**Indigenous Beverage Production and Economic Empowerment of Rural Women in Rwanda**

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1. **Introduction**

Indigenous beverages are popular in many African communities. Several social, religious, health and therapeutic values are associated with indigenous beverages, making them a critical and integral part of the communities that produce and consume them (Aka et al , 2008 ; Djè et al ., 2009 ; Nwachukwu et al. , 2010). Across sub-Saharan Africa, indigenous non alcoholic and alcoholic beverages are produced from locally available materials such as cereals, fresh milk, fruits and vegetables. In many instances, these raw materials are subjected to a fermentation or brewing process, often in order to improve one or more of taste, nutrition, shelf-life, alcoholic content, appearance, texture etc. In more recent times, religious beliefs restrict the consumption of traditional beverages among some Africans to the non-alcoholic variety. Traditionally however, a segment of the population in Africa such as children, pregnant women and the elderly prefer non-alcoholic beverages or are customarily expected to consume such; alcoholic beverages are preferred or expected to be consumed by the male members. Alcoholic beverages is the preferred variety that plays a dominant role in the social life across the region with palm wine, millet, maize, sorghum, honey, banana and cassava usually utilized as raw materials in their production.

Rural women’s economic empowerment can hardly be discussed without an understanding of the place of indigenous technology in acting as a resource with which rural women are able to achieve some form of financial independence and contribute to family upkeep. In traditional Africa, women are usually the custodians of the indigenous technology needed for the production of indigenous beverages. Usually working from home or in cooperatives, women produce for domestic use and/or for sale to neighbors or purely for commercial purposes. Indigenous beverage production can grant rural women the economic power needed to enable them “to act freely, exercise their rights, and fulfill their potential.” An economically empowered woman is equipped with the necessary skills and resources to advance equally, by being able to compete in markets and to access economic institutions (Markel & Jones, 2014, p. 2).

This paper examines four beverages in Rwanda produced with the use of indigenous technology, with a view to determining their contribution to the economic empowerment of rural women and how existing institutions and practices impede or create conditions for further advancement. Sorghum is a staple in the traditional diet and one popular alcoholic and one popular non-alcoholic beverages made from sorghum are studied. Sorghum beer ‘Ikigage’ is a popular fermented beverage that is especially used during celebrations such as marriage, birth, and during festivals. Ubushera is the non-alcoholic beverage made using sorghum as raw material. Banana is another food that is widely consumed across Rwanda. Banana wine (urgwagwa and banana non-alcoholic drink (umutobe) are two different products made using banana as raw materials that are also studied. Although these drinks are traditional to Rwanda and previously widely consumed, they are losing market to imported drinks or locally manufactured sodas. The study looks at how the indigenous technology based production of beverages from banana and sorghum contributes to increased income and enhanced access for rural women and explores trends, challenges and opportunities in improving the economic situation of rural women who are engaged in such business in Rwanda.

Key research questions the paper seeks to answer include: To what extent is indigenous technology a viable route to economic empowerment of women in rural areas in sub-Saharan Africa? What are economic benefits that accrue to women producers of local beverages in rural Rwanda? What are impediments to economic empowerment of women producers of indigenous beverages in rural Rwanda? Using indigenous technology, what avenues exist for the scaling-up of the production capacity of women producers of local beverages in Rwanda?

As far as methods is concerned, the paper used in-depth personal and focus group interviews to collect data from 100 rural producers of Urwagwa (banana wine), Umutobe (banana juice), Ubushera (sorghum soft drink) and Ikigage (sorghum beer). These producers oftentimes double as middle men and retailers and occupy small lock-up shops fitted with tables and chairs where consumers are served. Also interviewed were 10 producers of Umutobe who bottle and sell their products to middle men and distributors. This is in addition to interviews conducted with government departments and other agencies involved in rural women economic development, mainly to gain insight into policy and understanding of government towards indigenous beverage production in rural Rwanda.

Although hugely popular among consumers in rural areas in Rwanda, little support is given to women producers of traditional beverages who utilize indigenous technology in their production processes. This is a huge gap that needs to be bridged, and the paper is therefore, necessary for researchers, policy makers and stakeholders involved or interested in rural development and in women economic empowerment.

Chronologically, the paper begins with a conceptual clarification of indigenous technology and its relationship with rural development. Rural women economic empowerment is next discussed within the ambit of indigenous technology and is followed by the challenges of indigenous technology which ends the second section. Section three explores indigenous beverage production in Africa, with emphasis on products made with sorghum and banana. Section four is a presentation and analysis empirical research which focuses on the production and sale of indigenous beverages in rural Rwanda, with attention paid to the availability of resources, access to production materials and infrastructure, production standards and capacity building. The next segment looks at more option for improving the lives of rural women via indigenous technology and is followed by the conclusion.

1. **Indigenous technology and development**

Indigenous technology refers to that technology that is localized and can be sustained by a community without the need for any form of importation of parts or expertise. In many instances, indigenous technology is either developed from scratch within a community over many years or was imported and adapted to the available materials and needs of a community. Indigenous technology is indivisible from culture and livelihood of local communities who often utilize it in their quest to survive and thrive (World Bank, 1998; Senanayake, 2006). Indigenous technology is easy to access, costs little, is locally owned and managed, and has been found to be efficient and able to spur innovation and growth (Gorjestani, 2000). The global conference on indigenous knowledge held in Toronto in 1997 encouraged The World Bank and other donors to learn from local communities in order to ensure long term development, noting that for sustainable development and for identification of development needs, local people should be involved in their problem solving mostly utilizing locally available resources and know-how (Gorjestani, 2000).

* 1. Indigenous technology and rural women economic empowerment

Rural development consists of improving the quality of life for rural dwellers. Rural areas thrive on the use of indigenous technology since small scale local knowledge based industries match the processing capacity of rural dwellers with available raw materials. Raw materials for indigenous technology are available, and manufactured products are affordable to local communities and lead to economic development that is based on the use of local human and material resources.

