



(RESEARCH ARTICLE)



Assessment of health and social implications of Gari factories for their host communities in Oyo State

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Abstract

This paper is a comprehensive assessment of the health and environmental impacts of gari factories on their host communities in Oyo State, Nigeria. Four health centers in the host communities of the gari factories under study were surveyed using structured questionnaires to gather data on the prevalent illnesses and perceptions of the local health personnel. The IITA Health Center serviced the IITA gari factory, Moniya served the Laniyonu gari factory, Agunrege catered to the Agunrege gari factory, and Aafin Health Center provided healthcare services to the Sakutu Sabo Oyo gari factory. The study revealed valuable insights into the demographic and socio-economic characteristics of the health personnel respondents at these health centers. Notably, these health personnel played a key role in understanding the health dynamics within their communities. The health personnel's responses highlighted the gari factories' impact on the health of their respective communities and the prevalent health issues. Malaria was common in all communities, while headaches, respiratory infections, and cough were reported in specific areas. Stagnant water and cassava peels were identified as sources of environmental concern. In addition to the health assessment, the study explored the social implications of gari processing in these communities. Residents' perceptions of the gari factories varied, with some communities appreciating their contributions to employment and environmental development while others raised concerns about environmental risks. The findings of this study indicate that Agunrege gari factory poses the highest health threats and environmental risk to its host community due to concerns related to smoke and air pollution. These insights can inform policies and interventions to mitigate the negative impact of gari processing on health and the environment in these communities.

Keywords: Gari industry; Health implication; Host communities; Environmental impacts; Prevalent illness

1. Introduction

Gari is a beloved and iconic food that finds its place on countless tables in West Africa, becoming an integral part of daily life for families across the region [1]. The Gari industry which is synonymous with the production of this staple food product derived from cassava, has emerged as a noteworthy consumer of firewood. Firewood plays a pivotal role in powering the traditional processing methods of cassava into Gari [2]. Firewood has been a fundamental source of energy for centuries, serving as a vital component for cooking, heating, and various industrial processes. This paper unravels the intricate relationship between firewood utilization and the Gari industry, which encompasses not only the health implications but also the socio-economic dynamics of its effect on host communities [3,4].

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The prevalent use of firewood as the primary source of fuel energy in the majority of gari processing factories across Nigeria constitutes a critical issue warranting attention [5]. The combustion of firewood leads to the emission of pollutants into the environment, significantly impacting air quality. The World Health Organization (WHO) highlights the presence of gases like carbon monoxide, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, and ammonia, which have been associated with adverse health effects including respiratory difficulties, such as breathlessness, rapid breathing, and even as severe as complete cessation of breathing [6]. Furthermore, the repercussions extend to chest discomfort, exacerbation of asthma conditions, and potential consequences culminating in coma [6].

Of particular concern is the role of carbon dioxide in exacerbating environmental challenges. This greenhouse gas possesses an extraordinary warming effect, surpassing other gases by 3000 times, contributing significantly to global warming and consequently, driving climate change. The pressing concern lies in the correlation between the prevalent use of firewood, the resultant release of harmful gases, and the far-reaching environmental and health implications. This complex nexus necessitates thorough investigation and appropriate intervention to mitigate the cascading effects on both human health and the environment [7].

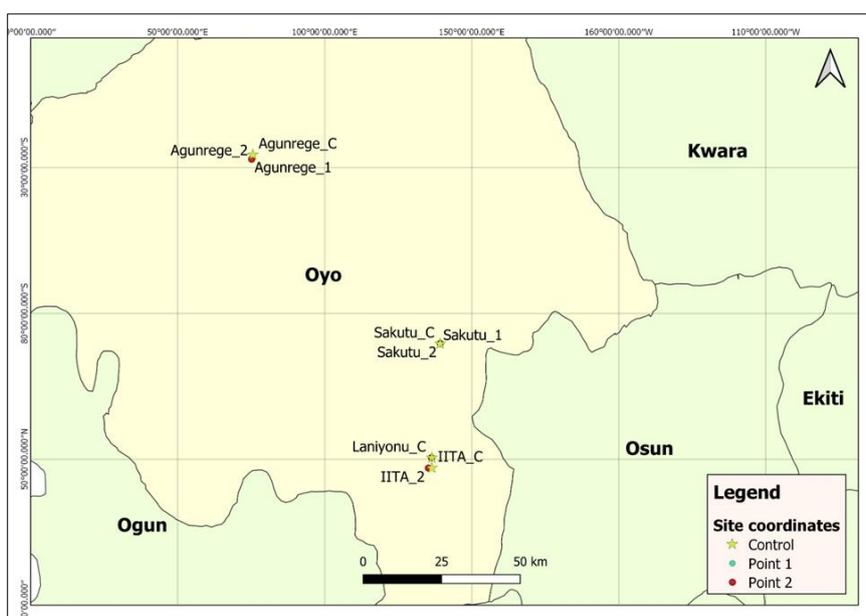
The objective of this paper is to assess the health and social implications of the gari factories on the host communities by exploring the multifaceted impacts of using firewood as fuel energy for gari production in Oyo State, the second-largest producer of gari in Nigeria.

