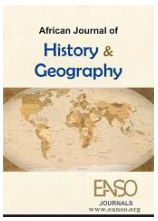
Article DOI: https://doi.org/10.37284/ajhg.3.1.2455



African Journal of History and Geography
ajhg.eanso.org
Volume 3, Issue 1, 2024
Print ISSN: 2790-7589 | Online ISSN: 2790-7597
Title DOI: https://doi.org/10.37284/2790-7597

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Kibiro Indigenous Salt Making Technology and Uganda's Economic War, 1972-1979

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Article DOI: https://doi.org/10.37284/ajhg.3.1.2455

Date Published: *02 December 2024*

Keywords: *Technology, Women, Salt, Making, Kibiro, Economic War.*

ABSTRACT

This paper examines the continuities and changes that characterised traditional salt-making technology at Kibiro during the 1972 economic war in Uganda and the influence of these technologies on the volume, quality, and benefits of mined salt. While Kibiro's salt-making was not new in historical discourse, attention had largely been on its archaeology rather than its history. Using a historical qualitative approach, data was collected through oral interviews through purposeful snowballing, documentary review, and observations. The data were analysed using documentary analysis and narrative techniques. Results show the dynamics in the traditional salt making technology that provided a basis for appreciating how national changes can lead to unintended changes and benefits to the local communities without necessarily changing the production technology. The traditional salt-making technology exclusively done by women reveals the power of a woman salt miner to survive and support her household in an agriculturally barren geographical setting with trivial support from men due to cultural beliefs and practices.

APA CITATION

Ssematimba, J., Kyazike, E. & Khanakwa, P. (2024). Kibiro Indigenous Salt Making Technology and Uganda's Economic War, 1972-1979. *African Journal of History and Geography*, *3*(1), 149-166. https://doi.org/10.37284/ajhg.3.1.2455.

CHICAGO CITATION

Ssematimba, Juliet, Elizabeth Kyazike and Pamela Khanakwa. "Kibiro Indigenous Salt Making Technology and Uganda's Economic War, 1972-1979". *African Journal of History and Geography* 3 (1), 149-166. https://doi.org/10.37284/ajhg.3.1.2455

HARVARD CITATION

Ssematimba, J., Kyazike, E. & Khanakwa, P. (2024) "Kibiro Indigenous Salt Making Technology and Uganda's Economic War, 1972-1979", *African Journal of History and Geography*, 3 (1), pp. 149-166. doi: 10.37284/ ajhg.3.1.2455.

IEEE CITATION

J. Ssematimba, E. Kyazike & P. Khanakwa "Kibiro Indigenous Salt Making Technology and Uganda's Economic War, 1972-1979", *AJHG*, vol. 3, no. 1, pp. 149-166, Dec. 2024.

MLA CITATION

Ssematimba, Juliet, Elizabeth Kyazike and Pamela Khanakwa "Kibiro Indigenous Salt Making Technology and Uganda's Economic War, 1972-1979". *African Journal of History and Geography*, Vol. 3, no. 1, Dec. 2024, pp. 149-166, doi:10.37284/ajhg.3.1.2455.

Article DOI: https://doi.org/10.37284/ajhg.3.1.2455

INTRODUCTION

Different scholars have explored how traditional salt making technology reconstruction occurred over the years in various parts of the world (Andrews, 1983, p.108; Brown, 2004, p.1; Eubanks & Brown, 2015, p.231). Some of the studies were conducted in sub–Saharan Africa (Rogers, 1984, p.66; Kuan et al., 2014, p.2). However, these studies did not examine how the traditional techniques used to make salt at Kibiro have been in Uganda since the economic war.

Kibiro is a salt-making village in Hoima district on the south-eastern shores of Lake Albert in the Albertine Rift, north-western part of Bunyoro Kingdom (Connah, 1996, p.6). Kibiro is a community of the Bagungu {Bakibiro} who settled there in the 11th century, having migrated from the present Democratic Republic of Congo (Browne, 2020, p.55). Kibiro is agriculturally barren because it is located in the rain shadow. This location renders the Kibiro community's livelihood heavily reliant on salt mining, supplemented by small-scale goat keeping and fishing on Lake Mwitanzinge or Lake Albert, as the colonialists renamed it (Connah, 1996, p.8). Kibiro salt mines are locally referred to as 'gardens' to reflect the idea that the role they play in sustaining the livelihood of the local community is similar to that played by gardens in agricultural communities (Connah, 1996, p.10; Connah, 2002, p.98). Salt is mined by only women using traditional and local technology, and it continues to be the main economic activity for the Kibiro community to date (2022), as one of the interviewed elderly men explained:

> *Salt mining is our main occupation. Because it is traditionally done by women, they are still in control of this powerful economic activity in our community, and it makes them more economically powerful than us. They are the ones meeting most of the household needs. Our traditional economic activity as men—fishing—has been interrupted by the army. They have chased us away and are now controlling all the shores of Mwitanzinge... (Interview with a 72-year-old man on 25 February 2022)*

The preceding excerpt suggests that even when some fishing has been going on at Kibiro, salt mining has played a more significant role in sustaining this community. This role has long been highlighted in the historical discourse, which Kibiro salt mines have attracted since 1876 when Major-General Charles G. Gordon first journaled about it (Robertshaw, 1997, p.407). This General, the then colonial governor of Khartoum, was the first European to visit Kibiro and to write about it as the site where salt, which Bunyoro Kingdom exchanged as one of its valuable resources, was mined (Robertshaw, 1997, p.407). The mining of this salt had started much earlier than this journal record. Extant scholarship indicates that this activity began in the early days of the second millennium (Schoenbrun, 2021, p.110). Archaeological evidence excavated by Connah (1989, p.47) suggests that salt mining occurred at Kibiro for over 800 years from 1989 backwards.

