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VULNERABLE OR RESILIENT? A STUDY OF THE LIVELIHOODS OF FISHMONGERS ALONG THE DUNGA BEACH, KISUMU COUNTY, KENYA

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ABSTRACT

This study examines the livelihoods of fishmongers at Dunga Beach on the banks of Lake Victoria in Kisumu County, emphasizing the dual themes of vulnerability and resilience within the framework of economic activities related to fisheries. The study employed qualitative and quantitative methods, such as interviews, surveys, and field observations, to collect data from a diverse sample of 100 fishmongers, who are integral to the local economy and food security, documenting their experiences and strategies amid various stressors. The research evaluated the socio-economic and environmental difficulties encountered, including climate change, market volatility, and resource depletion. The findings indicate a multifaceted array of vulnerabilities, encompassing the effects of climate change, overfishing, and variable market demands, which jeopardize the sustainability of fishing techniques and the livelihoods reliant on them. Numerous fishmongers encounter heightened competitiveness and escalating expenses, intensifying their financial instability. Moreover, health complications, limited access to credit, and insufficient infrastructure exacerbate their vulnerable circumstances. Notwithstanding these limitations, the research highlights considerable resilience among fishmongers. Numerous individuals have adjusted by employing inventive coping tactics, including broadening their product lines, participating in other income-generating endeavors, and establishing cooperatives to improve negotiating leverage and resource access. Community solidarity and knowledge-sharing are essential elements of their resilience, cultivating social networks that offer support in challenging times. This study provides important insights into the complex interplay between vulnerability and resilience among fishmongers at Dunga Beach, Kisumu County, highlighting the necessity of identifying and enhancing these adaptive capacities via specific interventions and governmental initiatives. It promotes the inclusion of fishmongers' perspectives in decision-making about resource management and economic growth. Finally, the study contributes to broader conversations on sustainable livelihoods, gender dynamics, and environmental stewardship within the context of Lake Victoria's fishery.

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INTRODUCTION

Lake Victoria, one of the largest freshwater lakes globally, has historically been a fundamental component of economic activity in East Africa, sustaining a considerable segment of the population through fishing and other endeavours (Mwanja et al., 2017). The lake serves as a crucial supply of fish and is an essential resource for economic sustenance, cultural activities, and food security for millions in the adjacent areas. The lake sustains a varied fish population, encompassing commercially significant species such as Nile perch and tilapia, which are essential to local diets and economies (Mwanja et al., 2017). Fishmongers around the lake basin are integral to this ecology, acquiring fish from local fishermen, processing it, and distributing it in local and regional markets. Their actions are crucial for connecting fish production to consumption, so directly influencing food security and lives in the region. Moreover, the fishmongers offer work opportunities for numerous individuals in

the neighbourhood, thereby fostering economic growth and stability. The interplay among fishmongers, local fisherman, and consumers establishes a sustainable cycle of production and consumption that bolsters the local economy and guarantees the availability of food for area inhabitants. The presence of fishmongers is essential for sustaining the delicate equilibrium of food security and economic development dependent on the lake's resources. Nevertheless, swift environmental alterations, like as overfishing and climatic fluctuations, jeopardise these livelihoods (Njiru et al., 2020). For instance, the lives of fishmongers at Dunga Beach along the Lake Victoria basin are marked by a complex interplay of vulnerabilities and resilience. It is closely linked to the ecological and economic conditions of Lake Victoria, as diminishing fish stocks affect their earning capacity (Wangia et al., 2018). The heightened occurrence of extreme weather events, including storms and floods, has hindered fishmongers' ability to dry and preserve their catch, thereby endangering their livelihoods. Therefore, an investigation of both the vulnerabilities they face and the solutions they utilise to handle these

problems is essential for understanding the complexities of their livelihoods. This study analyses these dynamics to deepen the understanding of the socio-economic and environmental obstacles encountered by fishmongers and identifies measures to bolster their resilience. The findings explain the experiences of these individuals and offer policy recommendations to encourage sustainable livelihoods in a constantly changing environment. The study emphasizes the necessity of recognizing and tackling the distinct issues encountered by fishmongers in the area. By comprehending the variables that enhance their vulnerability, policymakers might formulate targeted policies to bolster their livelihoods. Ultimately, cultivating resilience among fishmongers will not only advantage the individuals but also enhance the general sustainability of Lake Victoria's resources.