2. Material and methods

The research study was conducted in four gari processing factories located in three local government areas of Oyo State (Figure 1). The study employed purposive sampling to choose the four small-scale Gari factories for examination. Purposive sampling, also referred to as judgmental, selective, or subjective sampling, is a non-probability sampling approach that relies on the researchers' discretion when selecting individuals from the population to participate in their surveys [8]. The rationale behind selecting these particular Gari factories was the volume of gari produced and the diversity in energy sources used for production.

The four gari processing factories used for this study are:

- Gari processing factory in IITA, Ibadan;
- Laniyonu Gari processing factory in Moniya, Ibadan;
- Gari processing factory in Sakutu Sabo area Oyo town;
- Gari processing factory in Agunrege area in Oke-ogun area of Oyo state.



Source: Author's Field Work, 2023

Figure 1 Map of the Study Site

The health and social ramifications associated with the gari factories were assessed by employing a questionnaire-based approach. Specifically, two distinct questionnaires were developed and tailored for, healthcare professionals, and members of the community.

The health-related questionnaire was completed by the health personnel overseeing the clinics within the host community. Additionally, comprehensive key information interviews were conducted to capture data that may not have been encompassed within the questionnaire. The health personnel shared insights into the prevailing health issues in the diverse communities.

Conversely, the community questionnaire was administered to a total of two hundred (200) respondents, with fifty respondents selected from each community associated with a Gari factory. All respondents resided within a 500-meter radius of their respective Gari factories. These community residents provided information concerning the gari factory's corporate social responsibility (CSR) initiatives and the prevalent illnesses within their communities. Subsequently, a detailed analysis of this data was done using descriptive statistics.

3. Results and discussion

3.1. Social implications of Gari processing in the host community

Residents of the four gari factories' host communities were surveyed to discover the social implication of the gari factories in their host communities. Questionnaires were administered to fifty respondents from each host community namely Idi Ose (IITA), Laniyonu (Moniya), Agunrege (Saki) and Sakutu (Oyo). In total, 200 questionnaires were distributed and retrieved for this study.

Figure 2 shows the gender distribution of respondents from each community. In Idi Ose (IITA) community, 46% of the respondents were male and 54% were female. In Laniyonu community, 82% of the respondents were male, while 18% were female. In Agunrege and Sakutu Sabo communities, there were 54% and 72% male respondents, also 46% and 28% female respondents respectively.

Table 1 shows the age distribution of the respondents in each community. In Idi Ose community, the majority (36%) of the respondents were in the 21-35 years age bracket, followed by the 51-65 years age bracket (34%). In Laniyonu community, the majority (42%) of the respondents were also in the 21-35 years age group, followed by 36-50 years age group (26%). In Agunrege, the age group with the largest number of respondents was 36-50 years (34%), followed by the 21-35 years age group (26%). In Sakutu Sabo, the majority of respondents fell within the 21-35 years age group (34%), followed by 51-65 years age group (28%).

