



Highlighting the Physical Planning Implication of the location of the Ultramodern Abattoir in Rumueme, Rivers State

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Abstract: The act of building an ultramodern abattoir in a suitable location is a key driver for meaningful development in any locality and its neighbouring communities. Therefore, the selection of Rumueme Town is not out of place as it is the first of its kind. based on this development, this study aims to investigate the planning implications of establishing an ultramodern abattoir in Rumueme Town in Rivers State, Nigeria. This research focuses on the extent and requirements for the establishment of an abattoir and the planning implications of its location. The objective of the study includes but is not limited to identifying and evaluating the physical planning implications of the development of an abattoir in Rumueme Town and suggesting sustainable measures to mitigate and enhance the operation of an ultramodern abattoir. The study adopted a mixed-methods approach using a sequential explanatory design for data collection and analysis. The study also employed both purposive and simple random sampling techniques to identify and select 4 communities that are direct beneficiaries of the location of the abattoir. A total of 396 respondents were determined as the sample size employing the Taro Yamane formula at a 5% precision level and distributed across these communities proportionately. Eight (8) Key informants were interviewed, GIS was applied, and direct observations and photographs were also used to characterise the study area. The findings of the study reveal that the abattoir is sitting on 2.7 acres of land and meets the requirements of the global standard abattoir. The physical planning implications of the location of the abattoir include land use compatibility, waste management system, and environmental sustainability and employment opportunities.

Keywords: *Physical planning, implication, ultramodern abattoir, rumueme*

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INTRODUCTION

The establishment of an ultramodern abattoir in Rumueme, Rivers State, holds significant implications for physical planning in Port Harcourt. Physical planning plays a vital role in determining the layout, infrastructure development, and overall sustainability of urban areas. In the case of the ultramodern abattoir, several key implications must be

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carefully considered to ensure a well-planned and balanced integration of this facility into the existing urban fabric. An abattoir is a place where animals are slaughtered for meat consumption (Odetokun et al., 2021). They can be found in many towns and cities in Nigeria, serving as a central location for the killing of animals to provide meat for human consumption. This practice has been around since ancient times, with the history of public abattoirs dating back to the Roman Civilization and France in the 15th and 16th centuries (Bello & Oyedemi, 2009); (Gunorubon & Misel, 2014). An abattoir is a facility that is approved and registered by the controlling authority. It is responsible for ensuring hygienic slaughtering and inspection of animals, as well as processing, preservation, and storage of meat products for human consumption. Ultramodern design is influenced by various architectural movements, such as modernism and futuristic design. It draws inspiration from the advancements in technology, materials, and construction techniques, resulting in a style that is sleek, innovative, and forward-thinking (Alonge, 1991); (Christian & Eze, 2017).

Statement of the Problem

Over the years, the entire Port Harcourt city has not witnessed any modern or near standard abattoir since its existence in 1913, and people have got their protein from very unhygienic places regarded as slaughterhouses. What exists are makeshift shanties used as abattoirs without any recourse to the health, social, economic, and physical planning implications of establishing such makeshift abattoirs. These shanties are symbolic of the practice of slaughtering and distribution of unhygienic animals that are unfit for human consumption. Port Harcourt as it were, plays a significant role in the growth and development of Nigeria being the oil and gas hub of the country, yet it does not have a standard abattoir. This apparent lack of an ultramodern abattoir has led to increased revenue loss, unemployment, and other health-related challenges faced by users and operators alike.

Objectives of the Study

- Examine the extent of the abattoir and requirements of a standard abattoir in the study area.
- Identify and evaluate the physical planning implications of the development of an abattoir in Rumueme.
- Suggest sustainable measures to mitigate and enhance the operation of the ultramodern abattoir in Rumueme.