Though different studies have been conducted about the traditional technology used at Kibiro (see, for instance, Connah, 1989, 1990, 1991, 1996, 2002; Connah *et al*., 1990; Robertshaw, 1997; Schoenbrun, 2021), the focus was archaeological despite the historical context through which this technology evolved. Even when different scholars have analysed Uganda's political and economic history and have covered the vital socioeconomic role that the salt mined at Kibiro played, they, too, have not delved into how the traditional technology used at these mines was reconstructed from the historical context, particularly that which epitomised Amin's 'economic war' period (Jamal, 1976, p.603; Jørgensen, 1981, p.288; Mamdani, 1984, p.68; Sejjaaka, 2004, p.101; Taylor, 2015, p.2; Haas, 2017, p.608; Peterson, 2021, p.620). Against this backdrop, this paper aims to explore the patterns and trends of Kibiro's salt-making technology during Amin's economic war from 1972 to 1979. This entails examining the changes and continuities in the indigenous salt-making process.

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The paper aimed at the following specific objectives: (1) To discuss the changes that occurred in the traditional technology applied to produce salt at Kibiro during the economic war period of 1972-1979; (2) To establish the continuities and changes that characterised this technology and (3) To investigate the benefits realised as a result of reconstructing this technology during the economic war. Despite Kibiro salt being mined exclusively by women, it is unclear how the women used and reconstructed the traditional salt technology, the continuities, changes, and the benefits they have realised. This is the historical gap that this paper intends to fill.

KIBIRO'S TRADITIONAL SALT MINING TECHNOLOGY

Kibiro salt has always been mined exclusively by women in a manner very akin to cultivation, using traditional technology passed on from one generation to the next in a matrilineal way (Connah et al., 1990, p.27; Connah, 1996, p.7). Different scholars have described this technology without delving much into its continuities and changes over time (Connah, 1989, 1990, 1991, 1996, 2002; Connah et al., 1990; Robertshaw, 1997; Schoenbrun, 2021). Using oral traditional technology has its roots in the Bakibiro/Bagungu cultural fabric, which appeared to Nyasimba in the form of a dream. Nyasimba was the first woman in this Kibiro area who lost her child in the form of a sacrifice to appease the "gods" of the area by his husband, referred to as the Musimba man. This is noted by one of the still-existing 107-year-old musimba women from the basimba clan, the area's most prominent clan.

"Our ancestor Nyasimba received all the technology, that is the process, knowledge, skills, and tools that we are using from generation to generation from our god, who became happy after they had sacrificed the baby girl at the hot spring. Therefore, we cannot change the way we make our salt because that is what our god taught us" (107 old year old Musimba lady)

Such a narrative clearly shows that this technology has existed for many years and has been passed down from generation to generation. Therefore, understanding this traditional technology involves many things, such as knowledge, skills, tools, and processes.

Specifically, based on his findings, Connah (1989, p.47) observes that Kibiro's salt-making technology consisted of different tools and techniques devised indigenously. Salt miners used stone hoes to plough and loosen soils as well as earthenware such as ceramic scoopers applied to gather and spread the loosened soil over salty surfaces to absorb the salt through capillary attraction caused by sunbeams (Colvile, 1895, p.389; UNESCO, n.d). The scoopers were also used to gather absorbent soil into elongated ceramic bowls, which were carried into relatively large porous pots made by women (Connah, 1991, p.480). Water collected in small ceramic pots would then be poured into the porous pot containing the soil.

As the process continued, the mixture was placed over another pot, into which brine would percolate or leach. The brine-containing pot would then be put on a fireplace made up of three stones to boil to evaporate water out of it using burning firewood placed under it (Connah *et al*., 1990, p.27). After evaporation, the salt left in the pot crystallised (Robertshaw, 1997, p.407). Using hands, the crystallised salt would be moulded into salt cakes — the final salt products ready for domestic consumption or barter exchange with food and other goods needed to satisfy livelihood requirements (Schoenbrun, 2021, p.110). Kibiro's traditional salt making technology has a long history dating back to centuries. However, this paper analyses the continuities and changes that characterised it during Amin's economic war period, concerning the influence of salt mining on the quality, volume, and benefits.

Initially, salt making during the leaching process in the early 1960s {s} women were using pots in salt making until during the economic war when the use of saucepans was introduced (Figure 1&2).

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Figure 1. Use of pots at different stages of salt preparation

Source: Makerere University Archive

Figure 2. Salt making using saucepans during leaching

Source: field data 22/02/2022

Amin's Economic War

President Idi Amin Dada seized power by overthrowing Apollo Milton Obote's democratically elected government in a military coup d'état staged on 25 January 1971 (Twaddle, 1972, p.99). This coup occurred when Obote flew out of the country to attend a Commonwealth summit in Singapore. Slightly over a year after that, Amin declared an economic war against what he termed as the imperialist exploitation of Uganda rooted in Asian racism (Peterson, 2021, p.620). The 'war' was motivated by a serious concern, which Amin expressed at a two-day conference he had convened in December 1971 in Kampala about the status of Asians in Uganda (Peterson, 2021, p.635). Peterson added that at this conference, Amin asserted that he had heard severally that Asians were promoting racism by saying that "an African marrying an Indian" was like "a dog sleeping on its master's bed". He added that Asians perpetuated economic inequality through imperialist exploitation epitomised by having "no interest in Uganda beyond" maximising and "repatriating profits" back to their home countries (Peterson (2021, p.635).