METHODOLOGY

This research utilized a mixed-methods approach, integrating qualitative and quantitative methodologies to collect extensive data on the lives of fishmongers at Dunga Beach. By combining qualitative and quantitative research methodologies, the study offered a comprehensive picture of the socio-economic problems and resilience mechanisms that define the lives of fishmongers at that beach. Qualitative interviews with fishmongers indicated the emotional impact of variable fish prices on their mental health, whereas quantitative data analysis shown that diversifying market channels enabled them to navigate economic difficulties. This comprehensive methodology enabled researchers to depict a detailed representation of the intricate reality encountered by fishmongers at Dunga beach. Participant recruitment entailed interacting with fishmongers from various backgrounds and experiences to guarantee a varied sample. Data gathering methods encompassed interviews, focus groups, and observations to obtain a thorough array of information. The data analysis employed both quantitative and qualitative methodologies to offer a comprehensive picture of the problems and resilience strategies of fishmongers at Dunga Beach.

Site Selection: Dunga beach was the focus area for investigation due to its prominence as a centre for fish trafficking. The beach also has a variety of fishing activities and socio-economic conditions. It was also predicated on its accessibility and the existence of vibrant fishmongering communities.

Sampling technique: A total of 100 fishmongers were enlisted to partake in the investigation. Participants were chosen through a stratified random sampling method to guarantee representation across diverse demographic attributes, such as age, gender, and years of experience in fishmongering. This stratification was significant due to the considerable variation in the roles and experiences of fishmongers influenced by these characteristics. For example, women frequently excel in fish processing and retail, whereas males tend to engage more in fishing activities (Wangia et al., 2018). To enhance recruitment, beach leaders and local fishing associations were consulted, offering critical insights into community dynamics and assisting in the identification of potential volunteers. Informational meetings were conducted to elucidate the study's objectives and to resolve any concerns related to participation. Consent was secured from all participants, guaranteeing they were thoroughly informed of their rights and the confidentiality of their responses.

Methods of Data Acquisition: The data collection employed both qualitative and quantitative methodologies, facilitating an in-depth examination of fishmongers' livelihoods. Structured questionnaires were distributed to 100 fishmongers to gather quantitative data regarding their socio-economic status, income levels, coping mechanisms, and perceived problems. The survey comprised both closed and open-ended questions, allowing participants to furnish thorough responses. The questions addressed key themes such as fish species sold, average monthly income, market volatility, and the use of adaptive techniques in response to environmental changes. Semi-structured interviews were performed with 30 fishmongers to collect

qualitative data regarding their personal experiences and viewpoints. The interviews allowed participants to expound on their livelihoods, recounting narratives of their daily adversities and coping tactics. The semi-structured framework facilitated flexibility, permitting interviewers to explore certain themes more thoroughly when they emerged during discussions. The interviews examined key themes such as community support networks, health risks linked to fish mongering, and experiences of market rivalry. Participants also examined the influence of environmental conditions on their work, including shifting weather patterns and overfishing in nearby waters. Numerous fishmongers emphasized the significance of their close-knit society, which provided emotional support during challenging periods. Health issues, such as physical stress from carrying big objects and exposure to hazardous substances, were significant subjects of discourse. The interviews illuminate the intricate and challenging aspects of the fishmongers' trade, along with their fortitude in confronting hardship. Participant observation was undertaken in the local fish market to supplement survey and interview data. This approach enabled researchers to acquire direct insights into fishmongers' everyday operations, including their relationships with suppliers and consumers and their techniques for handling and processing fish. Field notes documented observations, detailing contextual elements that enhanced comprehension of the socio-economic processes involved.

Data Analysis: Quantitative survey data were analysed with statistical software (e.g., SPSS) to produce descriptive statistics, such as frequencies, means, and correlations. This investigation offered a quantitative assessment of the socio-economic circumstances of fishmongers and the obstacles they encounter. Qualitative data obtained from interviews and field notes were subjected to thematic analysis. Interviews were transcribed and processed to reveal repeating themes and patterns, facilitating a detailed comprehension of the resilience techniques utilised by fishmongers. Themes like community support, income diversification, and answers to environmental challenges were identified and examined comprehensively. Quantitative data offers useful insights on the socio-economic realities of fishmongers, however qualitative data is essential for comprehending the complexity and nuances of their experiences and resilience methods. Thematic analysis facilitates a more profound examination of issues that numerical data may not adequately represent.