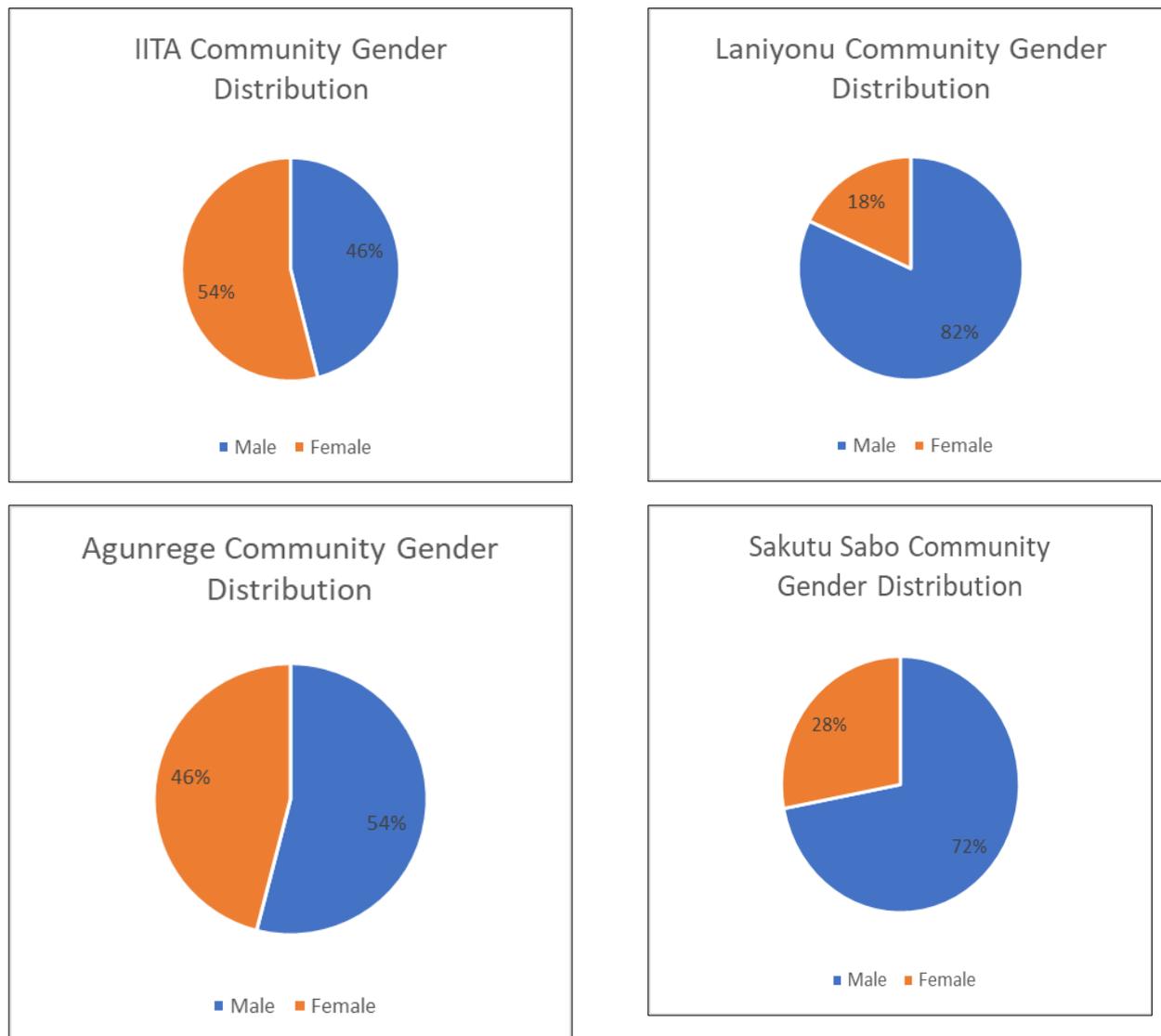
Table 1 Age Distribution of Community Respondents

| | IITA (Idi Ose) | | Laniyonu (Moniya) | | Agunrege (Saki) | | Sakutu Sabo (Oyo) | |
|-------|----------------|-----|-------------------|-----|-----------------|-----|-------------------|-----|
| | Freq | % | Freq | % | Freq | % | Freq | % |
| 21-35 | 18 | 36 | 21 | 42 | 13 | 26 | 17 | 34 |
| 36-50 | 11 | 22 | 13 | 26 | 17 | 34 | 12 | 24 |
| 51-65 | 17 | 34 | 10 | 20 | 11 | 22 | 14 | 28 |
| 66-80 | 4 | 8 | 6 | 12 | 9 | 18 | 7 | 14 |
| Total | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 |