During the World Economic Forum in Davos in 2013, Christine Lagarde, Managing Director of the International Monetary Fund noted that “when women do better, economies do better.” Research has established that when women have increased control over household resources, either through their own earnings or cash transfers, it enhances the possibilities of national growth and advancement. Evidence from countries as varied as Brazil, China, India, South Africa, and the United Kingdom shows that greater spending on family nutrition and on the education of children can be achieved when women have greater access to household income (World Bank, 2011). Women, especially in rural areas, are the storehouse of indigenous knowledge and utilize indigenous technology in agriculture and food processing, land use management, family health care and other day-to-day survival activities (Olatokun & Ayanbode, 2009). In Mali, for instance, rural women are involved in extracting oil from a plant called Jatropha curcas and this plant is also used as medicine where seeds are used in preventing bleeding and also against different kinds of infections, while leaves are used for treatment of malaria and it is also used in soap production (Henning, 2002).

* 1. Challenges faced by indigenous technology

Although rural women utilize indigenous technology widely in their search for livelihood, there is s general preference for imported western technology across sub-Saharan Africa with consumers often holding a preference for imported products or those manufactured using imported machinery. Several reasons adduce for this including a general perception of indigenous technology based processing industries as not meeting up to some international standards (Aworh, 2008). Some indigenous products have a short shelf life ranging from one to seven days and this limit the availability of products and lack of interest in investing in those products. Another reason why there is little interest in developing indigenous technology insufficient capital and limited access to financial institutions by poor rural dwellers who often hold the technological know-how (Aworh, 2008). As a result, more and more societies are losing knowledge and complex indigenous technology in favor of imported and sometimes ill-fitting western techniques which most of time add pressure to the environment, for instance, the use of chemicals in agriculture (Senanayake, 2006).

1. **Indigenous Beverage Production in Africa**

The Production of Indigenous beverage is common in African countries and millions, especially women, depend on indigenous beverages as a source of food and income. Though modern commercial alcoholic beverages are widely consumed, but still indigenous beverages are produced and widely consumed in many corners of Africa especially in rural areas. These beverages are produced mostly by women and constitute payment for labour and serve as an important cash income for them (Aka, Konan, Fokou, Dje, & Bonfoh, 2014) . Studies posit that in East Africa alone, the consumption of indigenous alcoholic beverages accounts for about 80% of the entire consumption. Apart from economic gains, indigenous beverages are also attached with various social-cultural aspects and these beverages are also considered and consumed for various health benefits including being source of calories, proteins and vitamin B (Lyumugabe, Gros, Nzungize, Bajyana, & Thonart, 2012).

Africans use various traditional methods and a number of raw materials to process indigenous beverages. In many local communities a wide range of cereals raw materials such as sorghum, millets, banana etc are used to produce foods and a wide variety of alcoholic and non-alcoholic beverages (Monang , 2011). In the past, indigenous alcoholic and non-alcoholic beverages were largely manufactured and consumed by local communities during social and religious feasts such as celebrations of naming of new babies, new year harvests, to name but a few ;and they were thus hardly produced for commercial purposes. (Djè, Heuertz, Lefèbvre,, & Vekemans, 2000). However, in the past few decades due to the increase in market demands for such products and pressure from governments on local processors to abide by health standards, indigenous alcoholic beverages are industrially produced and commercially available in many markets. This commercial production makes indigenous beverages more acceptable to urban dwellers, and restricts the consumption of beverages produced using indigenous technology to the urban poor and rural dwellers.

Indigenous technology produced beverages, hold remarkable economic, social and health benefits for rural women economic empowerment, but numerous challenges exist. Safety concerns, limited lifespan, storage, packaging and preservation difficulties have combined to make some African countries to adopt policies that at best encourage the formation of beverage processing associations and cooperatives, for the production of better quality beverages. At worst, there is outright policy ban and discouragement of individual processors who produce little quantities with difficulties and do not respect all safety and health market standards (Kanyana, Ouma, & Asten, 2013).

* 1. Sorghum Drinks in Rwanda

Sorghum is a crop with strong cultural ties to Rwanda. Sorghum features alongside the sun, coffee, a basket, a cog wheel and two shields as Rwanda’s national symbols. In many social events, sorghum beer is still used-though not necessary consumed, as a symbol of unity and family cohesion. Both in the ancient and modern history of Rwanda, sorghum drinks *Ubushera* (Non-alcoholic) and *Ikigage* (Alcoholic) were produced by thousands of Rwandan families and used during various ceremonies like new baby naming, marriage and sundry religious rituals[[1]](#footnote-2). Sorghum drinks are also used for health reasons in Rwanda. Sorghum porridge is given to little babies and is believed to be very rich in vitamins. In rural communities, school children, laborers and workmen take sorghum drinks early in the morning as the breakfast before they start their daily work and many of them can work throughout the day without taking their lunch until dinner time. Furthermore, during the period of extreme famine *Impengeri*, sorghum cooked in hot water, usually serves as the staple food.

In the past, Rwanda was self-sufficient in sorghum production. However, recent reports indicate that though sorghum is still grown in all districts and an estimated 1,200 kilograms can be harvested per hectare, but the country is now a net importer of sorghum. Recent reports predict that sorghum will lose its place to other cereals in Rwanda since the production of sorghum has dwindled due to reasons which include lack of cultivation knowledge, geographical unfavorable conditions, weeds invasion such as Striga which attack and affect the cereal, in addition to some unfavorable government policies (Mugoya, 2012). However, efforts are being taken by Rwanda Agriculture Board (RAB) in collaboration with various stakeholders to improve the production of sorghum.

* 1. **Banana drinks in Rwanda**

Banana has a long history in Rwanda, researchers and experts in Rwandan history are in agreement that bananas might have been introduced to the country Rwanda between 1411-1444 during the reign of Mibambwe I, the 11th King of Rwanda. It is narrated that after Abanyoro (troupes from a neighboring country) had defeated the Rwandan’ troupes and the later scattered, they started planting bananas across the areas they had occupied and this is how bananas spread across the country (Kagame, 1972). Since then new varieties of banana have been introduced to match with the land and weather requirements as well as with their ability to face with pests, diseases and plant nutritional problems.