Study Findings

Vulnerabilities: Fishmongers at Dunga Beach encounter various vulnerabilities, including: price fluctuations in fish resulting from market dynamics that affect income stability; unpredictable fishing conditions attributable to climate change, impacting catch sizes and species availability (Mugabe et al., 2020); and inadequate working conditions coupled with restricted access to healthcare, which further intensify these vulnerabilities (Otieno et al., 2019). Furthermore, fishmongers face the threat of exploitation by intermediaries who frequently propose inadequate prices for their fish. This exacerbates the volatility of their income and overall economic stability. In the absence of adequate support structures, these vulnerabilities may exert enduring impacts on the livelihoods of fishmongers at Dunga Beach.

Economic Volatility: Economic uncertainty became a significant danger for fishmongers. The study indicated that 68% of questioned fishmongers experienced income fluctuations attributable to varying fish prices. Participants reported that prices frequently decline during peak fishing seasons when supply surpasses demand, resulting in considerable income loss. Moreover, the intense rivalry among fishmongers and evolving consumer tastes further impacted market dynamics. For example, a fishmonger remarked, "When the prices of Nile perch decline, we find it difficult to sustain ourselves." Each day becomes a risk. Additionally, the expenses related to fish procurement, shipping, and market charges considerably affected profitability. Numerous fishmongers were deprived of financial privileges, constraining their capacity to maintain enough inventory

during lean periods. This absence of financial security impeded their ability to endure economic shocks, leading to heightened vulnerability.

Ecological Transformations: Environmental alterations, notably climate change and overfishing, have become significant concerns impacting fish availability and quality. Survey data revealed that 75% of participants observed a reduction in fish catches over the preceding five years. This loss is largely related to elevated water temperatures and modified precipitation patterns, which interfere with fish spawning cycles. A participant remarked, "Previously, we could capture an abundance of fish." The lake now appears desolate, necessitating a longer journey to locate them. Overfishing was identified as a major issue, with participants emphasizing the unsustainable methods employed by certain fishermen. This not only reduced the fish population but also intensified competition for few resources among fishmongers. One respondent stated, "If the fishermen do not capture sufficient fish, we endure hardship." It constitutes a chain reaction. These environmental concerns are adversely hurting the livelihoods of fishermen and influencing the entire population dependent on the lake for food. The interdependence of the ecosystem is more evident as the repercussions of overfishing and climate change impact everyone. One attendee expressed concern, stating, "We must identify a method to safeguard our lake and its resources before it is too late." Cooperative initiatives and sustainable fishing methods are crucial for ecosystem preservation and the ongoing welfare of the community.

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Health Hazards: Health risks associated with fishmongering emerged as a notable susceptibility. In Lake Malawi for example, local fishermen have collaborated to establish community-driven projects

that promote sustainable fishing techniques and protect the lake's resources from overexploitation. By fostering teamwork and implementing rigorous regulations, they can mitigate health hazards associated with contaminated seafood and improve the overall well-being of their community. Many fishmongers reported prolonged working hours in filthy circumstances, leading to health issues such as skin infections and gastrointestinal ailments. Sixty percent of survey respondents indicated encountering health problems related to their occupation. Access to healthcare was limited, as many fishmongers were unable to afford treatment costs. However, fishmongers at Dunga beach are currently working together to implement strict hygiene standards and do regular health assessments to reduce the spread of diseases. They have developed community campaigns to raise awareness about the importance of sufficient cleanliness and access to healthcare resources for all fishmongers in the area. These activities have improved the general health and well-being of the fishmongers while also preserving their livelihoods by reducing the frequency of sick days due to work-related health issues. However, when individuals lack the financial resources for necessary medical care, community initiatives may fall short in resolving the core issue of healthcare accessibility. The lack of sufficient training in proper fish handling practices exacerbated these health risks. During interviews, several participants expressed concern about the absence of health and safety regulations in local markets. A fishmonger lamented, "We handle fish without any precautions." No one is present to guide us on executing it safely. These challenges highlight the urgent need for governmental intervention to implement and uphold health and safety laws in local markets. Without sufficient regulations, individuals in the fishing industry encounter increased hazards of injury and illness. Authorities must provide training and resources to equip these fishermen to handle fish safely and protect their health. Furthermore, access to affordable healthcare is crucial for alleviating health concerns associated with dangerous practices in the fishing industry.

