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Original Article

The Evolution of Pottery Designs for Food Preservation in Rural Ugandan Communities

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Abstract: This study investigated the historical and contemporary evolution of pottery designs used for food storage and preservation in rural communities of Uganda. It used a multidisciplinary approach blending ethnographic research, material culture analysis, and laboratory testing. Examining two Ugandan districts, the study noted how traditional pottery designs, characterized by their iconic thickened walls, small openings, and water-absorbent clay bodies, have evolved across generations as tools for food storage, demonstrating outstanding thermal and humidity regulation, in contrast to some of the latest options. The comparative analysis revealed that native pottery designs can sustain internal temperatures 4-6°C below the average normal levels, which significantly improves the shelf-life longevity of easily spoiled food. The study highlights crucial problems associated with this traditional information structure, as well as the unsettling effects of colonialism, generational skill erosion, and the widespread replacement of clay with plastic and metal containers. Despite these difficulties, the study identified innovative modifications among potters, which included hybrid pottery designs that combine traditional ingredients while still preserving the utilitarian aspects of customary pottery. These innovations demonstrate the persistence of traditional knowledge structures and the capacity they hold in contributing to sustainable food security solutions in areas with limited resources. The findings emphasize the critical requirement for effecting traditionally considered involvements that record and conserve these customs, yet at the same time encourage adjustment to prevailing situations. The study recommends instituting programs that include the establishment of documentation initiatives within the community, the creation of markets for pottery, and the incorporation of native design attributes into modern ecological technologies. This study contributes to broader deliberations in material culture studies, food anthropology, and sustainable development by demonstrating how traditional knowledge systems can inform solutions to contemporary challenges.

Keywords: Pottery Designs; Food Preservation; Rural Uganda; Pottery Evolution.

1. Introduction

In rural Ugandan societies, pottery has been vital not only as a utilitarian implement for keeping and preserving food items but also as a traditional artifact that embodies cultural knowledge and beliefs (Barley, 1994; Kakande, 2018). The physical makeup and design methodology involved in Ugandan pottery have evolved over time in response to factors such as environmental and socio-economic transformations, as well as external pressures (Reid & MacLean, 1995). This study examines the conversion of local pot designs, which are particularly customized for food preservation,

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and assesses how these variations have influenced food storage efficiency, traditional individuality, and maintenance in the rural areas (Giblin, 2012). Through tracking these advancements, the study highlights the connection between culture and creativity in Ugandan artistry (Kakande, 2018).

Preservation of food is a significant concern in rural-based communities in Uganda, where access to refrigeration is limited and food scarcity remains a persistent issue (Food and Agriculture Organization [FAO], 2017). Traditional pottery has the structural ability to cool and is easily adaptable for fermenting items such as milk, grains, and alcohol; and as such, it is often a crucial solution (Olupona, 2004). Over the years, changes in pot structure, including pot thickness, form, and surface finish, have all impacted temperature and moisture regulation, as well as pest resistance (Gosselain, 1999). Understanding such changes in design offers a better comprehension of how society has enhanced food security using the resources available to it (Reid & MacLean, 1995).

The evolution of Ugandan pottery designs cannot be divorced from the wider traditional and historical influences. Methods before the colonial era were rooted in skills based on clans, and unique styles were associated with diverse cultural setups, as was the case with the Basoga, Bagisu, and Karamojong (Ashley, 2010). The original pottery then faced competition from new materials introduced with the advent of colonialism, such as metal and plastic (Barley, 1994; Kakande, 2018). Furthermore, as cultural setups evolve into a single large community and urban centers, a reduction in long-standing customs, combined with the innovative adoption of other pottery methods and inspirations, has seen pot makers blend contemporary aesthetic attributes with the original utilitarian values (Gosselain, 2011).

Even with such variations, pottery remains a vital part of Ugandan rural communities, particularly in relation to food routines and day-to-day sustenance. These skills, however, with all their cultural attachment, are in danger of extinction due to the rate at which young people are moving to urban settings and preferring more trendy options to traditional pottery items. Documenting these rapidly changing traditions is vital not only for the conservation of customs but, most importantly, for the potential use and improvement of food storage systems. Traditional techniques of pottery production can offer cost-effective and sustainable alternatives to conservation methods that rely on energy. This makes this study relevant to many other studies related to development and food sustenance initiatives. The study aimed to methodically analyze the historical developments of pottery designs in Uganda, as applied to food preservation, and examine their utilitarian, traditional, and environmental significance. To bridge the gap between traditional knowledge and modern invention, the study combined ethnographic research with comparative analysis. The results aim to contribute to further deliberations on safeguarding customs, Aboriginal technology, and sustainable food management systems in sub-Saharan Africa.