Banana is a preferred crop in Rwanda and are consumed as food, desserts fruits and used to produce traditional beverages. Banana wine-*Urwagwa*-and banana non-alcoholic drink-U*mutobe*- are two different products made using banana as raw materials but subjected to different processes. In the past, it was a common cultural practice for brides to include banana in the wedding package for it is used to produce local Banana food called *Matoke* that is believed to be very important to the health of women*.* Women were also expected to ensure that a well prepared Urwagwa is served their husband for every meal and whenever important guests are received by the family. In addition, banana leaves were culturally used by women as plates during the new baby naming events and were also used to covers traditional pots during cooking.

Banana was a highly sustainable crop in Rwanda, but with the introduction of various diseases and pests in the last 10 -20 years, production has fallen by over 40%. (Nsabimana, Nantale , Karamura, & Staden, 2008). Indeed, Rwanda was among the top producers of banana in the East African Great Lakes Region and the rate of beer consummation was higher two decades ago. However, due to the fact that growing banana requires bigger space while the arable land in Rwanda is very limited, the Government of Rwanda has started sensitizing citizens to turn to other important food products other than banana (Gaidashova, Okech, Gold, & Nyagahungu, 2005). But still, banana foods and traditional banana beverages are still consumed by a great number of Rwandans and banana products constitute sources of income for many women processors in rural areas.

1. **Production and Sale of Indigenous Beverage in Rural Rwanda: an Overview**

Government of Rwanda through several policy actions has shown commitment to the development of rural communities. Through such programs as the Girinka (One-cow-per-poor-family), Ubudehe, Vision 2020 Umurenge etc. many in rural Rwanda has transcended extreme poverty over the years. Government of Rwanda supports medium scale bottlers of traditional beverages through regular trainings from the Ministry of Trade and Industry (MINICOM), Rwanda Bureau of Standard (RBS) and Private Sector Federation (PSF) on production processes, entrepreneurship, packaging and hygiene, branding and marketing and in financial literacy. These medium scale producers also receive support from government by way of endorsement, should they wish to borrow from financial institutions. However, government of Rwanda has not shown much support for rural women producers of indigenous beverages. On the part of major development partners in Rwanda such as the United Nations and its agencies, World Bank, DFID, USAID, JICA, EU, Sida, South Korea, projects embarked upon are usually crafted alongside government officials and since government of Rwanda has not indicated interest in empowering rural women producers of indigenous beverages, none of these organizations are actively involved in supporting them.

In order to determine the economic situation of rural women producers of indigenous everages, interviews were conducted among 100 women producers of four traditional beverages Urwagwa (Banana wine), Umutobe (non-alcoholic banana juice), Ubushera (non-alcoholic sorghum) drink and Ikigage (sorghum beer). These women produce and sell using 20 liter gallons (jerry cans). Shelf life of their products is usually an average of 3 days as emphasis is on the freshness of the products. Many retail directly to consumers, while some also produce and sell to middle men in addition to selling to consumers. Purposive sampling was used to identify these women in Musanze and Burera districts in Rwanda. Most women did not complete primary education and age range varied from women in their twenties who had been doing the business for less than 5 years to those in their sixties who had been doing the business for decades. As an aside, and in order to compare the situation of the majority poor rural producers of these indigenous beverage with their wealthier and more organized counterparts, additional interviews were also conducted among 10 women bottlers of the alcoholic beverages, who bottle and sell across Rwanda and sometimes export to neighboring countries. The shelf of the later products is between 1-3 years. While analyzing the responses of the poor rural producers of indigenous beverages, reference where necessary will be made to these bottlers of indigenous beverages. Some government officials were also interviewed to determine the response of policy makers to the poor rural women producers of these indigenous beverages.

* 1. **Production Process**

***Steps in sorghum beer and drink production in Rwanda***

Beer production in Rwanda undergoes three main steps which are production of malt (amamera), production of yeast (umusemburo) and brewing (kwenga).

Malting

Malting is the preliminary step in beer production and comprises of three main steps which are soaking, germination, and drying. Sorghum grains are first soaked for about 12 hours, and then drained and spread on a mat and a mixture of ash and water is generously sprayed on the grains, giving the sorghum a black color. Sprouting is induced by spreading sorghum grains on banana leaves and covering them with the same. Sprouting takes about 2 to 5 days, depending on the temperature. Sprouting activates enzymes that help to hydrolyze starch (non fermentable sugar) into fermentable sugars. Sprouted sorghum is known as amamera.

The next step is the drying process where sprouted sorghum grains are dried under the sun, usually within an average period of 3 days. During the drying process, enzymes continue to hydrolyze starch thereby increasing sugar content (fermentable sugars or simple sugars). Successful drying is determined by chewing, after which rootlets are removed and the sorghum grains are winnowed using a winnowing basket (intara) and stored for further use.

Preparation of Yeast

Yeast is a necessary ingredient in beer production and Umusemburo is the local yeast used in rural Rwanda for sorghum beer preparation. The first step of umusemburo preparation is called gusabika. It involves thoroughly mixing about two twenty litre jerry cans of heated water with about 5 kg of malt flour, using wooden stick called umwuko. The mixture is allowed to cool in a clay pot for between 3 days to one week and the product obtained is called umusabike. Thereafter, umusabike is taken and heated under strong fire until only one third of it remains and the product obtained is called umuteke. Umuteke is allowed to cool in clay pot for one day after which about 5 kg of malt is added. The mixture is observed for signs of gas production in a process and if there is no sign of gas production, then a bad beer has been produced and this often leads to it being discarded. If the product shows signs of gas production, then about 8 kg of malt is added the next day and mixed thoroughly in, the end the product is umusemburo and is the brewer’s yeast.