Source: Field Work 2021

The educational qualification of the respondents from each community is shown in Table 2. The respondents from Idi Ose community are well educated and have a minimum of Secondary School Certificate (SSCE). Fifty-four (54%) percent of the respondents have either a Higher National Diploma or University Degree (HND/Degree), 34% have an Ordinary National Diploma (OND), while 12% have SSCE as their highest education level. In Laniyonu community, over an average of the respondents have higher education qualification; 12% have Primary School Leaving Certificate (PSLC), 34% have SSCE, 32% have OND and 22% have HND/Degree has their highest education qualification. In Agunrege community, a quarter of the respondents have higher education qualification; 36% have PSLC, 40% have SSCE, 16% have OND and 8% have HND/Degree has their highest education qualification. In Sakutu Sabo community, less than half of the

respondents have higher education qualification; 24% have PSLC, 32% have SSCE, 26% have OND and 18% have HND/Degree has their highest education qualification. This information is necessary because the level of education of respondents will determine their perception of the gari industry in their community.



Source: Field Work 2021

Figure 2 Gender Distribution of Community Respondents

Table 2 Educational Level of Community Respondents

| | IITA (Idi Ose) | | Laniyonu (Moniya) | | Agunrege (Saki) | | Sakutu Sabo (Oyo) | |
|------------|-----------------------|----------|--------------------------|----------|------------------------|----------|--------------------------|----------|
| | Freq | % | Freq | % | Freq | % | Freq | % |
| None/FLC | 0 | 0 | 6 | 12 | 18 | 36 | 12 | 24 |
| SSCE | 6 | 12 | 17 | 34 | 20 | 40 | 16 | 32 |
| Diploma | 17 | 34 | 16 | 32 | 8 | 16 | 13 | 26 |
| HND/Degree | 27 | 54 | 11 | 22 | 4 | 8 | 9 | 18 |
| | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 |

Source: Field Work 2021; **Key:** **FLC** First leaving School Certificate; **SSCE:** Senior Secondary Certificate Examination; **HND:** Higher National Diploma; **Degree:** University Degree

Table 3 shows the information on the host community residents' perception of the gari factories. In Idi Ose community, the respondents were generally pleased with the operation of the gari factory. Majority (89%) of the respondents stated that IITA gari factory added value to the community in one way or the other. When asked to indicate in which particular ways the gari factory has benefitted them, 65% said by providing employment for residents of the community and 76% said by contributing to the development of the environment through various corporate social responsibility activities. None of the respondents perceived IITA gari factory as constituting a nuisance to the environment. The respondents were asked what illnesses are prevalent in the community and common to them, two illnesses; malaria and body pains were the only two indicated by 50 different respondents (Table 4).

In Laniyonu community, the respondents have indifferent opinion of the operation of the gari factory. Majority (76%) of the respondents stated that IITA gari factory added value to the community in one way or the other. When asked to indicate in which particular ways the gari factory has benefitted them, 69% said by providing employment for residents of the community and 67% said by contributing to the development of the environment through various corporate social responsibility activities. None of the respondents indicated that Laniyonu gari factory constitutes a nuisance to the environment. The respondents were asked what illnesses are prevalent in the community and common to them; malaria, cough and stomach ache were the three illnesses mentioned by respondents from Laniyonu community (Table 4).

In Agunrege community, the respondents were not so pleased with the operation of the gari factory. More than average (56%) of the respondents stated that Agunrege gari factory added value to the community in one way or the other. When asked to indicate in which particular ways the gari factory has benefitted them, 87% said by providing employment for residents of the community and 53% said by contributing to the development of the environment through various corporate social responsibility activities. More than a quarter (27%) of the respondents said Agunrege gari factory is constituting a nuisance to the environment. The illnesses are prevalent in the community according to the respondents are eye problems, stomach ache, typhoid, cough, malaria, head ache and difficulty in breathing. This survey infers that although, Agurege gari factory is a significant employer of labour in the community, it has poor environmental health management and thus constitute the highest health risk to its community (Table 4).

In Sakutu community, the respondents have a good perception of the operation of the gari factory. Majority (81%) of the respondents stated that Sakutu Sabo gari factory added value to the community in one way or the other. When asked to indicate in which particular ways the gari factory has benefitted them, 71% said by providing employment for residents of the community and 61% said by contributing to the development of the environment through various corporate social responsibility activities. However, 4% of the respondents stated that Sakutu Sabo gari factory constitutes a nuisance to the environment. The illnesses mentioned by the respondents as common in Sakutu are malaria, cough, catarrh and eye problems (Table 4).