Figure 1 Rumueme showing the location of the Abattoir

Source: Google earth imagery, modified by the researchers, 2023

Scope of the Study

The geographical scope of this study revolves around Rumueme town in Obio/Akpor Local Government Area of Rivers State (see Figures 1 and 2). The content scope includes highlighting the socio-economic characteristics of residents of the study area, examining the size and available facilities of the ultramodern abattoir, identifying, and

evaluating the planning implications of the development of an abattoir in Rumueme town, and suggesting sustainable measures for mitigation and enhancement of the operation of the abattoir in the study area.

LITERATURE REVIEW

The planning implications of the location of abattoirs (slaughterhouses) are to inform efficient and sustainable urban and rural development. The study aims to assess the spatial distribution, land use compatibility, accessibility, and economic considerations associated with abattoir locations (Smith, 2002); (Enogiomwan & Ukam, 2001). It is important to note that the planning implications of abattoir locations are context-specific and can vary across regions and jurisdictions. Local regulations, community engagement, and stakeholder involvement are critical in the planning process to balance economic, environmental, and social considerations. Spatial analysis plays a vital role in understanding the planning implications of abattoir locations. Researchers have utilized geographic information system (GIS) techniques to analyze and identify appropriate areas for abattoir establishment (Thierman, 2010); (Refslund, 2012). Spatial analysis was deployed to identify suitable locations for abattoirs in Nigeria, considering factors such as proximity to raw materials, markets, and transportation routes. Land use compatibility is an essential aspect that has been examined in research on abattoir locations. Studies have evaluated the impact of locating abattoirs near residential areas or sensitive land uses (Adeoluwa, Aboderin, & Omodara, 2013); (Udoh & Iyeneomie, 2014).

Proper siting and zoning regulations are crucial to minimise potential negative effects, such as odour nuisances, noise pollution, and public health concerns (Folorunso, 2014); (Iannett & Francesco, 2020). Accessibility is another significant planning consideration. Research has focused on assessing transportation networks and infrastructure requirements for efficient movement of livestock and meat products to and from abattoirs. Factors such as proximity to major roadways, rail lines, or ports have been studied to ensure smooth logistics and minimize transportation costs (Joao, 2008); (Reverter & Upton, 2000). Other researchers have explored the economic implications of abattoir locations. They have examined the role of abattoirs in supporting local economies, employment generation, and income distribution within communities. Studies have emphasized the need for strategic placement of abattoirs, considering market accessibility and local demand for meat products (Odoemene, 2011) (Jacques, 2015).

Additionally, researchers have examined the socioeconomic implications of abattoirs, particularly about communities and surrounding areas. The expansion or establishment of abattoirs can have both positive and negative effects on local economies, employment, and social dynamics. Researchers have evaluated the socio-economic factors and recommended inclusive planning and development strategies to ensure the positive contributions of abattoirs to local communities (Ganesamoorthy, 2018); (Slade & Alleyne, 2023). In terms of economic implications, research by Vargas and Dilorenzo (2022) focused on the economic viability of small-scale abattoirs in rural communities. Their findings emphasized the potential for local economic development and job creation through the establishment of small-scale abattoirs. Additionally, local abattoirs can contribute to reducing transportation costs and promoting the consumption of locally sourced meat products (Fitzgerald, 2010); (Odetokun et al., 2021).

Consequently, Sukanya and Joseph (2023), stressed the importance of efficient water management practices, such as recycling and reuse systems, to conserve water resources and minimize the environmental impact. Moreover, the generation of greenhouse gas emissions from abattoirs has been explored. Researchers have investigated the contribution of abattoirs to overall greenhouse gas emissions, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Mitigation strategies, such as renewable energy adoption and efficient waste management, have been suggested to reduce the carbon footprint of abattoirs (Spencer & Olde, 2017); (Odoemene, 2011).

