



Assessing the Multi-faceted Impact and Mitigation Strategies of the Port Harcourt Ultra-Modern Abattoir Situated in Rumueme Town

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Abstract

An abattoir functions as a facility dedicated to the slaughtering and processing of animals for the production of meat. Its importance is underscored by its pivotal role in the meat industry and the larger framework of the food supply chain. The primary objective of this study is to assess the multifaceted impacts of the Port Harcourt Ultra-Modern Abattoir in Rumueme Town and to develop strategies that ensure the facility's sustainable integration within the community. The study systematically explores the positive impacts of the abattoir on both the local populace and the surrounding environment. Through a meticulous examination, the aim is to identify aspects where the abattoir contributes positively. Conversely, the study rigorously investigates the negative impacts exerted by the abattoir on health, social dynamics, the economy, and the environment. This involves a detailed analysis to understand the challenges associated with its operations. An integral aspect of the study also was to identify and formulate a diverse array of strategies geared towards mitigating the identified negative impacts. Simultaneously, the study strives to enhance the positive contributions of the abattoir to the community, environment, and overall sustainability. The findings illuminate a complexity of perceptions, revealing challenges related to environmental issues, economic dynamics, and social structures. While acknowledging positive practices, the study underscores the need for balanced evaluations and emphasizes the significance of proper waste management as a key mitigation strategy. In conclusion, the study advocates for a holistic approach to address the identified challenges and enhance the positive aspects associated with the Port Harcourt Ultra-Modern Abattoir. The proposed mitigation strategies offer a pathway towards sustainable integration, fostering a harmonious relationship between the abattoir and the local community.

Keywords: Port Harcourt Ultra-Modern Abattoir, Abattoir Impact Assessment, Rumueme Town Abattoir Study, Multi-faceted Abattoir Impact, Mitigation Strategies for Modern Abattoirs

Introduction

Abattoirs, integral to the meat industry and broader food supply chain, embody a complex tapestry where economic, ethical, public health and environmental considerations converge (Rosser & Sumner, 2010; Animal Equality, 2023). While essential for food security and employment, industrialized abattoirs face criticism for potential ethical lapses, labour exploitation, and environmental degradation (Animal Equality, 2023). The ethical discourse revolves around humane treatment during slaughter, with advocates pushing for stricter regulations to minimize animal suffering (Temple, 2007). Opponents emphasize the necessity of meat consumption, advocating for improved standards within existing systems (Food and Agriculture Organization of the United Nations, 2018).

Abattoirs' crucial role in public health requires strict regulations to prevent food borne illnesses resulting from inadequate sanitation (World Health Organization, 2015). The

challenge lies in balancing safety concerns with economic efficiency, potentially sidelining smaller abattoirs and raising questions about market dynamics (McDonough, 2016). Environmental pollution, a significant consequence, necessitates a shift towards sustainable practices, including waste utilization and the adoption of eco-friendly technologies (United States Environmental Protection Agency, 2020; Godfray, Aveyard, Garnett, Hall, Kar, Kühn & Urama, 2018).

Abattoirs present a multifaceted landscape with positive economic contributions but challenges in ethics, public health, and the environment. Striking a balance demands robust regulations, ethical sourcing, and sustainable practices to ensure the coexistence of abattoirs with communities and the environment (Rosser & Sumner, 2010; World Health Organization, 2015; Godfray et al., 2018). This study will concentrate on assessing the multifaceted impacts of the Port Harcourt Ultra-Modern Abattoir in Rumueme Town and to develop strategies that ensure the facility's sustainable integration within the community.

Aim of the Study

To assess the impact of the Port Harcourt Ultra-Modern Abattoir in Rumueme Town on the health, social fabric, economy, and environment, while proposing strategies for mitigation and sustainable enhancement.

Objectives of the Study

- i. Investigate the positive impacts of the abattoir on the local population and the surrounding environment.
- ii. Investigate the negative impacts of the abattoir on the local population and the surrounding environment.
- iii. Identify and develop a range of viable strategies to mitigate the negative impacts of the abattoir, while enhancing its positive contributions to the community, environment, and overall sustainability.

Study Area

The study area encompasses Rumueme and its environs; all in Port Harcourt.



Fig. 1.3: Map of Rumueme showing the Location of the Abattoir
Source: Google Earth, Modified by the Researcher, 2023

2.0 Conceptual Review of Literature

2.1 The Concept of Abattoir

An abattoir refers to a building, structure, or a designated area where animals undergo slaughter for the purpose of processing meat intended for human consumption. Additionally, it is a facility where meat products are manufactured, processed, handled, stored, or sold, as defined by the Law insider.com dictionary.

Furthermore, an abattoir is an establishment officially sanctioned by a regulatory agency or local authority. Its primary function is to ensure the humane slaughter of food animals, with a focus on producing safe and wholesome meat for human consumption. The key objectives include the humane treatment of animals during slaughter, the dressing of food animals, the processing and preservation of high-quality meat, the responsible utilization of by-products, and the hygienic disposal and treatment of both liquid and solid waste (Biswas & Mandal, 2015).