Brewing

In the brewing process, water is boiled and flour from malt is added, after which cold water is added followed by hot water and then mixed using a wooden stick (some brewers skip adding the cold water). More cold water is added to the mixture which is thoroughly stirred with the wooden stick (the amount of water to be added may vary from one producer to another). The product obtained at this stage is called umusururu. Umusururu is transferred to another container and allowed to cool. After cooling, the yeast umusemburo is added and the container is closed in such a way as to allow gas produced during fermentation to escape. Fermentation is left to occur overnight and product is served in a fermenting state the next day since producers do not know how to halt fermentation once it has begun.

***Processing of non-alcoholic sorghum drink***

Non alcoholic sorghum beverage known as ubushera follows all the steps mentioned above, with the omission of yeast addition. After getting malt from sorghum, milling is done to obtain flour.

* 1. **Steps in banana wine and juice production (Urwagwa and Umutobe)**

***Banana Wine***

Production of banana wine (Urwagwa) begins with collection of matured banana. Bananas of different varieties have different sugar content and some producer are selective others are not. A pit called urwina is dug and heated with fire after which banana leaves are spread inside and the matured bananas added. The pit is then covered with leaves and soil in a process called gutara. Smoking of the pit cover is done twice a day, morning and evening. Smoke induces production of ethylene which is a form of ripening gas. Once ripened, banana is removed from the pit, peeled, and put in a wooden container called umuvure. Grasses called ishinge are added and mixing is done with hands until juice (umutobe) is obtained. The juice can be separated with other materials by filtration and water is added to the remaining mixture and mixed again so more juice can be obtained. The two juices have differing sugar content and can be mixed or kept separately. For those who do not drink alcohol, product is ready and can be heated and consumed or served.

However, in the process of extraction, sometimes no juice comes out which is called gutema. This is because, vacuole which contains juice is not broken to release juice. Producers do not have any control over this situation and are left with no option but to incur a loss. However, using enzymes called pectinase can help, in addition to adding some grasses called ishinge, a common, although unhygienic practice. After the juice has been obtained, it is put in clay pot which is also deposited in a pit (urwina). On the top of juice coarse ground roasted sorghum flour is added and product is well covered with banana leaves and soil. Fermentation takes place in about two days after which product is filtered and served.

**Note:** All products are transported to final destination using 20 litre jerry cans and usually served to consumers using open bottles for Urwagwa or umutobe and cups for ikigage or ubushera. For the fermented products, one of the main challenges is that producers are not able to control the fermentation process. The products are served while fermentation is still ongoing which is thought to be the origin of short shelf life of the products. For those which are not fermented, they also end up being fermented because they are exposed to the air which is also thought to be a reason of short shelf life.

* 1. **Indigenous Beverage and Availability of Resources to Rural Women in Rwanda**

***Access to income***

Women who produce indigenous beverages in Rwanda have access to income through the sale of such products and are able to invest their profits in taking care of family needs, and sometimes further re-invest such profits to grow their businesses. Being that traditionally, “women earn less and are less economically productive than men almost everywhere across the world” (Ana & Sudhir, 2012, p. 40), the availability and easy access of rural Rwandan women to indigenous technology as a source of income should be of interest to development stakeholders.

Initial start-up capital for embarking on the sale of indigenous beverage is usually money saved up over a period of time or borrowed from family members or cooperatives. Women who produce Ikigage (sorghum beer) make an average of one dollar per 20 litres of jerry can sold. Depending on patronage, women producers who restrict their sale to only consumers can sell between 3 – 10 jerry jerry cans. Those who sell to middle men in addition to retailing directly to consumers could sell up to 40 jerry cans per week.

Women who produce Ubushera (sorghum drink) make an average of 40 cents per 20 liter jerry can sold and depending on location and patronage sell an average of 7 jerry cans daily for direct retailers, and up to 16 jerry cans per day for those who sell to middle men as well as directly to consumers.

Women who produce Umutobe (Banana juice) make an average of one dollar per 20 litres jerry can sold and depending on patronage, can sell an average of 40 jerry cans per week. 90 per cent of Umutobe juice makers sell to middle men, who are usually small scale bottlers of banana juice .

Women who produce Urgwagwa (Banana wine) make an average of one dollar per 20 litre jerry can sold, and depending on patronage those who sell directly to consumers may sell an average of 7 jerry cans per week, while those who also sell to middle men may sell an average of 14 jerry cans a week.

In a country where 80 per cent of the population is made up of rural peasant farmers who earn roughly the equivalent of $0.82 per day, the extra income of an average of $20 per week provided by production of indigenous beverage is a needed addition to household income. Rural women consider the business of producing indigenous beverage to be profitable and they are able to take care of basic household needs as a result of the business. These rural producers of indigenous beverages also employ labor depending on the volume of production, sometimes hiring up to 5 temporary workers per day.

Essentially, production of indigenous beverages allow rural women in Rwanda who usually work more as unpaid family laborers, farm on smaller plots and cultivate less profitable crops in comparison to their male counterparts to have access to finances. Most of these women are able to purchase health insurance for their families, pay school fees, buy nutritious foods and ensure the general well being of their households from proceeds made from the indigenous technology based production of traditional beverages.

***Access to Financial Services***

Extending access to financial services to poor rural women entrepreneurs is known to be a “key factor of successful rural development strategies. Designing appropriate financial products for women to be able to save, borrow and insure is essential to strengthen women’s role as producers and widen the economic opportunities available to them” (Fletschner & Kenney, 2011). Rural women producers of indigenous beverages in Rwanda do not receive any form of support from government or financial institutions. Government officials who were interviewed acknowledged that there is no known policy that supports the extension of financial services to rural women producers of banana and sorghum beverages who use indigenous technology. 90 per cent of respondents noted that they can expand their business if they have access to more capital. So lack of access to credit facility is a major impediment to business expansion.