METHODOLOGY

The study employed the mixed-methods research approach using a sequential explanatory research design for data collection and analysis. A purposive sampling technique was used to select four communities (Mgbo, Rumuepirikom (Mile 4), Oroakwo and Mgbuoshimini) from among the list of communities due to their proximity to the 1.5km impact zone of the ultramodern abattoir and are net beneficiaries of the location of the abattoir. A total of 396 respondents were selected to form the sample size employing the Taro Yamane (1967) formula at a 5% precision level and distributed across the residents of the study community based on the census population figures (see Table 1). While simple random sampling technique was used to select respondents for the study from its impact zone of a 1.5km radius (see Figure 2). Key informant interviews were conducted with 8 key informants who are knowledgeable in abattoir activities. They include but are not limited to members of staff of the Rivers State Ministries of Agriculture, Environment and

Physical Planning and Urban Development, Butchers Association and practising Town Planners. Direct observation and photographs were also used to characterise the study area in addition to the deployment Geographic Information System (GIS) to locate and show the extent of the facility and impact zone. Also, content analysis was deployed to analyse the qualitative data obtained from the interviewees and Statistical Package for Social Sciences (SPSS) Version 22 was used to process the quantitative data collected from the field survey.

Table 1 Determination of sample size for the study

S/N	Sampled Communities	1991 Census Population	2023 Population Projection	Total Number of Households	Number of Questionnaires Administered
1	Mkpo	7922	59,431	11,886	113
2	Rumuekpikom (Mile 4)	8333	62,514	12,503	118
3	Oroakwo	5719	42,903	8,580	81
4	Mgbuoshimini	5784	43,392	8,678	84
	Total	27,758	208,240	41,647	396

Source: Researchers computation, 2023

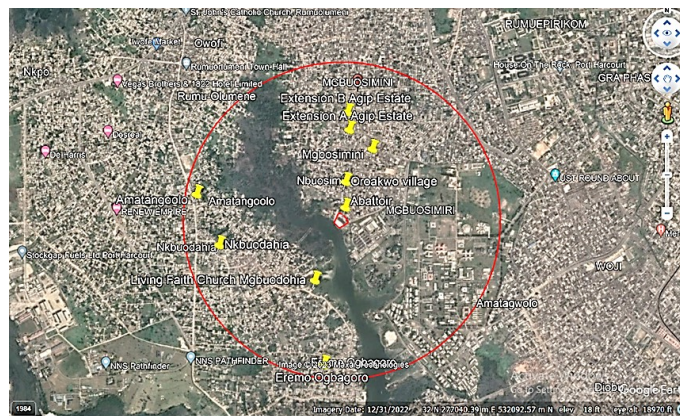


Figure 2 : 1.5 km Radius Map showing Communities Within the Study Area Close to the Abattoir in Mgbuoshimini, Rumueme
Source: GIS Google Earth, 2023 modified by the Researchers

RESULTS AND FINDINGS

The extent of the Abattoir and Requirements of a Standard Abattoir

The extent of the abattoir in the study area as shown in Figures 3 and 4 indicates that it is situated on 2.706 acres of land which is a standard requirement for a medium size abattoir with adequate space for equipment and other uses (Biswas & Mandal, 2015). It is accessible to major roads but built close to the Mgbuoshimini waterside to ease access through the Victory River. From its size, it is a medium abattoir with good facilities, proper infrastructure, generous design, and layout. It has separate areas for live animal holding, stunning, bleeding, dressing and meat processing. It has a good waste management plan for the abattoir (see Figure 3). The abattoir is located in a high-order central place in relation to the Christaller (1933) central place theory which suggests that abattoirs are located in a high order place since they need a significant customer base to maintain profit and economic viability. Good infrastructure design, hygienic practices and equipment, worker safety (personal protective equipment), guidelines and standards for workers protection and training. Efficient equipment for meat processing, chilling, and packaging to improve the shelf life of meat products.