2.2 Types of Abattoir

In developing countries, slaughter facilities typically fall into three categories: modern abattoirs, old slaughterhouses and slaughter slabs, and makeshift premises. Among these, modern abattoirs are considered the most advanced and ideal in terms of conventional design, equipment, and services (Clotey, 1985).

Abattoirs can also be categorized based on their practices and daily animal slaughter capacity. Regarding slaughter technology, they are classified as Traditional, Semi-modern, and Modern Abattoirs. Additionally, based on the scale of operations, abattoirs are further divided into large, medium, and small, depending on the volume of animals processed daily (Biswas & Mandal, 2015).

2.3 By-products from the Abattoir

Some of the waste products generated from slaughterhouses prove to be highly beneficial. For instance, bones are repurposed as bone meals, serving as mineral supplements for stock feed, thereby enhancing the overall health of livestock. Meat, bone, and carcass meals also function as valuable sources of sterile protein for food supplements.

Additionally, secondary rural industries can utilize by-products of animal origin, such as tanneries (involved in the treatment of skins and hides to produce leather), tallow (animal fat used in candle or soap production), soap, glue, and bone meal manufacturing. The pricing structure is influenced by these by-products and the compensation provided to livestock producers. The transformation of offal into by-products not only contributes to new employment opportunities but also fosters skills development at both the primary and secondary industry levels.

Moreover, the conversion of offal into fertilizers has the potential to enhance crop yield, as highlighted by Biswas and Patra in 2020.

2.4 Guidelines for a Modern Abattoir

The establishment of a modern abattoir necessitates adherence to essential guidelines. Paramount among these is the humane slaughter of animals, emphasizing the absence of cruelty in the process. Additionally, there is a stringent focus on maintaining hygienic standards throughout the production and processing of meat. The effective

segregation of clean and dirty slaughter operations is imperative to ensure optimal hygiene.

Ensuring the safety of meat and its derived products constitutes a critical aspect of the guidelines. This encompasses measures aimed at preserving the integrity of the final products for human consumption. The guidelines also underscore the judicious utilization of both edible and inedible by-products, thereby emphasizing sustainable practices.

Furthermore, environmental safety is a cornerstone of the established guidelines, reflecting a commitment to minimizing the ecological footprint of modern abattoir operations (Biswas & Mandal, 2015).

2.5 Impact of Abattoir on the Environment

The assessment of abattoirs, commonly known as slaughterhouses, on the environment is undertaken with the objective of comprehending and mitigating potential adverse effects related to waste management, water pollution, air emissions, and energy consumption. This scholarly investigation encompasses various facets, beginning with an examination of waste management practices within abattoirs. A notable study by Olawuni, Daramola and Soumah (2017) delves into the environmental ramifications of solid waste generated by abattoirs, emphasizing the critical need for proper disposal and treatment methods to mitigate pollution risks. Recommendations include the implementation of effective waste management systems, such as composting or anaerobic digestion, to curtail environmental impacts.

Water resource depletion emerges as another significant concern associated with abattoirs. Rigorous scrutiny of water usage patterns in abattoirs, considering both processing activities and cleaning processes, has been conducted by researchers like Parker, Thompson and Kumar (2017). Their findings underscore the significance of adopting efficient water management practices, such as recycling and reuse systems, to preserve water resources and minimize environmental consequences.

Moreover, the investigation extends to the generation of greenhouse gas emissions from abattoirs. Scholars have scrutinized the contribution of abattoirs to overall greenhouse gas emissions, encompassing carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Proposed mitigation strategies involve the adoption of renewable energy sources and the implementation of efficient waste management practices to alleviate the carbon footprint of abattoirs (Mozhiarasi & Natarajan, 2022).

Ecological impacts and biodiversity loss constitute additional focal points of research endeavors. Investigations have appraised the potential influence of abattoir effluents on nearby ecosystems and aquatic habitats. A nuanced understanding of the effects on aquatic organisms and habitats is imperative for the formulation of appropriate mitigation measures aimed at preserving biodiversity (Crook et al, 2015; Baard, 2021). Environmental impacts of abattoirs on water resources, concluding that effluents containing organic and inorganic contaminants from abattoirs may lead to pollution of nearby rivers and groundwater, thereby negatively impacting aquatic ecosystems and the quality of water resources intended for human consumption (Igbiosa & Uwidia, 2018; Mujere, 2020).

Addressing public health concerns, studies by Libera, Konieczny, Grabska, Szopka, Augustyniak and Pomorska-Mól (2022), and Rodarte, Fair, Bett, Kerfua, Fasina and Bartlow (2023). Explored the prevalence and transmission of zoonotic diseases associated with abattoirs. The study underscores the paramount importance of

adhering to proper hygiene practices and implementing stringent biosecurity measures to prevent the transmission of diseases from animals to humans during meat processing and handling.