Access to finance for rural women producers of indigenous beverages could take the fomr of “a menu of loans that takes into account the diversity of women’s needs and constraints: What are they trying to finance? How much will they need? What is a reasonable repayment schedule? (Fletschner & Kenney, 2011, p. 20)” Rural women producers of indigenous beverages also note that their business is seasonal, therefore, it is important that loan conditions match seasonal production. Additionally, government should consider “expanding the menu of acceptable collateral to also include social collateral and the type of physical assets women are more likely to own or control. Offer incremental loans based on individual repayment behavior to reach out to women who might not be able to provide collateral. Ensure women can apply for loans without their husbands’ or other male approval” (Fletschner & Kenney, 2011, p. 20).

Taxes

According to a research output from the National Bureau of Economic Research, around the world, “women are less financially literate than men and are aware of this shortfall.” (Lusardi & Mitchell, 2011). Even for the well educated business person in urban areas, navigating the terrain of tax preparation can prove a daunting task, this is much more difficult for rural women producers of indigenous beverages. A respondent noted that her greatest challenge in the business is that “when it is time to give tax, it becomes difficult, it interrupts business.” There is no training offered to these women on how to prepare taxes, and this is while acknowledging that the Rwanda Revenue Authority has implemented several reforms aimed at a simplification of the tax laws and procedures. However, many rural dwellers still find it difficult navigating the tax reporting and payment processes. Some women resort to a dependence on their husbands for tax preparation, which can lead to the man having greater access to, and control of her profit and even capital. It has been argued that, “it is important that development strategies that aim to boost rural women’s productive capacity must enhance women’s direct access to financial services, i.e. not mediated through their husbands” (Fletschner & Kenney, 2011, p. 2). Studies conducted among couples in Latin America, South East Asia and Sub-Saharan Africa indicate that many women would rather not have their husbands fully privy to their actual financial situation (Ashraf 2009; Doss 2001; Duflo and Udry 2004; Robinson 2008; Feltshcner 2009). Beyond emphasizing that these rural women producers pay their sales tax, there is need for training and rendering of assistance to these women to help them in tax preparation.

Another related challenge is that although there is no policy support that ensures increased financial access for female indigenous beverage producers in rural Rwanda, this segment of the population do have to pay very high taxes on their businesses. In the words of a producer, “consumers are not many, but tax is high.” Rwanda’s sales tax rate is presently 18 per cent and most of the women in question consider this to be quite high, after they have taken care of production costs and cost of renting shops. In this regard, it is necessary that in deciding the tax rate of rural poor women, consideration should be given to the fact that “low-income families experience far greater income fluctuations than higher-income families and, as a result, taxation of annual income disproportionately burdens low-income families” (Lily, 2003).

***Access to Production Materials***

Access to raw materials for production of sorghum and banana beverages is increasingly becoming a huge constraint to the advancement of the business of indigenous beverage production by rural women. According to a respondent, “sometimes, I am not able to supply enough to my customers due to lack of bananas.”

The growing dearth of bananas and sorghum in Rwanda might be connected with the government of Rwanda’s agricultural land use consolidation policy. Rwanda suffers from low agricultural output and the government of Rwanda is convinced that this is mostly due to production inefficiency occurring as a result of the preponderance of small farms. Government of Rwanda in response to this challenge instituted the Agricultural Land Use Consolidation Policy in 2008, with the aim of increasing “output of all types of agricultural products with emphasis on export products, which have high potential and create large amounts of rural employment; this, under sustainable modes of production” (MINAGRI, 2009).

The Agricultural Land Use Consolidation Policy mandates farmers in Rwanda to consolidate agricultural land and to uniformly cultivate assigned crops (Musahara, Nyamulinda, Bizimana, & Niyonzima, 2014, p. 8). This practice is known as regional ‘crop specialization’, which refers to a situation where certain crops are allocated to regions where the terrain is considered best for their cultivation. The government of Rwanda promotes pure specialization, sometimes known as mono cropping where one single crop is encouraged per region. Musahara *et al* (2014), note that the government of Rwanda enacted the Land Use Consolidation Policy with the conviction that, “joining these small plots together to farm as a single unit would deliver important economies of scale in the acquisition of inputs, processing and marketing as well as efficiencies in access to extension services” (Musahara, Nyamulinda, Bizimana, & Niyonzima, 2014, p. 6).

In Rwanda, regional crop specialization is based on seven crops pre-selected by the government which are maize, rice, wheat, beans, soybean, Irish potato, and cassava, all allocated to different rural localities in the country. These seven crops are exclusive of several of Rwanda’s indigenous food such as banana, sorghum, sweet potatoes and pulses which form the staple of the rural population. The market oriented approach in selecting the crops for regional specialization means that such raw materials as banana and sorghum are increasingly loosing out state support and producers of indigenous beverages are struggling.

Rather than discourage cultivation and promotion of these two traditional crops, there is need for government of Rwanda to invest in research on how to improve them due to their economic importance to rural women. Increasignly, diseases attack banana and sorghum plantations and there is need for government to step up investment in these plants for the indigenous beverage production sector to thrive. There is need also, to improve access to certain variety of banana such as Kainji, which is known to yield much juice. Price of sorghum also fluctuates widely as a result of lack of constant availability, thereby affecting the overall profit margin of these producers.

Another major challenge to the sourcing of production materials is firewood. In 2010 Rwanda’s Director of Forestry Field Programmes in the nation’s National Forestry Authority noted that the nations faces the threat of desertification, as only 533,000 hectares or 20 per cent of the country was covered by forests (FAO 2011). Firewood and charcoal usage record highest in the rural areas of Rwanda as approximately 85 per cent of Rwandans depend on biomass for use in household cooking (FAO 2011). The annual l fuelwood consumption in Rwanda is at 2.8 million tonnes, while it is estimated that charcoal, when converted into wood usage, accounts for up to 50 per cent of total wood-fuel consumption in the country (World Bank 2012). On average, households spend between 10–15 per cent of their monthly incomes on purchase of fuelwood and charcoal (FAO 2011).