Amin further noted that he was deeply concerned that the Uganda he presided over as the president

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had its commercial sector largely devoid of indigenous Ugandans; it was dominated by Asians who were "bloodsuckers" bent on "milking its wealth" (BBC, 1972). After the conference, Amin waited to see if the Asian community would address his concerns by starting to intermarry with Africans and reducing the economic exploitation of Uganda through profit repatriation (Decker, 2010, p.494). The Asian community did not look into the concerns as it continued behaving similarly for almost a year, thereby annoying Amin to declare an economic war against it (Taylor, 2015, p.2).

On the 4th of August 1972, Amin made a speech to the nation in which he explained that Ugandans had been slaves since colonialism and were still slaves in their independent country after colonialism. Without mincing words, he asserted that "Ugandan Africans have been enslaved economically since the time of the colonialists" (Uganda National Address, August 1972). Jørgensen (1981, p.288) echoed the same view by noting that true to his outspoken character, Amin announced:

We are determined to make the ordinary Ugandan master of his own destiny and, above all, to ensure that he enjoys his country's wealth. Our deliberate policy is to transfer the economic control of Uganda into the hands of Ugandans for the first time in our country's history.

The economic war was essentially declared in terms of policies that involved the expulsion of 50,000 Asians who came from India with British passports (Jørgensen, 1981, p.289). This number was later amended to 60,000 by including all the Asians who were not Ugandans (Mamdani, 1984, p.68). However, Amin exaggerated numbers to 80,000 in his 1972 decree that required all the specified categories of Asians to depart from Uganda within 90 days (BBC, 1972). It did not spare even the Asians whose forefathers had stayed in Uganda since 1901 after completing the construction of the Uganda Railway as labourers (Jamal, 1976, p.603). Neither did it exclude Asians who had contributed to the development of the business sector from which Amin expelled them (Peterson & Taylor, 2013, p.65). Amin maintained that the expulsion of the Asians was necessary to purge their dominance from Uganda's business sector, thereby Africanising it by putting it in the hands of native citizens (Collier, 1999, p.2; Peterson, 2021, p.636).

The Africanisation policy focused on expropriating all the commercial properties the expelled Asians owned in Uganda but had vacated. The properties consisted of 5,655 large-scale enterprises, including large-scale farms, ranches and estates, as well as over 19,000 shops that had been left behind by the departed Asian community (Jørgensen, 1981, p.288). These enterprises were essentially the backbone of Uganda's private sector-led economy (Kaberuka, 1990, p.109). After that, the management of the enterprises went to different African Ugandans who mismanaged them because they lacked the necessary competence (Peterson & Taylor, 2013, p.75).

The international community, particularly the West, retaliated swiftly to Amin's economic war by imposing stern economic sanctions on Uganda's foreign trade (Sejjaaka, 2004, p.101; Haas, 2017, p.608). With Amin's macroeconomic mismanagement, the decay of local manufacturing and processing factories due to incompetent internal management, and political instability, Uganda's impressive economic growth trajectory was severely interrupted and reversed (Mugisha & Kitamirike, 2017, p.77). The economy started shrinking at 14.8% annually (Sejjaaka, 2004, p.101). Acute shortages of essential commodities such as sugar, soap, and salt also hit it. The most acute shortage was salt, leading to importing it from Kenya and other overseas countries (Peterson, 2021, p.627).

Amin tried to contain the shrinkage of Uganda's economy by switching his alliance from the West, particularly from the UK, Israel and the United States, to the then Soviet Union and East Germany for financial and military assistance (Kyemba, 1977, p.44). He also turned his economic focus on policies that could stimulate domestic production to cover the scarcity of goods that the sanctions

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started creating in the market (Leopold, 2020, p.35). This article examines how these economic developments influenced the traditional salt making technology at Kibiro from 1972 to 1979.

The period 1972-1979 is also when Kibiro salt production was so high that it is said to have surpassed the level it had reached before 1888. Before 1888 Emin Pasha economically crippled Chwa II Kabalega, the then king of Bunyoro Kingdom, to succumb to British colonisation, which he had fiercely resisted (Efe, 2016). Kibiro salt works in 1894 were halted entirely to stop Kabalega's bartering it for ammunitions he applied to sustain his guerrilla resistance against British colonialism (Robertshaw, 1997, p.407).

Therefore, Kibiro twice lost its economic status as the "only manufacturing town in Unyoro" (Thurston, 1900, p.143), which weakened Kibiro's salt production to its lowest (Uzoigwe, 1975, p.44). The only salt mined was that the miners could directly exchange with food and other household commodities they needed to meet their survival needs (Robertshaw, 1997, p.409). This low mining level continued relying on the same traditional technology described earlier. Due to the role Kibiro salt works played in economically sustaining Kabalega's resistance against the British, no effort was made to encourage this activity after bringing Bunyoro under the Protectorate Government (Nduneseokwu, 2020, p.3). In addition, the British destruction of the underground salt granaries that Kabalega had established at Kibiro significantly reduced the role that the Bagungu chiefs played in encouraging women to produce and transport salt to these granaries as a tribute to the king of Bunyoro Kitara (Mutebi, 2006, p.2). The British colonials imposed royalties to replace the tribute, which was not effectively enforced by the Bagungu chiefs because the Protectorate Government did not show interest in the produced salt (Robertshaw, 1997, p.408).