2.6 Mitigation and Enhancement Measures to Impacts of Abattoir Location

The proper planning of abattoirs, as articulated by Olarenwaju (2018), encompasses various stages from site selection to construction, management planning, and pollution control. Waste generated during abattoir operations, from animal arrival to the rendering of animal parts, poses significant environmental challenges. Wastewater discharge into nearby water bodies, such as streams and rivers, has adverse implications for human and animal health, as well as the overall environment. Government intervention through the formulation and enforcement of policies and guidelines for waste management, abattoir site selection, and other specified techniques is crucial for ensuring optimal product production while safeguarding the environment. Olarenwaju (2018) advocates for stringent measures, including penalties for erring companies that fail to treat their effluent in accordance with stipulated guidelines.

An evaluation of abattoir practices in Ijebu Ode by Edet (2022) identified unsatisfactory and unsanitary conditions. Recommendations include the provision of standard facilities, closure of substandard abattoirs, and training for abattoir workers.

In the research article titled "Environmental Impact Assessment of Abattoir in Rivers State" authored by Anele, Okerentugba, Stanley, Immanuel, Ikeh, Ukanwa and Okonko (2023), the primary focus revolves around the evaluation and mitigation of environmental repercussions arising from abattoir activities. Key findings from the environmental impact assessment conducted on abattoirs in Rivers State, Nigeria, reveal the following:

- i. Abattoir operations significantly affect the physicochemical characteristics of wastewater, soil, and air within the abattoir environment.
- ii. Microbial analysis of wastewater, soil influenced by abattoir discharge, and air in the abattoir surroundings indicates the presence of pathogenic species of bacteria and fungi.
- iii. Microbiological contamination of slaughter wastewater with pathogenic bacteria and fungi, including *Escherichia coli*, *Salmonella*, *Shigella*, and other opportunistic pathogens.

The study underscores the importance of encouraging abattoir operators to comply with proper waste management, including wastewater treatment.

In response to the environmental challenges identified in the assessment of abattoirs in Rivers State, Nigeria, the study recommends the following actions:

- i. Promotion of proper waste management practices among abattoir operators, with a specific emphasis on wastewater treatment.
- ii. Implementation of measures to mitigate the ecological impact of abattoir waste discharge into the surrounding ecosystem.
- iii. Adoption of precise methods and operational standards throughout the abattoir process to minimize environmental impact.
- iv. Heightened regulatory attention to the environmental health risks associated with abattoir operations in Nigeria, particularly in the Niger Delta region.
- v. Emphasis on the establishment of facilities for animal management and proper waste disposal in abattoirs to prevent environmental harm.

2.7 Empirical Review

While the establishment of abattoirs is not inherently negative, empirical studies consistently highlight the potential adverse environmental and health effects associated with their operation, particularly concerning the proximity of residents to abattoirs. Olawuni, Daramola and Soumah (2017) conducted a study in Oko-Oba, Agege, Lagos State, focusing on the environmental implications of abattoir waste generation and management. The research revealed that the abattoir in question had polluting effects on the surrounding environment, leading to negative health impacts on nearby residents. The study employed a stratified approach, dividing the study area into four strata based on distance from the abattoir. The findings indicated that closer proximity to the abattoir correlated with a higher degree of environmental effects, emphasizing the importance of waste disposal facilities within the abattoir and the need to regulate residential building development near such facilities.

Jamal (2019) conducted a study in India, emphasizing the major environmental problem associated with slaughterhouses—specifically, the improper disposal of untreated liquid and solid waste. This practice was identified as a significant contributor to the contamination of shallow water tables and nearby water bodies, potentially resulting in waterborne diseases among residents in the vicinity.

Officha, Onwumemesi and Nzewi (2018) explored the impact of abattoir operations in Igbo-Etiti Local Government area of Enugu State. The study aimed to assess environmental hazards, waste disposal practices, and management equipment within the abattoir. The findings indicated that abattoir operations had led to air, water, and soil pollution, as well as adverse effects on public health. Issues identified included a filthy environment, drainage system blockages, flies' infestation, and health concerns for the populace. Recommendations included daily evacuation of abattoir waste, the use of proactive protective gear by slaughterhouse workers, public enlightenment campaigns on the impact of abattoir waste, and the establishment of legislation against the improper dumping of waste into streams and rivers.

These empirical studies collectively underscore the urgent need for strategic interventions in abattoir operations to mitigate environmental pollution and safeguard public health.