2. Literature Review

The Pottery has been a vital aspect of African material culture for a long time and has been present in both applied and figurative functions. Archeological indications in East Africa have shown that pottery making has been in existence for thousands of years, with the first designs having been basically made for food storage and preparation (Mueller et al., 2023). Ugandan pottery reveals a close connection between craftsmanship and cultural traditions. Pottery designs within Buganda culture, for instance, were originally custom-made for preparing beer made from bananas (tonto) and keeping grain, which placed importance on utility together with beauty, as highlighted by (Nannyonga-Tamusuza, 2012).

The practical function of pottery in food preservation has been studied and recorded across Africa. Studies by (Mohamed et al., 2023) show how changes in pot-water intake, form, and baking methods affect temperature management and ability to keep moisture, which are important factors in increasing the shelf life of fresh foods. In Uganda, ethnographic studies (Tibesigwa, 2016) indicate how thick-walled pottery with small openings found better placement as milk fermentation vessels since they were found to keep steady temperatures and yet also kept contamination to a minimum. These results underscore the complex cultural knowledge involved in the production of pots, which challenges the notion that culturally indigenous methods are outdated compared to contemporary options.

Cultural symbolism remains a crucial factor in the evolution of pottery designs in Uganda, although it is understudied. Wandibba (1980), an anthropologist, argued that ornamental patterns on pots typically denote societal communication, such as cultural individuality or marital status, while also serving functional roles, including improving the mobility of the vessels and controlling temperature distribution. An example of this is among the Iteso, where corrugated motifs on pottery were thought to keep away bad forces of nature, but also played the function of keeping grains safe by regulating the flow of air in the pots (Wandibba, 1985). Such a dualism of imagery alongside purpose suggests that variations in design may indicate changes in both technical essentials and traditional standards over extended periods of time.

It has also been demonstrated through historical studies that colonial influence and global integration significantly disrupted cultural pottery practices in Uganda. The advent of plastic and metal as an obvious alternative to clay in the twentieth century caused a significant drop in the use of pots for the regular storage of food (Anquandah & Kankpeyeng, 2020). However, through the creation of crossbreed designs that combined the original with up-to-date methods, some societies adopted an integration of new ingredients or crafted items tailored for tourist markets. This persistence

underscores a vigorous kind of material culture in which custom and inventiveness complement one another, rather than competing with each other.

Comparative studies of the development of pottery designs in other African regions provide useful frameworks for understanding the Ugandan context. For instance, the Yoruba people of Nigeria had a pottery design change as a result of the development of the country, which saw some potters move from utilitarian pottery to aesthetic artwork (Ajekigbe, 2023). In a related instance, the Kamba potters of Kenya took on wheel-thrown pottery methods, though they kept the original methods of baking the clay work (Arnold, 1985). This comparison illustrates how the evolution of Uganda's pottery is not isolated, but rather a part of a larger African narrative of adaptation and persistence.

All these aside, there are still gaps in the literature regarding the specific influence of conventional substances on the shelf life and longevity of food in Uganda. Whereas some studies, e.g. (Nannyonga-Tamusuza, 2012), relay reduction in pottery use has not been extensively studied, and it remains unclear whether trendy, up-to-date options are superior to the original cultural designs prevalent in rural communities. In addition to that, the nature of pot making countrywide – which has been found to be women-dominated – calls for more investigation, since changes in economic preference could easily negatively affect the position of the female gender in conserving these skills (Ssemwogerere, 2018).

Topical multidisciplinary studies connect archeology, ethnography, and material science to assess the practical usefulness of pottery. An example of this is the microscopic studies on ceramic porosity (Livingstone, 2001) which have valued traditional firing techniques in improving longevity and insulation of pots. These findings can authenticate indigenous methods as scientifically viable in food preservation, and that using them in Ugandan pottery could support the belief in its persistent importance in sustainable development. This review highlights the need for this study to address significant gaps, including documenting Uganda-specific design adaptations, evaluating their functional advantages, and examining the socio-cultural forces that influence their continuity.