The abattoir conforms with the National Physical Planning Standards and Guidelines 2011 (Draft) (Ministry of Lands, Housing and Urban Development) and the Laws of Rivers State of Nigeria, the provisions of Chapter 86 of the

Rivers State Meat (Inspection and Sale) Law. The abattoir meets up with the prerequisite guidelines for establishing a modern standard abattoir (Biswas & Mandal, 2015); (Shuaib & Ibrahim, 2022). The aerial view of the facility and the vicinity as shown in Figure 4, indicates the presence of waterbody on the other side of the abattoir. The aerial view of the vicinity showing the back view of the abattoir is shown in Figure 4. It showed the extent of the abattoir and other facilities from the back view, the extent of the river to the abattoir and the market building on the left side of the abattoir from the picture. The aerial view of the vicinity shows the parking lot and part of the study area. It showed the enclosed view of the abattoir, the parking lot, and the complete view of the entire facilities in the area, the water tank, offices, toilet facilities and so on.

The outside of the lairage is shown in Figure 4. The animals are discharged in front of the lairage and are moved into the lairage. There is provision for water to wash off the floor and is drained appropriately if the place is littered before they are finally moved into the lairage. In this section, the entrance into the cattle, sheep, and goat lines of the abattoir, a device cuts off the head of the animal and is hoisted up and head down to allow the blood to flow and can be collected in the canal below into the blood bank which will be used for blood meal used for feed formulation.



Figure 3 : *Location and Extent of Abattoir at Mgbuoshimini, Rumueme*
 Source: Google Earth 2023 modified by the Researchers, 2023



Figure 4 : *Aerial View of the Vicinity of the Abattoir*
 Source: Rivers State Ministry of Agriculture, 2023

Planning Implications Associated with the Location of the Abattoir at Rumueme

The planning implications associated with the location of the abattoir in Rumueme encompass considerations of land use compatibility, environmental justice, and broader principles of environmental equity and sustainability. These findings indicate that careful and strategic planning can lead to economic growth, food security, and development in the livestock industry. With the abattoir serving as a catalyst, employment opportunities will be created, related industries will be attracted, and the local economy will benefit. Furthermore, the presence of the abattoir will enhance

food security by providing a steady supply of fresh meat to the community, reducing reliance on external sources, and improving access to safe and quality meat products.

A certified practising Town Planner who was interviewed confirmed that the location of the abattoir is acceptable. It is situated at one end of the town, connected by well-planned road networks.

'...for me, the location of the ultramodern abattoir in that area is quite impressive as there was a makeshift abattoir there before now and this new one will be accessible to adjoining communities I think it is a strategic plan by the government of the day to attract development into Rumueme town and its environs before you know it, there will be pockets of small-scale industries springing up to create employers and employees...' **Practising Town Planner**

Additionally, the existence of an already operating abattoir in the area indicates that people from different catchment areas come to patronise the place. This suggests that the current location enables easy access to the target market beyond the local community. The key informant acknowledged that there is no established land use scheme specifically designated for abattoirs in the Mgbuoshimini area. However, they mentioned that the abattoir has appropriate facilities such as a retail market and lairage. It implies that the abattoir's location aligns with the needs and requirements of the area, even if there is no specific zoning regulation for abattoirs in place. The abattoir's location is adequate, considering its distance from the residential area. They expressed confidence that any problems that may arise during the operational phase can be mitigated using available solutions. This implies that there is flexibility in addressing future needs and challenges.

Another key informant from the Rivers State Ministry of Environment also highlighted the importance of conducting an prior to the establishment of the abattoir.

'If you look at the EIA Law operating in Nigeria, a project of such size requires a full-scale Environmental Impact Assessment (EIA) to be carried out. Unfortunately, the governor then was not interested in such a process and disregarded proper planning advise...' **Staff of the Ministry of Environment**

They emphasised that if an EIA had been carried out, the community could have provided insights into potential challenges and environmental concerns. The lack of an EIA suggests that some environmental considerations may have been overlooked in the planning process. The key informant mentioned receiving a letter from the Rivers State Ministry of Agriculture instructing the relocation of the abattoir. This indicates that there was some form of stakeholder engagement involving the ministry. However, the level and extent of engagement with other relevant stakeholders are unclear from the given response.