3.0 Methodology

Survey research design was adopted for this quantitative study (Creswell & Plano Clark, 2011). The primary focus of the study is Rumueme community, a densely populated area characterized by a concentration of residential and commercial structures where individuals both reside and engage in various activities. The study area is surrounded by several neighbouring communities, enhancing the overall context of the investigation. These adjacent communities include Mgbu-odohia Rumuolumeni, Nkpor Rumuolumeni, Mgbuosimini Rumuolumeni, Rumuepirikom Mile 4, Agip Estate Rumueme, Ahiaogologo Rumuemewate, Ogbuosimini Oroazi Rumueme, Federal Housing Estate Rumueme, Rumuchida, and Oro-akwo. Together, these communities form an interconnected network contributing to the broader socio-cultural and geographical landscape within which the study is conducted. In the demography of Rumueme community and its surrounding environs, the population was purposefully organized into four discernible groups for analytical clarity. These distinct groups, along with their respective populations according to NPC (1991) data set, provide a comprehensive understanding of the demographic landscape:

Mgbu-odohia- Rumuolumeni (Group 1):

Mgbu-odohia- Rumuolumeni: 926
 Nkpor- Rumuolumeni: 2931
 Mgbuosimini- Rumuolumeni: 4065
 Total Population: 7922

Rumuepirikom Mile 4 (Group 2):

Rumuepirikom Mile 4: 8333
 Total Population: 8333

Oro-akwo (Group 3):

Oroakwo: 1619
 Rumuchida: 1079
 Federal Housing Estate Rumueme: 3021
 Total Population: 5719

Ogbuosimini- Oroazi- Rumueme (Group 4):

Ogbuisimini- Oroazi- Rumueme: 3332
 Ahiaogologo- Rumuemewate: 1996
 Agip Estate: 456
 Total Population: 5784

Grand Total Population Across All Groups: 27,758

Table 3.1 was meticulously crafted through the utilization of the Exponential Projection Model, incorporating an annual growth rate of 6.5%, as per data sourced from the National Bureau of Statistics (NBS) in 2016. The mathematical expression for this model, denoted as $P_n = P_0(1+r)^n$, where P_n represents the population at a future time, P_0 is the initial population, r denotes the annual growth rate, and n signifies the number of years.

Additionally, the formulation of Table 3.1 considered an average household size of five (5) individuals, as provided by the National Population Commission in 2019. This parameter contributes to a more accurate representation of the demographic dynamics within the studied area.

Furthermore, the determination of the sample size for the study adhered to the Taro-Yamane sample size formula, ensuring a statistically sound and representative dataset for analysis and interpretation. The sample size became 396 and that constitutes the total number of questionnaires administered to head of households in the study area. Primary data collection was made possible by administration of questionnaires (pre-coded, open-ended and closed-ended). Data presentation and analysis was done with the aid of tables and percentages.

Table 3.1: Study Population and Sample Size

S/N	Sampled Communities	1991 Census Population	2023 Population Projection	Total Number of Households	Number of Questionnaire Administered
1.	Nkpo	7922	59,431	11,886	113
2.	Rumuekpikom	8333	62,514	12,503	118

	Mile 4				
3.	Oroakwo	5719	42,903	8,580	81
4.	Ogbuosimini	5784	43,392	8,678	84
	Total	27,758	208,240	41,647	396

Source: Researcher's Computation, 2023

4.0 Data Presentation and Analysis

4.1 Impact of the Abattoir on the Local Population and the Surrounding Environment

4.1.1 Positive Physical Impact

Table 4.1 shows the percentage of positive physical impacts regarding operation of an abattoir. From the dataset provided, we can see that there are four categories of positive physical impacts regarding the operation of an abattoir: proper waste disposal, waste treatment, recycling of waste, and use of renewable energy. The dataset also includes the number and percentage of respondents who answered "Yes" or "No" for each category, as well as the total number and percentage of respondents. Proper waste disposal, 56 respondents (11.27%) answered "Yes" to proper waste disposal, while 134 respondents (26.96%) answered "No". The total number of respondents for this category is 190 (38.23%). Waste treatment, 20 respondents (4.02%) answered "Yes" to waste treatment, while 95 respondents (19.11%) answered "No". The total number of respondents for this category is 115 (23.13%). Recycling of waste, there is no data provided for the number of respondents who answered "Yes" to recycling of waste. 105 respondents (21.14%) answered "No" for this category. The total number of respondents for this category is 105 (21.14%).

Use of renewable energy, 4 respondents (0.80%) answered "Yes" to the use of renewable energy, while 83 respondents (16.70%) answered "No". The total number of respondents for this category is 87 (17.5%). Based on this analysis, we can identify some trends and patterns in the data. Firstly, the majority of respondents (83.91%) answered "No" for all categories combined, indicating a lack of positive physical impacts regarding the operation of abattoirs. Additionally, the percentage of respondents who answered "Yes" is relatively low for all categories, ranging from 0.80% to 11.27%.