Consequently, salt production remained at its lowest throughout the 68 years of colonial rule and the first ten years into the postcolonial era. During this period, the salt that Kibiro women produced was only that they needed to meet their survival or household needs and pay the poll and hut taxes that the Protectorate Government had imposed on their husbands (Robertshaw, 1997, p.409). Salt continued to be produced using the same traditional technology and for the same reasons until 1972 President Amin declared economic war. This paper explores whether any changes were introduced in this technology or if it continued to be applied similarly after the declaration of this war.

THEORETICAL UNDERPINNINGS AND LITERATURE

This article is grounded in the theory of diffusion of innovations. Kinnunen's (1996, p.431) seminal research indicates that this theory has its roots in the concept of innovation diffusion, which Gabriel Tarde proposed towards the end of the 19th century. In its present form, this theory was developed and popularised by Professor Everett M. Rogers in 1962 to explain how, why, and at what rate any innovation spreads in a given community (Rogers, 2003, p.15). To this theory, innovation refers to any unfamiliar or new idea, technique, method, process, activity, practice, tool or equipment that adopters (people) can take up and use to change their ways of life (Sahin, 2006, p.1). The theory defines diffusion as the extent to which any of these forms of innovation spreads within the community of the potential adopters over time, depending on different factors.

The factors include the innovation's attributes such as relative advantage or usefulness, ease of use, compatibility, observability of its benefits and trialability (how adopters can use it in the initial stages of implementing it) (Rogers, 2003, p.15). The factors also include the adopters' characteristics, such as their attitude towards the new technologies, awareness of the innovation, and competence or ability to use it (Minishi-Majanja & Kiplang'a, 2005, pp. 221-222). The factors further include the adopters' socio-political, economic and physical system characteristics, such as cherished cultural values and beliefs, communication networks and

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the nature of the physical landscape (Wisdom et al., 2014, p.480).

Different scholars have applied the theory to investigate technological changes (reconstruction of existing technology by accepting and using new technological innovations) and continuities (persisting with old technologies by being laggard or passive adapters) (Minishi-Majanja & Kiplang'a, 2005, p.211; Sahin, 2006, p.1; Wisdom et al., 2014, p.480; Aizstrauta et al., 2015, p.6; Makovhololo et al., 2017, p.461; Dearing & Cox, 2018, p.185; Skrbina & Kordie, 2021, p.254). These scholars investigated technological innovations as the new tools, techniques, processes or activities introduced in the existing technology. These scholars applied this theory to study these changes and continuities in different community contexts, which do not include salt-making communities, particularly Kibiro.

In particular, Aizstrauta et al. (2015, p.6) and Makovhololo et al. (2017, p.461) applied the theory of diffusion of innovations to assess technological changes adopted to promote sustainability of organisational settings. Wisdom et al. (2014, p.480) and Dearing and Cox (2018, p.185) examined the adoption of new technological tools and techniques in the health sector, why this adoption is generally slow, and it can be improved to make delivery of health services more efficient and effective. The studies of Shanin (2006, p.1) and Minishi-Majanja and Kiplang'a (2005, p.211) analysed technological changes in the educational sector. None of these studies focused on the salt mining sector. Therefore, how this theory explains changes in salt mining technology needs to be explored as this paper does in the context of traditional salt making technology at Kibiro from 1972-1979.

Different scholars have explored the reconstruction of salt production technology in terms of the changes that have occurred over the years (see, for instance, Rogers, 1984, p.59; Weller, 2002, p.317; Heru et al., 2015, p.175; Sumiati, 2015, p.1; Lestari et al., 2019, p.1); however, none of these scholars covered the changes within the context of Kibiro's traditional salt making technology. In particular, Rogers (1984, p.59) explored traditional salt production, observing that it involved the evaporation of seawater either by sunlight or by boiling, which required large quantities of fuel because of the low salt content in this water. Consequently, some salt miners introduced the 'thorn graduation' method, which involved evaporating the water out of the brine by trickling it through high walls of brushwood. However, Rogers (1984) examined changes in traditional salt production technology applied in eastern Australia, not at Kibiro, concluding that the changes did not succeed because the introduced method was not economically viable.

Sumiati (2015, p.1) examined technological changes in the form of the new technologies adopted in the traditional process used to produce salt. The new technologies Sumiati analysed were techniques that included Electrolysis, Evaporation, and Geomembrane technology. Adopting these techniques modified the traditional technology, thereby increasing the quantity of salt products by 50% from 60-70 tons per year per hectare to 90-117 tons per year per hectare. They also increased the quality of the produced salt by improving its purity from 90% to 99.5%. Essentially, similar observations appear in the study of Heru *et al*. (2015, p.175) on traditional salt production processes for improving product quantity and quality. These observations were, however, made within the context of Indonesia.