As previously stated, there is no established land use scheme specifically zoned for abattoirs in the Mgbuoshimini area. This suggests that formal considerations for land use planning and zoning regulations may not have been followed in siting the abattoir. A part of the key findings of this research indicates that there was no proper land use planning before the location of the ultramodern abattoir.

'I am not excited about the location of that abattoir in Rumueme Town. The reason is that there was no proper land use planning, and no consultation with the development control department to know the appropriate land use designated for that location. Let the government learn to partner with the appropriate professionals to get optimum results in projects like this...' **Staff of the Ministry of Physical Planning and Urban Development**

The key informant expressed that a proper spatial layout and design process could have benefitted the abattoir. They indicated that issues such as the arrangement of facilities, including the shed, slaughterhouse, lairage, waste disposal, and wastewater channels, were not appropriately addressed. This implies that the spatial arrangement of the abattoir may not have been carefully planned or optimised.

similarly, another key informant indicated that the abattoir has some necessary infrastructure in place. They mentioned the provision of parking spaces, wide gates to enable the entry and exit of big trucks, and well-planned drainage systems. The informant also noted that the abattoir's location is quite a distance from the residential area, contributing to its organisation and functionality. While the informant did not assess wind direction during the inspection, they suggested that prevailing wind patterns in Port Harcourt, particularly the Southwest wind, were taken into consideration to avoid disturbing inhabitants.

'This abattoir is about the best in the entire South-South and South-Eastern region of Nigeria. It has the latest state-of-the-art facilities with other ancillary services being rendered by more persons within and outside of the locality of the abattoir...' **Staff of the Ministry of Agriculture**

This assertion is significant because of the presence of a cold room, market stalls, and other ancillary facilities at the abattoir. It also has all the necessary facilities and equipment available to support each stage of the slaughtering process.

In addition, there is an appropriate waste management system and necessary facilities to prevent contamination and environmental pollution managed by qualified waste management service providers as determined by the managers of the abattoir.

Drawing from the responses of the key informant, it can be concluded that while the abattoir in Rumueme may have certain positive aspects, such as easy access to the target market and adequate infrastructure, there are also areas where environmental considerations, stakeholder engagement, spatial layout optimisation, and compliance with zoning regulations may have been lacking. These findings highlight the planning implications of locating the abattoir in Rumueme and the need for proper engagement from the planning stage to ensure a well-designed, inclusive, user-friendly, and sustainable abattoir that meets the required standard with minimal negative impacts. The implementation of an ultramodern abattoir implies that there will be a focus on modern and efficient infrastructure planning. This process factors in good road networks, functional drainage systems, efficient waste management facilities, and utilities. The objective is to ensure that the abattoir is well-connected to transportation routes and has adequate facilities to support its operations. Other impacts highlighted by the respondents include enhancement of public health and safety, increased environmental sustainability and economic development and the promotion of urban planning and management.

Mitigation and Enhancement Measures for the Negative and Positive Impact in the Location

Mitigation measures :

Table 2 Mitigate measures to impacts on the location of Abattoir

Mitigation Measures	N	%
Proper waste management	66	51.4
Security	32	25
Reduce the high rate of taxation	12	9.4
Provide job opportunities for residents	6	4.7
Avoid the use of tire in roasting animal skin	8	6.3
Electricity	2	1.6
Construction of a bridge across to ease movement for waterside residents	2	1.6
Total	128	100