In response to the high usage of wood and depletion of Rwanda’s forests, government of Rwanda established that National Domestic Biogas Programme (NDBP) in 2007 with the objective improving the provision of biogas to meet the cooking and lighting needs of households that own a minimum of two cows. Since its establishment, NDBP has installed domestic biogas in 4,600 households and has trained 555 masons in household biogas constructions and maintenance, out of which 195 have registered businesses (REG 2014). In order to more readily assist these women indigenous beverage producers, there might be need for NDBP to specifically create avenues that will encourage them to acquire biogas. Presently, government of Rwanda heavily subsidizes biogas installation for rural dwellers, and the subsidy can even be increased for such entrepreneurs.

***Market Access for Products***

The ability of rural woman to access markets for their products can be hampered by several factors. These include transport, gender norms such as restricted mobility, infrastructure (good roads). In the case of the producers of sorghum and banana beverages in rural Rwanda, impediments to market access include the lack of access to adequate capital. According to one respondent, “I have a big market, the constraint is capital. Once capital increases I can sell it (umutobe) in different towns.” Another says “If I have enough capital, I can open new places to sell my product.” 50 per cent of umutobe producers supply their products to bottling companies in their district of operation. However, there are times when there are too many sellers of banana wine, and this causes reduction in the amount paid by the banana wine bottling company. Some women, however think that the market size is too small to make for growth to occur and feel restricted by that size. This is especially for those who sell beverages with a shorter shelf life such as Ikigage. However, rural women agree that government can work them through the process of establishing cooperatives for the purpose of production and packaging of beverages, they will be able to both access more markets and still service their local customers adequately.

* 1. **Indigenous Technology Production Standards Among Rural Women**

***Quality of end-product***

Production quality of indigenous beverages produced by rural women has been a source of concern to governments and consumers. Rural women producers of indigenous beverages in Rwanda who were interviewed acknowledge that there is much room for improving the quality of their products. When asked, most respondents pointed to the lack of adequate finance as responsible for the oftentimes poor quality of their beverages. However, on closer and more in-depth interviewing, it began to emerge that poor quality can be attributable to several factors outside of access to finance. For instance, many respondents were skeptical as to the affordability of higher quality products by their patrons. According to one respondent, “Yes, I can improve the quality but it will also affect the price, and our customer may not afford high prices”. For another respondent, “yes, I can use small amount of water (instead of the large amount she presently uses) during dilution, but it can affect the price (increase it) and my customers cannot buy much at that price.”

A related challenge is that of quality of raw materials used. Many banana producers note that they are increasingly facing the challenge of buying banana that do not produce juice. 90 per cent of respondents note that biratema (juiceless bananas) is a challenge that pervades and affects the quantity of juice produced, which can lead to excess dilution of end products. Further, due to the agricultural land us consolidation and crop specialization policies of the government of Rwanda, many producers of sorghum beverages now buy from neigboring Democratic Republic of Congo and from Uganda, and they note that such can be low quality and lack in freshness, especially from Congo. According to one respondent, “sometimes If you use bad quality of sorghum you get bad product.”

***Health and Safety***

The hygienic standard of production of indigenous beverages is a source of concern to governments and consumers. In Rwanda, there have been several reported cases of deaths and injuries to internal organs occurring as a result of consumption of traditional beverages produced and sold under unhygienic conditions. A Hazard Analysis and Critical Control Points (HACCP) based study of microbiological and physico-chemical quality of banana juice and beer was conducted on samples collected from indigenous producers across four localities in Rwanda. Results indicated “high total bacterial counts of 9.02-9.86 log10 cfu mL-1 with yeast and moulds as well as lactic acid bacteria being the predominant microbes. Coliform counts were high in artisanal processed banana beer, 7.65-8.11 log10 cfu mL-1 but were low or undetected in semi-industrial processed beer samples” (Kanyana, Ouma, & Van Asten, 2013). All respondents claimed that they maintain the highest hygienic standards while preparing their beverages, but most conceded that they can do with more training in that area.

***Shelf life and Packaging***

The texture, flavor, appearance and nutritious levels of foods can drop significantly over time, and worse still, such food can become microbiologically unsafe even prior to displaying physical signs of deterioration. International standard practice demands that in cases where consumer approval of food will be affected by deterioration, without any impact on his safety and health, a best before date is applied to the product. According to the New South Wales Food Authority,

The length of the use by time for foods can be determined by using storage trials to estimate the physical, chemical and microbiological stability of the food. Interpretation of results requires technical experience and competence. Some products will require additional studies such as computer models of microbial growth or challenge studies. It is the manufacturer’s responsibility to determine shelf life. Reliable use by or best before times cannot be determined by guesswork or by copying the shelf life of a competitor’s product (NSW Food Authority, 2010).

The shelf of all four studied products average about 3 days; Ikigage has the shortest, which is 1 day, and Umutobe has the highest, which is 5 days. Many respondents noted that they usually do not throw away expired products. Some mix it with freshly made products and sell it, while others give it or sell to owners of pigsties. All respondents decried the losses incurred as a result of not being able to sell off all products within applicable shelf life. None of the respondents package their products and about 90 per cent say it is because they lack both capital and knowledge to do so. Sale of product is restricted within the immediate vicinity of the producer and is seasonal. Sorghum drink producers, for instance note that few clients patronize their businesses during rainy season. For other beverages, farmers form the bulk of their customers and during planting time when farmers do not have much money, patronage is drastically reduced. However some respondents are not keen on packaging their products since, according to them, their patrons cannot afford the price of packaging. This introduces a new dimension to the widespread clamour for indigenous beverages to be packaged as locals will then be unable to afford the drinks.