Lestari et al. (2019, p.1) analysed the changes in the traditional salt production technology in the form of a method that produces salt from "plots of evaporation of the salty seawater by sunlight", which were demarcated inside but near the shores of the sea (p.3). Their findings revealed that this traditional technology was improved by adopting the Thread Filter Technology or geomembrane. These changes increased salt production from less than three tons to between four and five tons, significantly enhancing the miners' income from selling the produced salt. Lestari and his colleagues, however, analysed these changes based on the salt production technology used at

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Kajhu Village Baitussalam, Aceh Besar in Indonesia.

Guntur et al. (2017, p.2) had earlier examined how traditional salt production using geomembrane or filtering-threaded technology had improved due to adopting the prism greenhouse method. These scholars explained that the prism greenhouse method produces salt using a greenhouse model that formed a prim structure based on the principle of integrating geomembrane and filtering-threaded technology. They added that it increased salt miners' productivity threefold by speeding up the harvest time and improving salt's weather resistance. The method also increased the quality of produced salt by raising its content from 85% to 95%. However, Guntur et al. (2017) made these observations in the context of salt production technology in Sidayula, a village in Indonesia that is not in Kibiro, Uganda. Moreover, when critically examined, these scholars agree with the paper examining traditional technology's role in Kibiro salt gardens.

Furthermore, Kasedde et al.'s (2012, p. 28) study indicates that traditional salt technology involving artisanal mining methods, particularly solar evaporation in open ponds demarcated in a salty lake, has been modified by introducing modern technological techniques. Kasedde et al (2012 &2014) noted that efforts to mechanise salt production at Lake Katwe failed because the introduced technology was wrong. These scholars described other technologies applied, including thermal (distillation and solar evaporation), membrane (Electro-dialysis, Reverse Osmosis), and chemical and hybrid methods. Similar observations appear in the studies of Kasedde et al. (2013) and Lwanyoga et al. (2014). However, these studies discussed introducing these changes in traditional salt production technology within the context of Katwe but not Kibiro. Even the scholars who have written about the technology applied to make salt at Kibiro have fallen short of delving into the changes that have occurred in this technology, such as Connah (1989, 1990, 1991, 1996, 2002); Connah et al., (1990); Robertshaw, (1997) and; Schoenbrun, (2021).

Therefore, extant literature generally depicts a gap in the changes or continuities that characterised the reconstruction of traditional salt-making technology and the benefits of produced salt. This article fills this gap.

MATERIALS AND SOURCES

The study employed a historical research design involving qualitative data collection and analysis. This research design was adopted to facilitate the collection and analysis of primary and secondary data needed to meet the study's objectives (Rose, 2018, p.12). This specifically enabled the researcher to collect and analyse qualitative data that was needed to get insight into the changes and continuities that characterised the reconstruction of Kibiro's traditional salt making technology as well as their influence on the volume, quality and benefits of the salt mined during the economic war period-1972-1979 (Argyres et al., 2020, p.343). Secondary data was collected using documentary review, online and printed dissertations, journals, press reports, official documents, and textbooks on Uganda's and Bunyoro's political and economic history and the history of salt production at Kibiro.

Primary data was collected in February 2022 from participants drawn from the study population, which consisted of former and current community leaders and salt miners. Salt miners mainly retired and active miners aged 50 to 100, are elderly and knowledgeable enough to provide needed data based on their memories, testimonies, and experiences with salt mining at Kibiro. The sample consisted of several participants who enabled the researcher to reach the data saturation point — the number of respondents beyond which extra responses were replicas of already collected data (Guest et al., 2020, p.78). Purposive and snowball sampling techniques were used to get these respondents.

Purposive sampling was used to select community leaders since, in their position as leaders, they were expected to be key informants who were knowledgeable about the changes and continuities in Kibiro's salt production technology and the

Article DOI: https://doi.org/10.37284/ajhg.3.1.2455

benefits thereof. Those selected included the LC1 chairperson, the former chairman in 1973 and the former BAKODA Chairperson. Snowball sampling was applied to select either active or retired salt miners aged 50 to 100 years based on the expectation that these salt miners were old enough to remember whether and how the technology they used to make salt changed from 1972 to 1979. This sampling enabled the researcher to identify subsequent respondents by being directed by the first identified respondent (Kirchherr & Charles, 2018, p.3).

Data was collected from the selected respondents using key informant interviews aided by an interview guide and recorded using the researchers' smartphone. The interview guide facilitated asking questions and recording responses on the continuities and changes in the salt making technology and their influence on the volume, quality and benefits of mined salt in a systematic and detailed manner.

The collected data was analysed using qualitative content and textual analysis — which involved perusing through the data collected in the form of text or words, highlighting the relevant extracts from it, quoting the extracts and discerning their meaning subjectively within the context of the research question being answered (Ahmady et al., 2020). In this study, this analysis involved playing and replaying the telephone recorder, listening critically and transcribing all the provided interview responses by writing them in a notepad. After transcription, relevant responses were extracted and directly quoted into the findings with minor editing where necessary. Kort-Butler (2016, p.36) recommended editing was applied to summarise the quotes by leaving out unnecessary text and retaining only that which reflected the meaning needed to understand the continuities and changes in Kibiro's salt making traditional technology and their influence on the volume, quality and benefits of the mined salt.

All the relevant ethical considerations were observed during data collection and analysis. Specifically, clearance necessary to collect data was obtained from the Head of the History Department at Makerere University. Respondents' informed consent was obtained by explaining the purpose of the study to them. The findings were reported as accurately as they were obtained from the data to ensure their authenticity and significance as discussed henceforward.