Source: Researchers field survey, 2023

In Table 2, the study found that one of the suggested measures to mitigate the negative impacts of the abattoir was proper waste management measures should be implemented to address the unpleasant issues arising from the abattoir as 54.4% of the respondents opted for effective waste management practices. This indicates their recognition of the importance of managing and disposing of waste generated by the abattoir in a responsible and environmentally friendly manner. This suggestion agrees with Hanafi et al. (2017) perception regarding the environmental implications of managing abattoir solid waste and emphasises the importance of proper disposal and treatment measures to minimise the risk of environmental pollution and other health related hazards. Effective waste management systems, such as composting or anaerobic digestion, were also recommended to reduce environmental impacts. Another significant suggestion, put forth by 25% of the respondents, involves the need for improved security within and around the vicinity of the abattoir. Implicitly, some residents perceive a potential increase in security risks associated with the presence of the abattoir and propose measures to ensure the safety and well-being of the community, workers at the abattoir and other users. In addition, 9% of the respondents believe that reducing the tax levied on the residents would help alleviate the issues caused by the abattoir. This suggests that they perceive a financial burden on the residents due to the abattoir's operations and advocate for a reduction in the tax burden to mitigate these concerns.

Furthermore, the study found that 6.3% of the respondents suggest the discontinuation of the use of car tyres to roast slaughtered animals. This response indicates that they are aware of the potential environmental and health hazards associated with such practice leading them to propose an alternative and more sustainable method for roasting animal skins. Additionally, 4.7% of the respondents suggest the creation of more job opportunities for the residents. This

suggestion recognises the potential social and economic benefits that can be derived from the abattoir and advocates for employment opportunities within the community. Besides, Biswas and Patra (2020) identified that some of the waste products generated from slaughterhouses are very useful. For instance, the bones are used as bone meals, and mineral supplements for feedstock, and meat, bone, and carcass meals are valuable sources of sterile protein food supplements. Products of animals feed other industries such as Tanneries (the process of treating skins and hides of animals to produce leather), tallow (animal fat used in making candles or soap), soap, glue, and bone meal manufacture. The conversion of offal into by-products also creates new employment and skills at both the primary and secondary industry levels if properly harnessed. The offal converted into fertilizers will help increase crop yield, the production of glues from animal bones in Port Harcourt, revealed economic uses from waste generated from the abattoirs in addition to several other uses of waste to wealth schemes from the abattoir will create employment opportunities (Gunorubon and Misel 2014). another significant mitigation measure suggested was to reduce the high rate of taxation in the study area as 9.4% of the respondents suggested this measure. This measure will encourage investors and individuals to take advantage of the economic potential of the abattoir and locate their businesses and other economic activities to improve and diversify the local economy and support job creation.

Consequently, 1.6% of the respondents suggest the construction of a bridge to facilitate transportation for residents situated on the other side of the waterside. This suggestion indicates their concern for the challenges that will eventually come with the difficulty in accessibility faced by some residents and proposes a solution to improve their transportation infrastructure. These suggestions provided by the respondents in Table 2 offered valuable insights into the concerns and proposed solutions for mitigating the challenges caused by the abattoir. It reflects the diversity of opinions and areas of focus for community improvements related to waste management, security, taxation, environmental practices, job creation, and infrastructure development. These suggestions provided informed discussions that will enhance the decision-making processes aimed at addressing the concerns and implementing appropriate measures to mitigate the problems associated with abattoir provision in the study area and another environment where such development can be carried out.

Enhancement measures :

Table 3 *Enhancement measures to impacts on the location of Abattoir*

Enhancement Measures	N	%
Proper waste management (clean environment)	100	33.3
Electricity	24	8
Demolish non-standard buildings (hideout for criminals)	6	2
Security and orderliness	84	28
Construction of bridge for easy movement for waterside residents	14	4.7
Mini fire service and fire hydrants	14	4.7
Traffic control officer for easy flow of vehicle	4	1.3
Provision of outboard engine boats	12	4
Provide employment opportunities	14	4.7
Abattoir should be operated and managed by the private operator to ensure smooth running	8	2.7
Provision of Streetlights	4	1.3
Reduction of rents for shop and rooms	12	4
Improve drainage system	4	1.3
Total	300	100