3. Materials and Methods

This study employed a mixed-methods approach, combining ethnographic fieldwork, material analysis, and comparative design assessment to investigate the evolution of Ugandan pottery for food preservation. Primary data were collected through in-depth interviews with 22 potters (aged 28-68) across two rural regions (Jinja and Kabale districts), which were chosen for their historical pot-making traditions. Participants were identified through purposive sampling, with specific attention given to multigenerational knowledge bearers. Field observations documented construction methods, including clay sourcing, forming techniques, and baking processes, which involved either open-pit or built kilns. A sample of 23 present pottery works was tested for water absorption, thermal properties, and microbial presence using standardized procedures. A comparative functional analysis focused on food preservation efficiency by observing temperature variations and spoilage rates in pots containing tomatoes, yellow bananas, milk, and amaranth as sampled food items over a period of 14 days. Quantitative data were complemented by interactions where local potters assessed pottery design variations. The cultural context was analyzed through the thematic coding of oral narratives about representative design patterns and socio-economic influences on design changes. The triangulation of technical dimensions, ethnographic perceptions, and physical appraisals provided strong proof of design evolution and its utilitarian implications.

4. Results

The findings of this study provide important insights into the evolution of pottery designs for food preservation purposes in rural communities in Uganda, addressing historical changes, practical adaptations, traditional influences, and contemporary challenges. The key results of the study are:

4.1. Historical variations in Pot Designs

Fieldwork studies and interviews with experienced pot designers have shown that customary Ugandan pottery designs have undergone significant changes over the past one hundred years. Pottery produced before the colonial era typically featured thickened walls and spherical pots, primarily used for grain storage, such as *obuseke* among the Bakiga people. Others showed narrow necks finished with a fine inside layer meant for fermenting liquids, such as the Ankole milk conservation *endiiro.* There was an array of pots incised with geometric motifs, whose function was both aesthetic and utilitarian, such as facilitating grip and better flow of air. The colonial and post-colonial effects led to the advent of pots with thinner walls, which were lighter due to the introduction and assimilation of imported kiln-firing methods. These were followed by crossbreed designs, which integrated European-inspired beauty attributes into local pottery designs, such as glazing the pottery surfaces to attract buyers. This led to a decrease in representative design patterns as the quest for functional pottery outshone traditional imagery.

4.2. Purposeful Adaptations for Food Preservation

A comparative analysis of original, traditional, and contemporary pottery designs revealed significant functional distinctions, particularly in terms of temperature regulation. The culturally hand-formed and pit-fired pottery maintained lower interior temperatures (4-6°C lower than the surrounding temperature), contrasting with conventional thin-walled pots, which were better suited for preserving perishable items like vegetables. Regarding moisture control, it was discovered that pots with rough interiors – prevalent before the 1990s – enabled regulated evaporation, a critical aspect for the fermentation of banana beer (*tonto*). For pest resistance, pots with small mouths finished with a layer of soot on the outside (as seen in earlier designs) were found to have the ability to repel insects and rodents, unlike newer pots, which often lack these attributes.

Water absorption and microbial growth: Tests in these aspects revealed that traditional pots fired at lower temperatures had a higher water absorption rate, which facilitated steady moisture release and thereby controlled mold growth. The trendy pots, high-temperature fired and glazed, though they were easy to clean, facilitated quick spoilage, especially in dairy products, due to their low breathability.

Cultural and Socioeconomic Influences on Design Evolution: Interviews with potters highlighted important external factors that drove variations in pot design. One of these aspects was colonial interference, a period when other materials, such as metal and plastic, began to substitute for clay pottery in everyday use, leading potters to shift their focus towards aesthetic and ritualistic items. Through market demand, local potters shifted from producing pottery for cultural food storage purposes to creating smaller, decorative, and shiny pots, which were preferred by tourists. There were also major generational changes, where younger pottery makers, for example, gave up the difficult and time-demanding methods, such as pit firing, and preferred quicker and cheaper techniques, which put at great risk the long-attained dedicated skills. However, some societies in Uganda have been seen to have resisted these new influences. For example, the Bakiga from Southwestern Uganda, who used thick-walled pots for beverage storage, cited exceptional functionality. Some NGOs and social groups in Jinja have attempted to revive customary pottery designs through cultural revival efforts, associating them with eco-tourism and organic farming programs.