* 1. **Capacity Building for Rural Women Producer**

***Training***

The World Farmer’ Organization (WFO) has noted that training rural women is critical to enhance their use of natural resources in a sustainable manner, and to increase production and productivity (WFO, 2017). Most rural women in Rwanda who engage in production of indigenous beverages learned their skills from family, friends and as apprentices or hired laborers of producers. There is no formal training process either supported by government or NGOs for established, up-coming or would-be entrepreneurs. Rural women however, understand the need for training and acknowledge that training is necessary in order to make any progress in the business. Training needs include on the right production method to ensure consistency of output; according to one respondent“sometimes I can produce beer which is not good, in that case no body drinks it which causes loss”. For another respondent, “when ripening process is not well done, there is a failure in juice extraction (gutema) which induces loss.” Rural women producers of indigenous beverages also need training in entrepreneurship and financial management. According to one respondent, “sometimes I may use money for other priorities and miss money for business.” Other training needs include on courses such as storage, hygiene, packaging and marketing.

* 1. **Infrastructure, Indigenous Technology and Rural Women Economic Empowerment**

***Electricity***

Globally, it is estimated that 1.2 billion people lack access to electricity, while sub-Saharan Africa is amongst the poorest served (IEA, 2016). Reasons for this poor performance include a penchant by national governments to focus on the recovery of the cost of rural electrification, especially in cases where such has been financed by private interests. Recovering of electricity costs is often nearly impossible from rural households with historically very low income levels, and national governments have found it difficult to “effectively design tariffs and adapt regulatory systems that can make electricity more affordable to poorer communities” (IEA, 2016).

Several studies have linked electricity to a growth in income ( See Ozturk, 2010 &Wolde-Rufael, 2009). An empirical study conducted in rural Kenya directly linked increased electricity availability with increased productivity of studied enterprises (Kirubi, Jacobson, Kammen, & Mills, 2008). In rural Rwanda, women producers of indigenous beverages report that a lack of constant electricity is an impediment to their business since “power can go off which impend functionality of hammer mills (used in grinding).” Additionally, women who wish to utilize the night time when their children are asleep to produce beverages cannot do so due to lack of electricity. What happens is that their workload is heavier during the day and that affects their productivity and output.

***Transport***

Although considered a lifeline for rural communities, rural roads are often in a bad shape, making transportation extremely difficult, and at best, quite expensive for many rural dwellers, especially women. Studies carried out in South-East Asia established that “villages provided with road access produced more than they did before” (O'Neill, 2011). Many rural women in Rwanda point to bad roads and expensive transportation as reason for their lack of business expansion; many women resort to selling beverages from their homes. For one respondent, “If I have means, I can buy a vehicle which will help me in transportation of my products.” For progress to be made, there is need to improve rural road network across Rwanda. Government of Rwanda already has this as a top developmental priority, since rural roads “provide the backbone of economic activity for nearly 80% of Rwanda's citizens, most of whom depend on farming and small

* 1. **Gender norms and attitudes**

About 90% of respondent report that one their greatest challenges to selling is being owed over extended period of time by their patrons. Rwandan culture, especially in the rural areas is traditional in nature and women are not expected to be forward in relationships, and this includes between customer and client. Women are unable to aggressively pursue creditors, and creditors, knowing they are dealing with women do not often feel any urgency to pay outstanding bills. Rwandan culture demands respect in every interaction, thus, a creditor although he owes can still expect to be respectfully attended to by the female entrepreneur during his next visit.

The husbands of these indigenous beverage sellers would have come in handy in dealing with such customers, however, in several cases, rural women do not fully wish that their husbands be privy to most of their financial transactions. This is not peculiar to Rwanda as studies across countries and continents establish the same reality;

Ashraf (2009) finds that spouses in the Philippines sometimes choose to keep savings in accounts their spouses cannot access. Doss (2001) finds that households in Ghana do not fully pool risk, and Duflo and Udry (2004) report that spouses in Cote d’Ivoire do not fully insure each other against rainfall-induced fluctuations in income. Robinson’s (2008) field experiment in Kenya suggests that risks are not shared efficiently within the household. And, Fletschner (2009) reports that 15 percent of the women she surveyed in Paraguay said they were credit constrained even though their husbands claimed to have adequate access to credit (Fletschner & Kenney, 2011, p. 9).

From the above it can be said that the “standard assumption that women with male partners can count on their assistance to overcome the gender-specific obstacles they face in financial markets is misguided and not supported by evidence” (Fletschner & Kenney, 2011, p. 9)

1. **Improving the lives of Rural Women through Indigenous Beverage Production**
   1. ***Can the market be brought to the beer parlours?***

Considerations should also be given to the possibility of bringing the market to these indigenous producers of beverages, by way of making them attractions for both domestic and international tourists. Countries have achieved the status of geographical indication for some traditional products. In *Local Development and Heritage: Traditional Food and Cuisine as Tourist Attractions in Rural Areas*, Jacinthe Bessiere (1998) notes that in the coming decades, “the heritage component, and more particularly food, is likely to be a factor in tourist attraction, integration and social dynamization.”

With good reasons, much emphasis is laid by government and stakeholders on the fact that rural women producers of indigenous beverages should be assisted to package and sell their drinks in order to expand their market. This stance however excludes the huge possibilities inherent in freshly made indigenous beverages served in traditional Rwandan parlours for encouraging both domestic and international tourism . For instance, one travels to Italy and visits a pizzeria to experience freshly made Italian pizza and pasta, buying frozen pizza from off the shelf in Italy does not provide that experience. The same can be said of Chinese foods. Visiting China and eating freshly made Chinese food does not equate to buying pre-packaged Chinese food off the shelf. Equally many tourists will say that they prefer to eat local food consumed by the masses, if they are sure of the hygienic standards, rather than in high brow restaurants. International tourists believe that it is in “street” food, which locals eat, that one can find the real taste of a territory. Even domestic consumers have a taste for freshly made be beverages and can drive for miles from the city to the villages to purchase it despite widespread availability of the packaged variety in the city. Nigerian palm wine is a case in point.