Source: Researchers field survey, 2023

In line with the outcome of the key informant interviews, some enhancement measures as shown in Table 3 indicate that 33.3% of the respondents suggest that proper waste management (clean environment) which is a veritable aspect of

the abattoir business will engender efficient planning, management, and sustainability of the environment within the urban fabric. Consequently, the security and orderliness in the abattoir and its environment became an essential concern to enhance the location and operation of the abattoir which accounted for 28% of the respondents suggestions. The issues of construction of bridge for easy movement for waterside residents, provision of mini fire service including fire hydrants and employment opportunities were other enhancement measures that were suggested in Table 3. The provision of link roads from other sections of the metropolis is of important concern to the smooth operation and management of the abattoir which will increase accessibility and employment opportunities as the local economy becomes diversified including mini fire service and fire hydrants that will guarantee safety in the usage of the facility. The provision of outboard engine boats, reduction of rents for shop and rooms, the abattoir should be operated and managed by private operators to ensure smooth running, traffic control officer for easy flow of vehicles, streetlights, and improved drainage were some of the cogent suggestions made by the respondents as enhancement measures to impacts of the location of abattoir in the study area.

However, one lacuna found from the study findings was the lack of any specific law that defines the appropriate authority responsible for the operation and management (O&M) of the abattoir. There is a conflict of interest as to who should take charge among the Commissioner for Agriculture, the Permanent Secretary of the Ministry of Agriculture, the Veterinary officer, the health officer, and the Local Government Chairman who is supposed to be responsible for the regulation of the abattoir, operation, management, and regulation of the abattoir. Particularly the regulator. This conflict of interest creates loopholes that have the tendency to weaken the smooth or proper operation of the ultramodern abattoir such as the one under review. The consequence may be poor sustainability and commercialization of the facility, poor maintenance, and operation with time.

CONCLUSION

Findings from the study reveal that Rumueme Abattoir is a medium-sized abattoir which is built on 2.7 acres of land. It has all the requirements of a standard abattoir. There are physical planning implications of the location of the abattoir including considerations of land use compatibility, environmental justice in terms of waste management, and broader principles of environmental equity and sustainability. The location of the abattoir will improve the local economy of Rumueme town through the creation of employment opportunities, facilitate better market access and consistent supply of fresh meat to the community and the entire Port Harcourt metropolis and further develop the livestock industry in the area. The study also found mitigation measures for the negative impacts of the abattoir location including proper waste management, security, reduce the high rate of taxation and avoid the use of car tyres for the roasting of animal skin. Similarly, the enhancement measures suggested were efficient waste management practices, security and orderliness, constant electricity supply, link roads, fire service (safety) and employment opportunities. All these issues have created concern and further provided suggested recommendations to address these concerns as stated to achieve better operation and management of the abattoir and promote environmental sustainability, and well-being of the users and residents of the environment of the abattoir at Rumueme, Rivers State.

RECOMMENDATIONS

Addressing zoning regulations, the Rivers State Government should work closely with the local planning authorities and appropriate planning agencies to ensure compliance with zoning regulations. This will involve seeking necessary approvals, and permits, or proposing amendments to the existing zoning regulations to accommodate the operation of the abattoir. Waste management in the abattoir should be carried out following acceptable and appropriate regulations and standards of the monitoring Ministries and agencies of Rivers State to achieve sustainable waste management and a clean environment. This will promote the public health and safety of operators, users and residents of the abattoir location. Security and safety should be taken as priorities by the government and operators of the abattoir through collaboration with security agencies to mitigate and enhance the accessibility of users of the abattoir and residents of the Rumueme and its surrounding environment. There should be regular monitoring and evaluation of the operation and management of the activities of the abattoir to promote environmental sustainability and compliance with regulations in the study area. The government should identify and collaborate with linkage industries that will make use of the waste from the abattoir to create wealth that will improve employment opportunities and diversify the local economy of the study area. A Special Purpose Vehicle should be provided to include all relevant authorities, technicians, and individuals to properly manage the abattoir and follow the planning process taking particular reference to monitoring

and evaluation.

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