (USD 133) was availed from the sales of bamboo wine during the first part of bamboo wine production whereby the average bamboo wine output was relatively small, that is, 8.0 litres. This part of the season runs for about 56 days. The maximum average household income of Tshs. 728,560/- was available during the middle of the season whereby the output reached maximum and that the duration was the longest, that is, lasting for about 99 days. In the last part of the season, the average household income reached Tshs. 308,392/- obtained through bamboo wine sales which were recorded within 81 days. Seasonality in bamboo wine production had been previously acknowledged by Green (1999).

The trends in cash flows within one cycle of bamboo wine production indicates that household income was the lowest at the beginning of the production cycle and that from the middle towards the end of the production season the income decrease was minimal. This may be attributed to getting used to a drink, hence ensuring continuity of the market share. What is of significance is the reality that income stability was certain as the period of less output and lower income was the shortest hence lessening the tension to households which produced bamboo wine. The inverse

relationship between bamboo wine output and price and duration tended to guarantee profitability of the natural sap.

The income generated from bamboo sales was effectively used to meet various household above mentioned expenditure items. From the descriptions below, one may give a conclusion as to whether or not bamboo wine business is worth being considered as positively or negatively impacting on improved livelihoods and reduction of non-income poverty. The fact that bamboo wine is a mere tree sap, an alcoholic drink that according to Green (1999) does not impinge on household food resources, then it is qualified as significant in enhancing livelihood.

### **The Contribution of Bamboo Wine in Enhancing Rural Livelihood in Songea District**

The study established immense contribution of bamboo wine business in enhancing rural livelihood. The analysis and findings were based on items (a) and (b) below:

#### **(a) Bamboo Wine and Opportunities for Raising Income and Development**

In this regard, bamboo wine provided employment to farmers, tappers and sellers. Those people who were busy planting and taking care of bamboo plants would have no jobs in the absence of bamboo plants and the potential for bamboo wine production. Sellers of bamboo wine at both production and destination areas benefited from the crop as they earned income which is critical for their livelihood and survival. A significant proportion of the respondents indicated that they obtained provisions for their households through selling of bamboo wine.

The fact that the average annual household income for Songea in 2007 was Tshs 599,794 (URT, 2008), and the finding that the average annual income obtained through bamboo wine business, for households dealing with bamboo wine selling, was about Tshs 418,823; then it implies that the amount accrued through bamboo wine business was about 69.7 percent of the annual household income. This is a substantial contribution to the household income. As the national average household size is 4.7 (URT, 2014) then for the same households the *per capita* contribution accrued from bamboo wine business was Tshs 88,996, which is a substantial amount to make income difference from those households not dealing with the business.

In an alternative scenario, bamboo wine, local and cheap as it is, provides a drink to the rural and urban poor who can hardly afford a beer or a bottle of whisky. This aspect forms a means of leisure and a reason of social gathering for people to share views pertinent to their communities. No wonder that the price difference from that of a beer may be considered a saving that “keeps the poor going strong”. Side-effects associated to bamboo wine are scantily recorded in literature. In Njombe district, bamboo wine was observed to attract young men and women who drink during day time instead of working. Some of them were reported of being involved in promiscuous behaviours. These habits could be attributed to irresponsible drinking other than bamboo wine itself. If it is bamboo wine, it may then be due to its affordability. The bamboo wine business deviates labour from productive to non-productive and reproductive activities. Due to the latter, these drunken individuals cause an increase of incidents of sexually transmitted diseases which include HIV and AIDS (WHO, 2004).

#### (b) Bamboo Wine Business and Improvement of Rural Livelihoods

The reality that a big proportion of households which grow bamboo plants and sell bamboo wine have been able to attain relatively higher standards of life through acquiring various items is the evidence of how the crop plays a role in both improving rural livelihoods and alleviating poverty.

Building of shelter makes a big positive shift of a household. It marks advancement termed as development; hence contributing to alleviation of poverty. Having been able to send children to primary, secondary school, and to college, using money obtained from bamboo wine business is obviously a marked step forward. This is an important step towards alleviating poverty, not only to the current generation, but also for a number of generations to come.

The money obtained from bamboo wine sales for purchasing farm inputs, such as fertilizers, indicates the significance of bamboo wine in poverty alleviation as the crop plays a role in enhancing output of other crops, be it food crops or cash crops.