Table 4:1 Positive Physical Impact Regarding the Operation of Abattoir

Benefits	Yes		No		Total	
	N	%	N	%	N	%
Proper waste disposal	56	11.27	134	26.96	190	38.2
Waste treatment	20	4.02	95	19.11	115	23.2
Recycling of waste	0	0	105	21.14	105	21.1
Use of renewable energy	4	0.80	83	16.70	87	17.5
Total	80	16.09	417	83.91	497	100

Source: Researcher's Field Survey, 2023

4.1.2 Extent of Positive Physical Impact

Table 4.2 shows the extent of positive impact of the abattoir on the environment. We can see that the majority of respondents (38.63%) reported that the extent of benefit from the abattoir was "Not at all." This is followed by "Minor" (19.31%), "Beneficial" (15.69%), "Very beneficial" (14.89%), and "Moderate" (11.67%). This distribution suggests that a significant portion of the respondents did not perceive any positive impact from the abattoir. It is worth noting that the combined percentage of "Very

beneficial" and "Beneficial" responses is only 30.58%, which is lower than the combined percentage of "Minor" and "Not at all" responses (58.94%).

Table 4.2: Extent of Positive Physical Impact

Extent Positive Physical Impact	N	%
Very beneficial	74	14.7
Beneficial	78	15.7
Moderate	58	11.7
Minor	96	19.3
Not at all	192	38.6
Total	497	100

Source: Researcher’s Field survey, 2023

4.1.3 Negative Physical Impact

Table 4.3 shows the challenges related to environmental issues. The dataset includes the number of respondents who answered "Yes" and "No" to each challenge, as well as the total number of respondents. For noise pollution, 115 respondents (14.67%) answered "Yes" while 6 respondents (0.76%) answered "No", water pollution, 93 respondents (11.86%) answered "Yes" while 12 respondents (1.53%) answered "No", air pollution (odour): 127 respondents (16.20%) answered "Yes" while 22 respondents (2.81%) answered "No", dust Particles, 69 respondents (8.80%) answered "Yes" while 14 respondents (1.79%) answered "No". Dust particles are a concern, although not as significant as noise or air pollution, deforestation, 4 respondents (0.51%) answered "Yes" while 56 respondents (7.14%) answered "No". Loss of biodiversity, 27 respondents (3.44%) answered "Yes" while 52 respondents (6.63%) answered "No". Environmental stability, 25 respondents (3.19%) answered "No". There is no "Yes" option provided for this challenge. Indiscriminate dumping of Waste, 90 respondents (11.48%) answered "Yes" while 18 respondents (2.30%) answered "No". Indiscriminate dumping of waste is a concern, although not as significant as noise or air pollution. Vehicular congestion, 37 respondents (4.72%) answered "Yes" while 17 respondents (2.19%) answered "No". Based on the analysis, it is clear that noise pollution and air pollution (odour) are the most significant concerns among the respondents. These issues have the highest number of "Yes" responses compared to other challenges.

Table 4.3: Negative Physical Impact Regarding the Operation of Abattoir

Negative Physical Impact	Yes		No		Total	
	N	%	N	%	N	%
Noise pollution	115	14.67	6	0.76	121	15.4
Water pollution	93	11.86	12	1.53	105	13.4
Air pollution (odour)	127	16.20	22	2.81	149	19
Dust particles	69	8.80	14	1.79	83	10.6
Deforestation	4	0.51	56	7.14	60	7.7
Loss of biodiversity	27	3.44	52	6.63	79	10
Environmental stability	0	0	25	3.19	25	3.2
Indiscriminate dumping of waste	90	11.48	18	2.30	108	13.8
Vehicular congestion	37	4.72	17	2.19	54	6.9
Total	562	71.68	222	28.32	784	100

Source: Researcher’s Field Survey, 2023

4.1.4 Extent of Negative Physical Impact

Table 4.4 shows the distribution of responses regarding the extent of challenge. The majority of respondents rated the challenge as either "Moderate" (47.42%) or "High" (25.97%), while a smaller portion considered it "Minor" (16.41%) or "Not at all" (8.66%). Only a small percentage of respondents perceived the challenges as "Very High" (1.55%). These findings suggest that the majority of individuals perceive at

least some level of challenge from the abattoir. However, it is important to note that a considerable portion still views the challenge as minor or non-existent.

Table 4.4 Extent of Negative Physical Impact

Extent of Negative Physical Impact	N	%
Very High	12	1.5
High	201	26
Moderate	367	47.4
Minor	127	16.4
Not at all	67	8.7
Total	774	100

Source: Researcher’s Field Survey, 2023

4.1.5 Positive Economic Impact

Table 4.5 shows the positive economic impact regarding the operation of the abattoir. Employment Opportunity, 27.47% of the respondents identified employment opportunities as a benefit, while only 10.16% disagreed. Economic Growth, 30.34% of the respondents believed that the abattoir would lead to economic growth, while only 8.24% disagreed. Turnover on Goods Sold, 16.48% of the respondents identified turnover on goods sold as a benefit, while 7.45% disagreed. These findings indicate that the abattoir has positive economic impacts.