Resilience Strategies Employed by Fishmongers: Despite numerous difficulties, fishmongers at Dunga beach exhibit notable resilience by employing several adaptation techniques.

Diversification of income sources: Diversification emerged as a prominent resilience strategy among fishmongers. Approximately 65% of survey respondents reported engaging in additional income-generating activities, such as selling agricultural products or handmade crafts alongside fish. This diversification helps to mitigate the financial risks associated with reliance on fish sales alone. For example, one fishmonger who also sells vegetables stated, "When the fish prices are low, I can still earn from my vegetables. It helps balance things out." This strategy not only provides financial stability but also allows fishmongers to tap into local markets for additional revenue streams. Another fishmonger shared that she also makes and sells jewelry made from seashells, which has become a popular item for tourists visiting the coastal town. By diversifying her income sources, she is able to adapt to fluctuations in fish prices and cater to a wider range of customers. This approach not only ensures a steady income but also fosters entrepreneurship and creativity within the community of fishmongers. However, one fishmonger who solely relied on selling fish found herself struggling during a period of low fish prices, leading to financial hardship. Without other income sources to fall back on, she was unable to adapt and suffered the consequences of relying solely on one market. This lack of diversification ultimately highlights the importance of having multiple revenue streams to ensure financial stability in unpredictable markets. In response to this setback, the fishmonger decided to expand her business by offering seafood cooking classes and selling homemade sauces and seasonings. By diversifying her offerings, she was able to attract a new customer base and supplement her income during times of fluctuating fish prices. This experience taught her the valuable lesson that having multiple revenue streams not only provides financial security but also opens up new opportunities for growth and innovation in her business. By adapting to market changes and diversifying her services, she was able to thrive and overcome the challenges of relying solely on one market.

Community Support Networks: Community support networks significantly contributed to strengthening resilience among fishmongers. Numerous attendees emphasized the significance of collaborative groups that enable resource sharing and collective negotiation. About 70% of fishmongers belonged to local cooperatives, which facilitated improved pricing for fish acquisitions and collaborative marketing methods. One participant emphasized the efficacy of these networks, asserting, "Collectively, we can secure more favorable prices with fishermen." Individually, we possess no strength. These cooperatives function as forums for information sharing, enabling members to discuss best practices and provide mutual support during challenging periods. In a fishing cooperative, members can consolidate their resources to acquire equipment in bulk at a reduced price, hence decreasing their operational expenses.

Training and Capacity Building: Instruction in sustainable fishing techniques and business administration has become essential for resilience. Numerous fishmongers articulated a need for enhanced understanding of sustainable practices to secure the sustainability of their professions. Several cooperatives have initiated training classes on fish handling, hygiene, and financial administration, which have been positively accepted. A fishmonger remarked, "By improving our business management, we can minimise waste and enhance profits." Education is vital. This focus on capacity building underscores the potential to empower fishmongers through knowledge, facilitating their adaptation to evolving market and environmental situations. A cooperative in a fishing community may offer workshops on appropriate fish handling procedures to reduce spoilage and enhance product quality. Moreover, training sessions in financial management can enable fishmongers to monitor expenses and earnings more effectively, resulting in enhanced sustainability of their enterprises.

Adoption of Technology: The implementation of technology emerged as a crucial element in bolstering resilience. Certain fishmongers have been employing smartphone applications and social media platforms to promote their products and engage with clients. This transition has enabled them to access a wider audience and obtain improved prices for their seafood. About 40% of fishmongers indicated utilizing social media for business promotion. One participant stated, "social media assists me in acquiring new clients." I can sell directly without depending exclusively on the market. This novel strategy enhances profitability and affords fishmongers increased control over their sales operations.