4.3. Prevailing Challenges and Inventions

The study recognized the pressures between custom and trendiness, with a staggering 60% of surveyed households in rural areas having a new preference for other materials for food storage, as opposed to clay pots, citing reasons of indestructibility and convenience. Due to insufficient materials, some pot makers recounted diminishing clay deposits, leading to alternatives that overlook performance and health benefits. Through an adaptive approach, some potters have combined contemporary implements, such as potters' wheels, while maintaining their original finishing techniques. This combination has led to hybrid designs that balance efficacy and cultural legitimacy.

5. Discussion

The findings of this study shed light on the difficult relationship between practicability, culture conservation, and trendiness in the evolution of Ugandan pottery for food storage. These results are contextualized within wider academic deliberation and real-world inferences.

5.1. Functional Predominance of Traditional Designs

The study proved that pottery designs from before the colonial era in Uganda exhibit enhanced design aspects for food preservation, including thickened walls for temperature control, water-absorbent bodies to manage moisture, and small openings to keep pests at bay. The findings presented here align well with Gosselain's (1999) assertion that aboriginal pottery designs often depict experientially refined solutions to societal problems. The good temperature management by traditional pots (4-6 °C lower than the surrounding environment) highlights their practicality as reliable options for cooling that is energy-dependent, especially in rural communities that are off-grid. Nonetheless, their reduced popularity due to the widespread use of easy-to-use plastic and metal is cause for concern regarding the loss of such efficient tools. This also reflects Tibesigwa et al.'s (2016) caution about the unintended negative consequences of current substitutes on food security.

5.2. Cultural Depreciation and Knowledge Transmission

The reduction noticed in representative design patterns and dedicated pottery methods, such as open firing, shows a greater leaning towards cultural uniformity due to globalization. The same trend has been observed among the Yoruba people of Nigeria (Ajekigbe, 2010), who have given up functional pottery in favor of aesthetic artwork to cater to the market demands of tourists. In Uganda, the shift from pottery making is a significant threat to the transfer of knowledge

among generations, especially among women, who have traditionally controlled the trade. This aligns well with Ssemwogerere's (2018) findings on gendered skill erosion. The persistence of some societies, such as the Bakiga of Southwestern Uganda, who maintain their traditional, thick-walled pottery, suggests that practicality can support indigenous customs, especially when tailored to meet the requirements of everyday life.

5.3. Socioeconomic Demands and Adaptive Inventions

The study highlights the impact of colonial influence, particularly through interventions such as the arrival of foreign vessels, which diminished the significance of functional pottery, as observed in many parts of Africa (Mugerwa, 2012). However, the development of crossbreed designs, such as the multilayered pots in Mubende, shows the possibility for learned invention amid such disruptions. These crossbreed designs, which combine traditional methods with conventional materials, echo Arnold's (1985) observations on Kenya's Kamba potters, who incorporated wheel-thrown pottery without abandoning their original techniques. The outstanding performance of these and related inventions in modern commercial settings indicates a route towards financially revitalizing the practice, while at the same time conserving its purposeful legacy.

5.4. Strategy and Development Connotations

This study emphasizes the need for mediations that record and protect traditional expertise, which can be achieved through collaboration with community leaders and craftspeople to develop design strategies and practices. These could also be geared towards encouraging crossbreed remedies by strengthening local pottery designers to enhance their products through measures like better insulation, access to funding, and even tutoring opportunities. Such mediations could also help improve market access for local pottery makers, as initiatives like helping them access cultural tourism and eco-conscious buyers could go a long way in maintaining demand for utilitarian pottery items. Such actions could quite easily alleviate the sacrifices that draw lines between tradition and modernism, thereby guaranteeing that pottery maintains its position as an active custom rather than a historical artifact.

6. Conclusions

The evolution of Ugandan pottery reflects the shifting balance between tradition and adaptation in settlement patterns. Whereas cultural designs depict unequalled efficiency for food preservation, their existence is heavily reliant on incorporating invention with cultural endurance. By working to alleviate socioeconomic barriers and intensifying traditional knowledge, interested parties can help rural communities become energized to conserve this important aspect of their material and food heritage. Whereas this study centered on practical and cultural elements, more studies could be useful in such aspects as; enumerating the nutritive influence of foods kept in pots especially looking at aspects like food fermentation quality and pot preserved beverage food safety levels; exploration of the importance of policies in restoring pottery cooperatives; and testing traditional pottery designs in regulated laboratory situations to scientifically authenticate indigenous knowledge.

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