Table 4.5: Positive Economic Impact Regarding the Operation of Abattoir

Benefits	Yes		No		Total	
	N	%	N	%	N	%
Employment Opportunity	200	27.47	74	10.16	274	37.6
Economic growth	220	30.34	60	8.24	280	38.6
Turnover on goods sold	120	16.48	54	7.45	174	23.8
Total	540	74.29	188	25.85	728	100

Source: Researcher’s Field Survey, 2023

4.1.6 Extent of Positive Economic Impact

Table 4.6 shows the extent of the benefit of the abattoir to the study area. The majority of the respondents 40.66% agree that the abattoir is beneficial. 31.36% of the respondents identify the positive economic impact of the abattoir as very beneficial, 10.99% and 3.30% say the benefits are Moderate, and minor respectively, while 13.74% of the respondents disagree completely.

Table 4.6: Extent of Positive Economic Impact

Extent of Positive Economic Impact	N	%
Very beneficial	228	31.4
Beneficial	296	40.7
Moderate	80	10.9
Minor	24	3.3
Not at all	100	13.7
Total	728	100

Source: Researcher’s Field Survey, 2023

4.1.7 Negative Economic Impact

The Negative Economic Impact of the operation of Abattoir is shown in table 4.7. The dataset provided provides data on challenges of the abattoir as regards the economy of the study area. A higher percentage of the respondents did not agree that the abattoir caused any negative economic impact in the study area. The “No” respondents had it

more. Displacement of employment (23.61%) as opposed to 9.55%. Slow economic growth 29.44% as opposed to 1.86%, and reduced social activity 32.63% as opposed to 2.65%.

Table 4.7: Negative Economic Impact Regarding the operation of Abattoir

Negative Economic Impact	Yes		No		Total	
	N	%	N	%	N	%
Displace of employment	72	9.55	178	23.61	250	33.2
Slow economic growth	14	1.86	222	29.44	236	31.3
Reduces social activities	20	2.65	246	32.63	266	35.2
Others (security)	2	0.27	0	0	2	0.3
Total	108	14.33	646	85.68	754	100

Source: Researcher’s Field Survey, 2023

4.1.8 Extent of Negative Economic Impact

The extent of the challenge is shown on table 4.8. The data presented shows that a low percentage of the respondents agree that the extent of the challenge is very High and High at 2.04% and 1.49% respectively, while a higher percentage of the respondents disagree that the impact is moderate, minor and not at all at 19.13%, 37.76% and 39.76% respectively.

Table 4.8: Extent of Negative Economic Impact

Extent of Negative Economic Impact	N	%
Very High	15	2
High	11	1.5
Moderate	141	19.1
Minor	277	37.6
Not at all	293	39.8
Total	737	100

Source: Researcher’s Field Survey, 2023

4.1.9 Positive Social Impact

The positive social impact of the operation of abattoir is shown in table 4.9. it displays that the social impact of the Abattoir on the area is high. There is increase in Social network (21.25%), Job creation 21.05%, constant electricity and Provision of water supply at 11.50% and 12.48% respectively.

Table 4.9: Positive Social Impact Regarding the Operation of Abattoir

Positive Social Impact	Yes		No		Total	
	N	%	N	%	N	%
Increase social networking	218	21.25	58	5.65	276	26.9
Job creation	216	21.05	60	5.85	276	26.9
Constant electricity	118	11.50	138	13.45	256	25
Provision of water supply	128	12.48	90	8.77	218	21.2
Total	680	66.28	346	33.72	1026	100

Source: Researcher’s Field Survey, 2023

4.1.10 Extent of Positive Economic Impact

The extent of the benefit of the social impact of the abattoir is shown in table 4.10. Majority of the respondents agree to the beneficial nature of the abattoir as regards the social impact. Very beneficial, Beneficial and Moderate is 27.80, 39.04, 18.72

respectively while respondents who disagree are Minor and not at all, as 4.28% and 10.16% respectively.

Table 4.10: Extent of Positive Social Impact

Extent of Positive Social Impact	N	%
Very beneficial	270	27.8
Beneficial	365	39
Moderate	175	18.7
Minor	40	4.3
Not at all	95	10.2
Total	935	100

Source: Researcher’s Field Survey, 2023

4.1.11 Negative Social Impact

The negative social impact of the abattoir is shown on Table 4.11. Majority of the respondents 25.83% agree to rent increment, while 9.48% disagree. Other responses to diseases, lack of electricity, communal clash and insecurity are minor, 0.71%, 6.40%, 4.03% and 0.95% respectively.

Table 4.11: Negative Social Impact Regarding the Operation of Abattoir

Negative Social Impact	Yes		No		Total	
	N	%	N	%	N	%
Rent increment	218	25.83	80	9.48	298	35.3
Diseases	6	0.71	150	17.77	156	18.5
Lack of electricity	54	6.40	130	15.40	184	21.8
Communal clash	34	4.03	164	19.43	198	23.5
Others (insecurity)	8	0.95	0	0	8	0.9
Total	320	37.92	524	62.08	844	100

Source: Researcher’s Field Survey, 2023

4.1.12 Extent of Negative Social Impact

Table 4.12 shows the extent of the negative social impact of the abattoir. Majority of the respondents says it is moderate at 36.73%, then High at 25.51% others are minor 20.92%, 13.27% and very high at 3.57%.