Table 3 Perception of Community Respondents of the Gari Factory

| Community | Idi Ose (IITA) | | Laniyonu (Moniya) | | Agunrege (Saki) | | Sakutu Sabo(Oyo) | |
|---|-------------------|----|----------------------|----|--------------------|----|---------------------|----|
| | Freq | % | Freq | % | Freq | % | Freq | % |
| Added value to the community | 44.5 | 89 | 38 | 76 | 28 | 56 | 40.5 | 81 |
| Provides employment for the community | 32.5 | 65 | 34.5 | 69 | 43.5 | 87 | 35.5 | 71 |
| Contributes to the development of the environment | 38 | 76 | 33.5 | 67 | 26.5 | 53 | 30.5 | 61 |
| Constitute a nuisance to the environment | 0 | 0 | 0 | 0 | 13.5 | 27 | 2 | 4 |

Source: Field Work 2021

Table 4 Community Respondents response on observed prevalent illnesses in the community

| Common illnesses observed in the community | | | |
|---|--------------------------|-----------------------------|--------------------------|
| Idi Ose (IITA) | Laniyonu (Moniya) | Agunrege (Saki) | Sakutu Sabo (Oyo) |
| Malaria -78% | Malaria- 100% | Malaria- 75% | Malaria- 57% |
| Body pains-7% | Cough- 67% | Stomach Ache- 33% | Cough- 46% |
| | Stomach Ache-14% | Typhoid- 58% | Catarrh- 78% |
| | | Cough- 87% | Eye Problem- 66% |
| | | Eye problem- 47% | |
| | | Head Ache- 81% | |
| | | Difficulty in Breathing-49% | |

Source: Field Work 2021

3.2. Health Implications of the gari factories

The closest health centers to the gari factories were surveyed through structured questionnaires to ascertain the various illnesses prevalent in their host communities. Four health centres namely IITA Health Center, Primary Health Care Center, Moniya, Agunrege Primary Health Care Center and Aafin Primary Health Care Center, Oyo were visited for the study. Table 5 shows the demographic and socio-economic characteristics of medical personnel respondents, while Table 6 shows the information on community health issues.

IITA Health Center in Akinyele Local Government Area, Moniya in Oyo State is the health facility servicing the IITA gari factory. Key informant interview was done with the head nurse, who is a female registered nurse and midwife, aged 47 years old. She is married and her highest educational qualification is B.Sc. Nursing.

Structured questionnaires were administered to the six medical personnels (majorly nurses) and in their response, they acknowledged that there is a gari factory in the IITA community and asserted that it poses no disturbance to the neighborhood. They acknowledged the connection between smoke and health, and named smoke related illnesses as cough, respiratory infection, and cough. They however disclosed that none of these mentioned illnesses are reported or prevalent in the clinic but named malaria and headache as the two most reported medical conditions in the clinic.

Moniya Primary Health Care Center in Akinyele Local Government Area is the health facility servicing the Laniyonu gari factory and host community. Key informant interview was done with the head nurse, who is a female registered nurse and midwife, aged 50 years old. She is married and her highest educational qualification is Diploma in Nursing.

Structured questionnaires were administered to the four medical personnels and in their response, they acknowledged that there is a gari factory in Laniyonu community and ascertained that it does not pose any environmental concern to the community. They ascertain that smoke can cause illnesses and named them as heart conditions, lung infections, and headaches. They however disclosed that none of these mentioned illnesses are reported or prevalent in the clinic but listed malaria, aches, and headaches as the prevalent illnesses reported at the clinic.

Agunrege Primary Health Care Center in Atisbo Local Government Area, Tede of Oke-Ogun in Oyo State is the primary health center servicing Agunrege gari factory and host community.

Key informant interview was done with the head nurse, who is a female registered nurse and midwife, aged 55 years old. She is widowed and her highest educational qualification is Diploma in Nursing.

Structured questionnaires were administered to the five medical personnels (majorly nurses) and in their response, they acknowledged that there is a gari factory in Agunrege but stated it (the factory) poses a risk to the community because of smoke from firewood combustion and air pollution from the smell of stagnant water and cassava peel. They also concurred that there is a connection between smoke and health issues and named them as pneumonia, upper and lower respiratory tract infections, allergies, the common cold, and cough.