Rwanda has consistently ranked among the top 3 countries in Africa on the Ease of Doing Business Index Report for the past four years, and according to a recent World Bank report, Rwanda’s private sector is to be commended for playing a crucial role in the nation’s economic growth. "Private sector development has played a catalytic role in Rwanda's economic growth. The Government has undertaken measures to foster private sector participation in the country's key industries, such as tourism," the report reads in part (World Bank, 2016).

Government of Rwanda, private sector and other stakeholders can work with rural women producers of indigenous beverages to attract both domestic and international tourists, through for instance, conducting training on hygiene, improved ambience[[2]](#footnote-3) and service (using traditional items) and customer service. Government of Rwanda can mandate the compulsory and unscheduled supervision of premises and production processes in order to ensure compliance. Government can identify some champions across sectors and umudugudus for training and assisting in scaling up their businesses not necessarily to metamorphose into packaged drinks, but as beer parlors where both domestic and international visitors can drive to for a time of refreshment over freshly brewed drinks. Those that Government has identified and assisted will serve as reference points for other practitioners in the rural areas to aspire towards, leading to improved quality, safety, hygiene and branding. Marketing of these champion outlets should also be part of the package, where exceptional rural Rwandan women producers of indigenous beverages can be marketed as part of Rwanda’s cultural heritage. Efforts to obtain international geographical indication for these products can also be started by Rwanda’s Ministry of Trade and Commerce.

Beer parlors act as places of congregation for rural communities where socialization takes place and women are able to network, gain information for markets and build social capital. Tourists, in addition to tasting freshly made local drinks can interact with locals in their own community. Although one may argue that beer parlors can still exist with packaged beverages, however, packaging leaves a lot of room for patrons to buy and consume at home or send their wards to make purchases for home consumption. Serving freshly made beverage in beer parlors increase social bonding across communities. Therefore, rural women can cater to the taste of fresh beer/beverage while medium scale manufacturers cater to packaged products. Rural women interviewed make it clear that once packaged, the cost of the products will go beyond what majority of their patrons can afford. It will make little sense to alienate rural consumers in the efforts to expand the market as they also constitute a veritable market themselves. Further, while there is much to be gained from packaging indigenous beverages including expanded market access, however, the capital and other necessary resources required to make this possible has proven a challenge. Bottlers of indigenous beverages note the high cost of purchasing bottles, and an inability to brand products, in addition to high tax payment.

* 1. **Cooperating towards Expansion**

The UN, EU and major development partners active in sub-Saharan African have all stressed the importance of self-help and nation-led development strategies. Cooperatives straddle the private and public spheres since they are made up of individuals who are also civil society members and are often strongly recognized, even supported by the state. Globally, cooperatives have a good reputation as platforms for the promotion of women’s economic empowerment. In India, the Self Employed Women Association (SEWA) is a good example of how women can develop a voice and unite to form a veritable channel for the fulfillment of the progressive aspiration s of her member. In Namibia, the Edufano women’s cooperative has created and sustained successful international businesses for women farmers over the course of well over four decades. Government of Rwanda strongly supports the establishment of cooperatives, although rural women producers of indigenous beverages in Rwanda have not yet been able to form cooperatives. The women themselves recognize this as a big challenge and according to one respondent, “there are many people in this business and the business is not well organized.” Forming cooperatives will enable rural women producers of indigenous beverages to form a strong network in order to more effectively tackle the numerous challenges that face them.

1. **Conclusion**

Indigenous technology is widely applied by rural women across Africa in both their domestic and commercial endeavors. Many of these women have leveraged on the income generated from the production of indigenous beverages to invest in livestock, health insurance, children’s education and other family needs. Efforts at the economic empowerment of rural women, to be effective, ought to take into consideration the present situation of rural women and their current level of access to technology. This is more so, since technology transfer has often proven unsustainable, especially in rural communities. Many rural women in Rwanda engage in the production of indigenous beverages using indigenous methods. While they experience high patronage from rural consumers, there is little or no support from Government of Rwanda and NGOs involved in rural development. Government appears to be skeptical of the rural, indigenous technology based beverage industry, owing to unhygienic practices and a possible overiding perception of indigenous technology as unprogressive, even backward. However, the rural indigenous technology based beverage sector has proven to be a sustainable source of income for rural women. Many challenges encountered by these women can be only be addressed with a collaboration of the rural women themselves, their communities and the strong support of government of Rwanda, its agencies and development partners since it is cultures, societies, and institutions which “create conditions that facilitate or undermine the possibilities for empowerment” (Markel & Jones, 2014, p. 2).

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1. In Rwanda, sorghum has played an important role during the celebration of annual harvest day event known as Umuganura celebrated on the 1st of August. Umuganura is one among 17 Rwandan rituals known as Inzira z’Ubwiru, and in the olden days, apart from the national celebration that held at the King’s court, other celebrations were held at family level and every woman was expected to prepare a very special sorghum beer for her husband so that when the King has launched the celebration at the national level, families would also do the same (Byaruhanga, 2016). At this occasion, the local homemade bread dish made from the sorghum flour Rukacarara is usually prepared for children by mothers. Although the celebration of umuganura is gradually losing its significance across Rwanda, but drinking and sharing sorghum beer is still part of the Rwandan tradition that is still observed and respected, especially in rural areas. [↑](#footnote-ref-2)
2. Aesthetically, the shops where these beverages are sold will hardly appeal to a non-rural dweller as a place of relaxation and refreshment. Cut out wooden benches and tables serve as furniture, while drinks are served in stainless steel cups, or iron cups painted over and chipped in several places. Interior decoration is almost non-existent and drinks are served often directly from 20 litre yellow jerry-cans positioned behind wooden shelf. Rural women can be trained to form cooperatives and use traditional decorations that cost little but appeal to the senses to decorate their parlors. Regarding hygiene, indigenous beverage producers need training, follow-up and clearly stated guidelines and regulations to assist them in ensuring that products sold to consumers meet the highest standards. Trainings on measurements and production standards will also help to ensure consistency in quality. [↑](#footnote-ref-3)