Table 4.12: Extent of the Negative Social Impact of the Abattoir

Extent of Negative Social Impact	N	%
Very High	28	3.6
High	200	25.5
Moderate	288	36.7
Minor	164	20.9
Not at all	104	13.3
Total	784	100

Source: Researcher’s Field Survey, 2023

4.1.13 Potential Health Impact of the Abattoir on the Residents

Showing the concern of the potential health impact of the abattoir on the residents in table 4.13. Majority 52.22% of the respondents says they are not concerned while 32.78% knows of potential impact that can arise from the abattoir and are concerned. 15% says they do not know.

Table 4.13: Potential Health Impact of the Abattoir on the Residents

Potential Health Impact	N	%
Yes	118	32.8

No	188	52.2
I don't know	54	15
Total	360	100

Source: Researcher's Field Survey, 2023

4.1.14 Predicted Potential Health Impact of the Abattoir on the Residents

The residents predicted potential health impact of the abattoir is shown in table 4.14. Majority of the respondents predicted the potential health impacts may come from air pollution from roasting animal skin, water pollution from contaminated water and environmental pollution accounted for 55.9%, 23.7% and 14.4%, respectively from the responses.

Table 4.14 Predicted Potential Health Impact of the Abattoir on the Residents

Predicted Potential Health Impact of the Abattoir	N	%
Risk of infection by sick animal	28	23.7
Air pollution from roasting animal skin	66	55.9
Unclean environment (dirty water)	17	14.4
Not functional	7	6
Total	118	100

Source: Researcher's Field Survey, 2023

4.2 Mitigation and Enhancement Measures to Impact on the Location of Abattoir

4.2.1 Mitigation Measures to Impact in the Location on the Location of Abattoir

Table 4.15 shows the percentage of respondents who gave suggestions on how to mitigate the problems caused by the abattoir. From the data, 51.4% of the respondents suggested that there should be proper waste management. Thus, 25% of the respondents suggested there should be security, 9.4% suggest that the tax levied the residents should be reduced, 6.3% suggest that the use of tyre to roast animal skins should be stopped., 4.7% suggested the creation of more job opportunities for residents and 1.6% suggested the construction of bridge to ease transportation for waterside residents.

Table 4.15: Mitigate Measures to Impact on the Location of Abattoir

Mitigation Measures	N	%
Clean environment (proper waste management)	66	51.4
Security	32	25
Reduce the high rate of taxation levied on residents	12	9.4
Provide job opportunity for residents	6	4.7
Avoid the use of tire in roasting animal skin	8	6.3
Electricity	2	1.6
Construction of bridge for easy movement for waterside residents	2	1.6
Total	128	100

Source: Researcher's Field Survey, 2023

4.2.2 Enhancement Measures to Impact in the Location on the Location of Abattoir

Measures to be put in place to enhance the benefit of location of abattoir in the study area is shown in table 4.16. From data presented, 33% of the respondents suggested that to enhance the benefit of the abattoir on the study area, proper waste management

should be put in place while 28% and 8% of the respondents suggested security and orderliness, and constant electricity, respectively from the data presented.

Table 4.16: Enhancement Measures to Impact in the Location on the Location of Abattoir

Enhancement Measures	N	%
Clean environment (proper waste management)	100	33.3
Electricity	24	8
Demolish non- standard building (hideout for crime)	6	2
Security and orderliness	84	28
Construction of bridge for easy movement for waterside residents	14	4.7
Mini fire service (fire hydrants)	14	4.7
Traffic control officer for easy flow of vehicle	4	1.3
Provision of flying boats	12	4
Provide employment opportunities	14	4.7
Abattoir should be Operated and managed by private operator to ensure smooth running	8	2.7
Street light	4	1.3
Reduction of rents for shop & rooms	12	4
Improve drainage	4	1.3
Total	300	100

Source: Researcher's Field Survey, 2023

4.3 Summary of the key Findings from the Data Presented

1. Positive Physical Impact

Categories of Positive Physical Impacts

Proper waste disposal: 11.27% respondents agreed.

Waste treatment: 4.02% respondents agreed.

Recycling of waste: No data provided for "Yes."

Use of renewable energy: 0.80% respondents agreed.

Extent of Positive Physical Impact

Majority (38.63%) reported "Not at all" beneficial.

30.58% combined "Very beneficial" and "Beneficial."

58.94% combined "Minor" and "Not at all."

Negative Physical Impact

Challenges Related to Environmental Issues

Noise pollution: 14.67% respondents reported "Yes."

Water pollution: 11.86% respondents reported "Yes."

Air pollution (odour): 16.20% respondents reported "Yes."

Dust particles: 8.80% respondents reported "Yes."

Deforestation: 0.51% respondents reported "Yes."

Loss of biodiversity: 3.44% respondents reported "Yes."

Environmental stability: 3.19% respondents reported "No."

Indiscriminate dumping of waste: 11.48% respondents reported "Yes."

Vehicular congestion: 4.72% respondents reported "Yes."