RESULTS AND DISCUSSION

Changes in salt making technology

The study was intended to explore the changes that characterised the traditional salt making technology of Kibiro during the economic war period of 1972-1979. This involved explaining any changes to the salt-making process during Amin's regime. The data revealed that these changes were mainly due to the tools used in this process. A retired 87-year-old female salt miner, who was still active in the 1970s, identified the changes as follows:

> *During Amin's regime, some things changed in our salt-making process. I think there was a nationwide shortage of salt in the market. I remember the shortage was acute, especially in 1973, because this was when the number of traders who wanted our salt increased, and we started bartering so much salt. The traders came from Hoima and Kampala to get our salt in exchange for items like aluminium saucepans and water cans (pails and jerry cans), plastic cups and plates, and other items they brought. We replaced the pottery ware we used to make salt with the saucepans, pails and jerry cans. The pottery tools were replaced because they were delicate and required much care to avoid breaking them. The traders convinced us, and we soon appreciated that the aluminium saucepans and plastic water can tools they brought were better at making salt than the fragile pottery ware we had been using." (Interview held 23 February 2022 with a retired female aged 87 years).*

The preceding narrative reveals that salt miners replaced the pottery ware, which was too fragile to maintain, with new tools, including the more durable aluminium saucepans, pails, and plastic

Article DOI: https://doi.org/10.37284/ajhg.3.1.2455

jerry cans. The narrative suggests that this started in 1973 when Kibiro salt miners began bartering their produced salt with the new aluminium and plastic items that traders started bringing. The narrative further reveals that Kibiro salt miners replaced pottery ware with aluminium and plastic tools because they appreciated the latter as more durable. The narrative further suggests that salt miners appreciated that the new tools were better than the pottery ware they had used. This suggests that salt miners had a positive attitude towards the new tools. Thus, in consistency with Roger's (2003) theory of diffusion of innovations, findings suggest that new technological innovations (tools in this case) are adopted to replace the old ones only when their attributes and those of the adopters are encouraging or favourable to their adoption.

It is imperative to note the political context that triggered the change in the traditional salt making technology. One of the Kibiro respondents Sayuni Kanzala's narrative reveals that traders started looking for salt from Kibiro in 1973 because of a countrywide salt shortage. The narrative does not reveal the cause of this shortage, perhaps because, as a rural salt miner who locally produced enough salt for her household and even bartered some to meet other household needs, Kanzala Sayuni ignored why there was a lack of salt in the general Ugandan market. Fortunately, this shortage was explained in the scholarly work of Sejjaaka (2014, p.101), Haas (2017, p.608), Mugisha and Kitamirike (2017, p.77), Leopold (2020, p.35) and Peterson (2021, p.630) who agree that the harsh economic sanctions that the West imposed on Uganda's imports in retaliation of Amin's expulsion of the Asians halted importation of most essential items, including most of the salt that was being sold on the Ugandan market. The salt shortage that resulted from these sanctions compelled traders to switch to locally produced salt. This is how the traders went to Kibiro: they took aluminium and plastic items that the salt miners bartered with salt and used some to replace pottery ware.

Reinforcing Kanzala Sayuni's narrative, another interviewee, an 89-year-old Nyakato Sarah, explained the exact manner in which the adopted aluminium and plastic tools replaced the Indigenous fragile earthenware in the salt making process:

> *First, the ceramic pots in which we used to collect the salty soil from the gardens and pour water in order to get brine (salty water) filtered out, and the ceramic pots we were using to boil the salty water in order to evaporate the liquid and remain with the solid salt, were all replaced by the more durable aluminium saucepans (called baganiko in local language). We also replaced the small ceramic pots we used before to carry and poured water into the big ceramic pots to filter salt from the soil with plastic basins (bowls), jerry cans, and aluminium pails of different sizes. As far as I can remember, we started getting these new tools from around 1973 onwards. Some pails and jerry cans were used to collect, keep and transport brine to the fireplace. We also replaced the ceramic scoopers for spreading soil with wooden scoopers (Ebisinga), obtained from Kigorobya or made locally by men from the wood they had fetched as firewood. We replaced the ceramic bowls for carrying salty soil from the gardens with wooden bowls or pans (Orwooto). The tools were adopted because they were less delicate than those they replaced. They did not require much care, and helped us to speed up salt making to meet the rising demand" (Interview held 24th February 2022 with 89-year-old female).*

The preceding narrative reveals that Kibiro's traditional salt-making technology was replaced by the use of earthenware, which, according to Colvile (1895), Connah (1989) and UNESCO (n.d), entirely relied on its indigenous state. The narratives indicate that since 1973, salt miners have been using wooden, plastic, and metallic ware. The narrative also reveals that all these new tools were adopted to harness their durable and non-fragile nature to speed up the salt-making process, producing more salt needed to meet the increasing demand.

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The findings generally indicate that the reconstruction of Kibiro's salt-making technology involved changing from using stony and fragile earthenware to more durable metallic and wooden tools, which included wooden scoopers, wooden bowls or pans, aluminium saucepans, metallic or plastic pails or jerry cans, and later plastic small plates and basins. However, the traditional process of making salt did not change other than the tools.