The respondents stated that malaria, common cold, cough, upper and lower respiratory tract infection are the health conditions that were frequently reported to the clinic. They confirmed that stagnant smelly water from the gari factory breeds mosquitos that causes malaria. They also mentioned that daily chocking smoke from the factory causes cough and respiratory illnesses. They further explained that the gari factory is negatively affecting the health and environment of the local population.

Aafin Primary Health Care Center in Atiba Local Government, Offa-Meta, Oyo is the medical facility servicing Sakutu Sabo Oyo gari factory and host community.

Key informant interview was done with the head nurse, who is a female registered nurse and midwife, aged 45 years old. She is married and her highest educational qualification is Diploma in Nursing.

Structured questionnaires were administered to the four medical personnels and in their response, they acknowledged that there is a gari factory in Sakutu Sabo and they do not see the gari factory as a risk to the community. They acknowledged the connection between smoke and health issues and named related illnesses as lung cancer and cough.

The respondents stated that malaria, and cough are the health conditions that were frequently reported to the clinic. They however, linked the malaria to stagnant pool of water by the gari factory and the cough to the smoke from wood combustion.

This survey shows that Agunrege is the gari factory that pose the highest health and environmental risk to the host community.

Table 5 Demographic and socio-economic characteristics of head nurse respondents

| Name of health Centre | Age | Gender | Marital Status | Highest Educational Level |
|-----------------------|-----|--------|----------------|---------------------------|
| Agunrege PHC | 55 | Female | Widowed | Diploma |
| Aafin PHC | 45 | Female | Married | Diploma |
| IITA health Centre | 47 | Female | Married | BSc |
| Moniya | 50 | Female | Married | Diploma |

Source: Field Work 2021

Table 6 Information on community health issues

| Question | Agunrege PHC | Aafin PHC | IITA health Centre | Moniya |
|---|--|----------------|--------------------|-------------------------|
| Are you aware of the gari factory in your area? | Yes (100%) | Yes (100%) | Yes (100%) | Yes (100%) |
| Does the gari factory constitute a nuisance to the environment? | Yes (100%) | No (100%) | No (100%) | No (100%) |
| Why? | Air pollution from the odour of the water and peel of cassava | N/A | N/A | N/A |
| Common health issues reported in the clinic | Malaria, common cold, cough, upper and lower respiratory tract infection | Malaria, Cough | Malaria, headache | Malaria, pains headache |

Source: Field Work 2021

4. Conclusion

In conclusion, this paper has provided a comprehensive overview of the health and environmental impact of gari factories on their host communities in Oyo State, Nigeria. Through surveys and questionnaires administered to health

personnel, valuable insights were gained into the prevailing health conditions, environmental concerns, and community perceptions.

The health centers, namely IITA Health Center, Moniya Primary Health Care Center, Agunrege Primary Health Care Center, and Aafin Primary Health Care Center, played a pivotal role in understanding the dynamics of health within these communities. The responses of the nurses revealed a spectrum of perceptions regarding the gari factories' impact on their respective communities. While some saw the factories as sources of employment and contributors to environmental development, others expressed concerns about environmental risks, particularly related to smoke and air pollution.

The prevalent health issues identified in these communities were indicative of the diverse health challenges faced by the residents. Malaria, a common tropical disease, was found in all communities, reflecting the regional health burden. Additionally, respiratory infections, cough, and headaches were reported in some areas, highlighting the potential health risks associated with gari processing. The presence of stagnant water and cassava peels as environmental concerns was an important finding, as it revealed potential sources of health risks in these communities.

The social implications of gari processing were explored, revealing varying perceptions among residents. Some communities recognized the positive contributions of gari factories, such as employment opportunities and environmental development. In contrast, others voiced concerns about the factories' environmental impact.

One of the most significant findings of this study was that Agunrege gari factory posed the highest health and environmental risk to its host community. Concerns related to smoke and air pollution, as well as the breeding of disease-carrying mosquitoes in stagnant water, were particularly prominent in this community.

These findings underscore the need for targeted interventions and policies to address the health and environmental challenges posed by gari factories. Measures to mitigate air pollution, improve waste management, and enhance community awareness can contribute to a healthier and more sustainable coexistence between gari factories and their host communities. It is imperative that these findings inform decision-making and guide stakeholders in efforts to enhance the well-being of these communities while sustaining gari production. This paper serves as a foundation for further research and initiatives aimed at improving the health and environmental conditions in these communities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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