Bamboo wine business has been able to facilitate acquisition of money for purchasing television and/or radio sets which are important items in disseminating information and news. Such gadgets therefore were significant in ensuring access to information and knowledge which is critical in raising livelihood status. Thus in this regard, livelihood was dealt with on a double edge, that is,

through ownership of the gadgets; and as regard to its effective utilization and its consequent impact. However, the extent of contribution of the mentioned gadgets to livelihoods could not directly be determined in this paper as it is outside the scope.

Transport has been a headache to many rural dwellers. However, the study noted that some of the respondents could manage purchasing bicycles and or motorcycles through the money obtained from bamboo wine sales. The eased transport is an important service for the communities in question that facilitated other economic activities (see Table 9).

**Table 9 Benefits Accrued from Bamboo Wine Business**

<b>Rating</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Very low	3	6	6
Low	13	26	32
Average	13	26	58
very high	21	42	100
<b>Total</b>	<b>50</b>	<b>100</b>	

## CONCLUSIONS AND RECOMENDATIONS

### Conclusions

Bamboo wine business is significant in terms of both enhancing household income and improving livelihoods. Bamboo farming therefore needs to be highly improved in terms of farming, tapping, and processing methods for better contribution to economic status of the people of Songea district. This is justified by overt lack of recognition by the AES, thus bamboo remains to be a traditional crop. This is also supported by Chihongo *et al.* (2000). Bamboo wine business contributes about 69.7 percent of the total average household income for the inhabitants of Songea district with an additional annual per capita income of Tshs 88,996.

The seasonality of the bamboo wine production levels, coupled with changes in price directly affects cash flow among households which deal with bamboo wine business. During high season households obtain less income as compared to low seasons when the prices are at the highest levels. The main observation was that bamboo wine price varies with the variation in its supply; normally, “the higher the supply the lower the price”. Being a seasonal product and currently not processed and or preserved; bamboo farmers shall remain losers since by the time of maximum output, the prices of bamboo wine plummet to the lowest levels. Similar findings were observed by Green (1999). This has an adverse effect to improving rural livelihood; in the period when farmers were to maximize income, through maximizing the supply, their product was given “for free” as it actually fetched no price. The farmers were, thus caught within the web of poverty and socio-economic stagnation as increased output alone is not solution to low income problem.

Male dominance which was observed in all pertinent activities of bamboo farming which ranged from farming tapping, and whole selling of the same, obscures a chance for women and men to benefit equally from bamboo wine business. However, since customary laws restrict women from owning farms, there is a slim chance for women to benefit from such an activity (Chihongo *et al.*, 2000; Haule, 2010). Women and girls could only be visible in the retailing sector, whereby most of the owners of such business were males. Gender bias in bamboo business was also noted in a study by Green (1999). To rural women, alcohol selling was just an adaptive livelihood strategy to support their households (McCoy *et al.*, 2013).

## Recommendations

Based on the above conclusions, the following recommendations are given for improvement of the current state of affairs pertinent to bamboo wine business in the study area and elsewhere; where socio-economic and environmental conditions are similar.

Since bamboo has an appreciable contribution to livelihood of people of Songea district, it is recommended that AES should consider extending their services to bamboo just like any other crop as a way of boosting output. Therefore, farmers have to be advised on how to grow and care for bamboo plants. Other extension services such as NGOs, which are responsive to farmers' needs, have to be articulated in the process. Expanded growth of riverine bamboo wine would enhance its supply during dry seasons hence securing a higher price. Bamboo wine processing is another means to add value for higher standards and raise price.

Bamboo wine processing which include bamboo wine tapping should be improved so as to capture the benefits of high season which, due to price falls, amount to losses. This provides a means towards price control and serving a larger market both within the country and elsewhere. Further research in the area is hereby recommended. It is also significant and necessary to start processing bamboo wine in order to internationalize the product and capture a wider market; hence enhancing both household and national income. Improvement is recommended with regard to storage, contents, packaging and distribution. This shall transform the product to cater for the local national and even international markets. If other drinks based on wild fruits, like *Amarula*, have made it to international standards and markets, why not *ulanzi* of Southern Tanzania?

There should be concerted efforts towards ensuring gender equity in bamboo farming that includes bamboo wine production and selling, so as to ensure equitable distribution of benefits obtained in the bamboo industry. The observed male dominance in the bamboo sector should be strategically addressed through the inclusion of both sexes.

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