Continuities in salt-making technology

The study also intended to investigate the continuities featured in the traditional technology applied to produce salt at Kibiro during the economic war period 1972 - 1979. Results suggested that while the fragile indigenous technological tools (earthenware) were replaced with the more durable metallic and plastic tools, the salt-making process and techniques remained virtually the same, implying that only the tools used in this mining process changed. There was consensus on this view among the participants. One of these participants, the former chairperson of BAKODA, suggested that,

> *The steps and techniques our mothers use to produce salt have never changed. They have always applied the same steps and techniques while improving the tools. It is entirely still the same old manual process. In the morning, they go to plough the gardens (locally called kibuuga) using hand-held hoes to remove the grass, collect the sandy soil and spread it in the garden using a wooden bowl (locally called Rwooto)...I know this because I have seen my mother and sisters doing it from the 1960s till the 1980s. As an adult since 1990, I have seen my wife and daughters do the same — you know this is women's work in our culture here. When a person has just ploughed her garden, there is no soil to spread. So, she borrows the soil from the neighbour and returns it after harvesting salt from it. The soil spread in the morning is heaped in the afternoon into moulds in their gardens using metals (called a kisinga)" (Interview held on 23rd February 2022 with a 77-year-old male).*

The excerpt above indicates that the steps and techniques used to make salt continue as they did traditionally. It also reveals that the salt-making process was entirely conducted by women, consistent with Connah's observation (1990, 1996). Another vital point to note from the excerpt is that once no loose soil was needed to spread on the surface area of a salt garden to absorb the salt, this soil would be borrowed from a neighbouring garden and returned after filtering the salt out. Here, borrowing means asking the neighbour who had excess loose soil (or the loose soil not being used to absorb salt at that moment) to let it be used by another salt miner who needed it. Since the soil was just needed to absorb salt, any excess could be used by different salt miners and be returned after filtering the salt out.

The steps and techniques that made up the salt production process had never changed at all because,

> *In the same way our ancestors used to make salt as my mother explained and taught me, the process is still the same. A salt garden is prepared, and loose soil is spread on the surface and left for two to four days to absorb salt from underneath. Loose soil is left there for days to ensure that it absorbs enough salt content to be harvested (filtered) from it. When the soil is ready for harvesting, two baganiko (big aluminium saucepans) are used: One has small holes manually put into its bottom using nails to make it serve as a sieve. This saucepan is placed on top of the other without holes, with small stones placed between to separate them" (An interview held on 23rd February 2022 with a 79-year-old woman).*

Another participant further noted that:

> *The collected salty sand-soil is put into a saucepan on top. Then water is poured into this soil as it leaches through the holes into the saucepan placed under. The filtrate*

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> *(called brine) is carried home and boiled until it solidifies or crystallizes. The crystallized salt is then placed on a clean carpet and using hands, shaped into portable moulds or salt cakes. The salt cakes are wrapped in paper ready for home consumption or to be transported to the market for sale" (Interview held on 23rd February 2022 with 79-year-old).*

The foregoing narratives reveal clearly that in terms of steps techniques and processes, Kibiro's traditional salt making technology remained entirely the same as it was in its Indigenous state as described by Connah (1991, p.480), Connah et al. (1990, p.27), Robertshaw (1997, p.407) and Schoenbrun (2021, p.110). It should, however, be noted that the difference in the narratives points out that they refer to the use of *baganiko* (saucepans) instead of the ceramic pots that Connah (1989, p.47) found to have been used in the traditional state of this technology.

Therefore, the findings generally indicate that Kibiro's traditional salt-making technology continued to be as it was in its Indigenous state as far as the techniques and steps that made the process applied to produce the salt were concerned. Regarding these technological attributes, nothing changed from the beginning to the end of the salt-making process.

Effects of technological reconstruction on salt production community and benefits

The study was further intended to explore the volume and quality of the changes in the salt produced at Kibiro and the benefits realised from it during Amin's economic war period of 1972-1979. In this case, explanations were sought for any changes realised in the quality of the salt they made and its benefits due to the changes in the tools used. The findings indicate that the quality of the mined salt did not change. The reason for not changing was because the salt mining process remained the same in terms of steps and applied techniques, as one of the interviewed respondents recounted:

> *I do not think the quality of the salt we produced during that time changed at all. If it has not changed up to date, how could it have changed then? We still follow the same process. We use the same steps and manual techniques to make the salt. The only change I have noticed is replacing the fragile pottery ware with sturdy and more durable tools. This change did not alter the quality of the salt. However, it reduced the losses we used to suffer whenever the earthenware slipped from the hands or head, fell and broke down accidentally or whenever erratic torrential rains washed away the pots containing salty soil or brine. These losses were eliminated, which made our salt-making levels stable and predictable" (Interview held with 90-year-old woman 25th February 2022).*

The above narrative indicates that replacing the fragile pottery ware with sturdy tools stabilised the salt production levels by removing the risks of earthenware breakages due to falling accidentally or unexpected heavy rains. The narrative suggests that what Colville (1895, p.333) described as the vulnerability of Kibiro's traditional salt-making process to torrential rains ended when the durable technological tools began to be used. Colville explained that salt was mined by women who used pottery tools that could easily be broken and washed away by torrential rains. The narrative further implies that the adoption of durable tools increased the reliability of the salt-making process by making it more stable and predictable than before. This change put the salt miners in a position to mine salt without worrying about losing it either through accidents that broke down the earthenware or due to weather vagaries that washed away the pots. The adopted tools also increased the benefits that salt producers realised from the mined salt, as explained by one of the former leaders.