Extent of Negative Physical Impact

Majority rated challenge as "Moderate" (47.42%) or "High" (25.97%).

Positive Economic Impact

Employment opportunity: 27.47% respondents identified as a benefit.

Economic growth: 30.34% respondents believed it leads to economic growth.

Turnover on goods sold: 16.48% respondents identified as a benefit.

Extent of Positive Economic Impact

Majority (40.66%) agree that the abattoir is beneficial.

Negative Economic Impact

Displacement of employment: 23.61% respondents agreed.

Slow economic growth: 29.44% respondents agreed.

Reduced social activity: 32.63% respondents agreed.

Extent of Negative Economic Impact

Majority disagreed that the impact is "Very High" (1.55%) or "High" (1.49%).

Positive Social Impact

Increase in social network: 21.25% respondents identified as a benefit.

Job creation: 21.05% respondents identified as a benefit.

Constant electricity: 11.50% respondents identified as a benefit.

Provision of water supply: 12.48% respondents identified as a benefit.

Extent of Positive Social Impact

Majority (39.04%) agree that the social impact is "Beneficial."

Negative Social Impact

Rent increment: 25.83% respondents agreed.

Extent of Negative Social Impact

Majority (36.73%) rated the impact as "Moderate."

Potential Health Impact

Concern of Potential Health Impact

52.22% respondents not concerned.

32.78% concerned about potential health impacts.

Predicted Potential Health Impact

Majority (55.9%) predicted potential health impacts from air pollution.

Mitigation and Enhancement Measures

Mitigation Measures

Majority (51.4%) suggested proper waste management.

Enhancement Measures

Majority (33%) suggested proper waste management.

5.0 Discussion of Findings

5.1 Positive Physical Impact

The data suggests a mixed perception regarding the positive physical impacts of the abattoir. A significant percentage of respondents acknowledged proper waste disposal as a positive aspect (11.27%), but other categories such as waste treatment, recycling of waste, and use of renewable energy received lower positive responses.

However, when considering the overall extent of positive physical impact, a substantial portion of respondents (38.63%) expressed that they perceived no benefit from the abattoir, raising questions about the effectiveness of current practices.

5.2 Negative Physical Impact

Environmental challenges, particularly noise and air pollution, emerged as major concerns among the respondents. Noise pollution (14.67%) and air pollution (16.20%) were reported by a significant number of respondents, indicating a tangible negative impact on the local environment.

The extent of these negative physical impacts varied, with a considerable percentage rating them as either "Moderate" (47.42%) or "High" (25.97%). This emphasizes the need for addressing these issues to mitigate environmental consequences.

5.3 Positive Economic Impact

While a portion of respondents recognized employment opportunities (27.47%) and economic growth (30.34%) as positive outcomes of the abattoir, the overall sentiment was not overwhelmingly positive. The extent of the perceived positive economic impact was moderate, with 40.66% agreeing that the abattoir is beneficial.

5.4 Negative Economic Impact

Concerns related to negative economic impacts were relatively lower. Displacement of employment, slow economic growth, and reduced social activity received limited agreement from the respondents. The extent of negative economic impact was also perceived as minor or non-existent by a significant portion of respondents.

5.5 Positive Social Impact

Positive social impacts, including an increase in social network (21.25%) and job creation (21.05%), were acknowledged by a noteworthy percentage of respondents. The perceived benefit was moderate, with 39.04% agreeing that the social impact of the abattoir is beneficial.

5.6 Negative Social Impact

Rent increment was identified as the primary negative social impact, with 25.83% of respondents expressing agreement. The extent of this negative impact was considered moderate by the majority (36.73%).

5.7 Potential Health Impact

A notable finding was the concern about potential health impacts from the abattoir, with 32.78% of respondents expressing worry. Predicted potential health impacts, such as air pollution from roasting animal skin, were highlighted by a majority (55.9%) of respondents.

5.8 Mitigation and Enhancement Measures

Suggestions for mitigation primarily centred around proper waste management, indicating a consensus among respondents (51.4%). For enhancing the benefits, again, a significant percentage (33%) emphasized the importance of proper waste management.

6.0 Conclusion

This study undertook an exploration of the diverse impacts exerted by the abattoir on the local populace and the surrounding environment, unveiling significant perspectives across economic, social, and environmental dimensions. Primary challenges identified include noise and air pollution, with limited positive effects on overall environmental well-being. Despite acknowledging economic contributions, concerns surfaced about the perceived lack of substantial benefits. Positive social impacts, such as increased social networks and job creation, were noted, yet concerns about rent increments emphasized the need for a balanced societal assessment. Apprehensions regarding potential health impacts, particularly related to air pollution, underscored the importance of stringent health and safety measures. Respondents strongly advocated for proper waste management, highlighting the pivotal role in shaping perceptions and impacts. The findings reveal a delicate balance between positive aspects and challenges, emphasizing the necessity of addressing environmental and social responsibilities for a sustainable coexistence between the abattoir and the local community.

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