> *The durable tools that began to be used during Amin's regime increased salt production. This is because the wooden bowls were more giant. They could carry more absorbent salty soils than the pottery bowls. In addition, the aluminium saucepans were*

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> *much bigger than the pots used before for leaching brine and boiling it to get crystallised salt. So, the adopted tools made more salt than before" (Interview held 24th February 2022 with 80-year-old former leader).*

As revealed in the narrative above, the increased salt production was a blessing in that it was in line with Amin's economic war policy. According to Leopold (2020, p.35), this policy focused on promoting domestic production by encouraging all Ugandans involved in productive activities to increase output to cover the shortages that the economic embargoes imposed on Uganda's imports by the West had created as Sejjaaka (2004) explained. The increased production was also in line with the rise in demand for domestically produced salt, which was inevitably created by the sanctions imposed on Uganda's imports. Consequently, with money slowly starting to facilitate the exchange of Kibiro's salt in the trading centre around 1974, the miners began realising more socioeconomic benefits from selling their salt at this centre and Kigorobya the trading centre. This change was revealed by the interviewed 92-year-old retired female salt miner who recounted:

> *We began exchanging our salt for money more seriously during Amin's time, especially in 1975, when the use of better tools enabled us to produce more salt and sell it to more and more people who came looking for it at our trading centre. Before Amin's time, we were reluctant to accept money because it could not help us buy the needed items. Many people here had not appreciated how money worked. Exchanging salt in a barter system was more realistic because we got what we needed exactly from the salt we exchanged. The barter system started getting phased out as the monetary exchange system took root during Amin's regime (Interview held 25th February 2022 with 92-year-old Matulesi Kaheru).*

The preceding extract indicates that salt exchange began to be monetised to the level that the Kibiro salt miners appreciated in 1975, which led to the phasing out of the barter system that these miners had been using for a long time, as noted by one of the interviewees.

> *More and more traders started coming to Kibiro with coins and paper money instead of tangible goods. They would tell us that we could also use the same coins and papers to buy whatever we needed from other traders or neighbouring communities that needed salt but did not have what we needed precisely. The money we got from exchanging our salt enabled us to get any items we needed to make life better quickly. I remember that from around 1975, many salt miners were using money to buy modern household utensils, clothing, and cotton mattresses; some salt miners could buy construction materials, particularly iron sheets they used to roof their houses instead of using grass. That is how grass-thatched houses are reduced in this community (Interview held 25th February 2022 with a 92-year-old).*

The above narrative suggests that the rise in salt production, which was caused by the use of the adopted durable tools combined with the monetary exchange system encouraged at Kibiro during Amin's economic war period to enable the miners to use the earnings from salt to buy the items they needed to improve their welfare. The improvements took the form of salt miners beginning to use modern household utensils, clothing, and cotton mattresses, with some improving their housing by using iron sheets to roof their houses. Improvements in housing were further explained by another interviewee who seemed to suggest that they even started earlier in 1974:

> *During Amin's regime, many things changed in our salt-making process. I remember... from 1974, the new durable tools enabled me to barter so much salt with iron sheets which are very memorable for me because they are the iron sheets I used to roof this house where you have found me... (Interview held 26th February 2022 with 83-year-old mungugu)*

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The interviewed Serina Bikaramunda, a retired salt miner, revealed increased ability to educate children as another benefit, which the rise in the production of salt resulting from using better tools caused:

> *These tools we adopted helped us produce more salt and sell it at the trading centre to get money. Some of us who appreciated education used our money to sell salt to educate our children. I educated my five children to become teachers, nurses, doctors and two accountants. Educating my children has helped me much in my old age. I am retired from salt making, but my children are looking after me, not by making salt, but by being employed by the government or not, at least surviving using their education. (Interview held 26th February 2022 with 85-year-old).*

Another interviewee said that education was the main benefit of our salt during Amin's time. I quote, "Look down there; that is the only school, and it is a primary school that Kibiro has. We built this community school using the money we got from the sales of the economic war. This is when we benefited greatly from our "bibingka" (salt gardens). We have continued with our salt-making technology through other regimes but have not built another school. Those two narratives indicate that the people of Kibiro benefited greatly during the economic war compared to other regimes.

In general, the findings indicate that the reconstruction of Kibiro's traditional salt-making technology involved replacing the fragile Indigenous earthenware with more durable tools, including aluminium saucepans and pails, plastic jerry cans, and wooden bowls. The changes did not involve the production process itself, as it continued to be the same in terms of the steps and techniques applied manually to mine the salt.

CONCLUSIONS

This study examined the reconstruction of Kibiro's traditional salt-making technology and, therefore, Amin's economic war period (1972-1979) partially changed the traditional salt making technology used at Kibiro. The change replaced most fragile earthenware indigenously used to produce salt with more durable metallic and plastic tools. The salt-making process did not change as the indigenous steps and techniques used to mine salt remained typically the same, conducted manually. Changing the salt-making tools did not change its quality. However, it increased its production levels, thereby improving salt's contribution to sustaining the livelihoods of the salt mining households in the Kibiro community in terms of improved education.

Funding

This work was supported by funding from the Andrew Mellon Foundation.

Disclosure statement.

The authors report that there are no competing interests to declare.

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Article DOI: https://doi.org/10.37284/ajhg.3.1.2455

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