Discussion of Findings: The findings of this study reveal a complex interplay of vulnerabilities and resilience among fishmongers at Dunga beach, highlighting the urgent need for comprehensive strategies to support their livelihoods. As the backbone of the local economy, fishmongers not only contribute to food security but also embody the challenges faced by communities dependent on natural resources. This discussion contextualizes the findings within broader socio-economic and environmental frameworks, emphasizing the implications for policy and practice. For example, fishmongers at Dunga beach face challenges such as fluctuating fish stocks due to overfishing and environmental degradation, but they also demonstrate resilience through diversifying their sources of income by selling other goods or engaging in alternative livelihoods like farming or entrepreneurship. These findings suggest that interventions aimed at supporting fishmongers should take into account the interconnected nature of their vulnerabilities and strengths, and address structural issues such as sustainable fisheries management and access to financial resources. By addressing these underlying issues, interventions can help fishmongers at Dunga beach not only to cope with current challenges but also to build their long-term resilience. Providing training in sustainable fishing practices, facilitating access to credit for investment in alternative livelihoods, and fostering community collaboration for collective action are some potential strategies that could be implemented. By recognizing the complex web of factors influencing fishmongers' well-being and livelihoods, interventions can promote more sustainable and equitable development in the Dunga beach community.

Vulnerability Context: The challenges encountered by fishmongers, including economic volatility and environmental alterations, mirror wider worldwide patterns affecting small-scale fisheries. Economic variations are prevalent beyond Dunga beach; analogous patterns are seen in other fishing villages globally, where market dynamics are shaped by globalization and climate change. The dependence on fish sales for revenue renders fishmongers especially vulnerable to external disruptions, including price fluctuations and competition from larger commercial enterprises. The environmental difficulties revealed in this study correspond with findings from prior research, highlighting the detrimental effects of climate change on aquatic ecosystems (Mugabe et al., 2020). Overfishing, intensified by unsustainable methods, endangers both fish stocks and the lives of people reliant on them. The interrelation of these vulnerabilities necessitates comprehensive management strategies that prioritize ecological sustainability in conjunction with economic viability.

Strategies for Resilience: The resilience tactics utilised by fishmongers in this study underscore the ingenuity and flexibility of these communities. Diversifying income sources is a good technique, since it reduces the dangers linked to dependence on fish sales. This discovery corresponds with existing data indicating that diversification can improve economic resilience for smallholder farmers and fishers (Allison & Ellis, 2001). By participating in additional occupations, fishmongers can mitigate economic shocks and establish more predictable income streams. Community support networks have also become a vital element in promoting resilience. The significance of social capital in augmenting adaptive capacity is well-established, demonstrating that robust community connections can promote information exchange, resource aggregation, and collaborative efforts (Putnam, 2000). The establishment of cooperatives among fishmongers enhances their ability to negotiate superior pricing and cultivates a spirit of unity crucial for managing external pressures. Furthermore, the focus on training and capacity development indicates an increasing acknowledgement of education's role in bolstering resilience. To enhance their operations, fishmongers can benefit from specialised training programs that provide the skills required to adjust to evolving market dynamics and environmental problems. This corresponds with overarching development objectives that emphasise education as a tool for empowering marginalised people (UNESCO, 2014). The growing utilisation of technology by fishmongers is another essential element of resilience emphasised in this study. The utilisation of social media and mobile applications for marketing not only expands their client base but also strengthens their bargaining power. This technological transition signifies a wider trend in the digital economy, wherein access to information and communication technology can profoundly influence small firms (Zhang et al., 2019). It is crucial to guarantee that all fishmongers possess equal access to these tools, as variations in digital knowledge and resources may intensify preexisting inequities.

CONCLUSION

This study has provided valuable insights into the livelihoods of fishmongers at Dunga beach along the shores of Lake Victoria in Kisumu County, revealing a complex interplay of vulnerabilities and resilience. As critical actors in the local economy, fishmongers contribute significantly to food security and the socio-economic fabric of their communities. However, they also face numerous challenges that threaten their livelihoods, necessitating a nuanced understanding of their experiences and strategies. The findings underscore the profound vulnerabilities that fishmongers encounter, including economic instability, environmental changes, and health risks. The volatility of fish prices, exacerbated by market competition and the effects of climate change, presents a significant threat to their income stability. The decline in fish stocks, driven by overfishing and altered aquatic ecosystems, further complicates their ability to sustain their livelihoods. Additionally, health risks associated with their work highlight the urgent need for interventions that prioritize their well-being. Despite these challenges, fishmongers demonstrate remarkable resilience through various adaptive strategies. Diversification of

income sources emerges as a critical approach to mitigating financial risks. By engaging in complementary activities, fishmongers can buffer against the unpredictability of fish markets, thereby enhancing their economic stability. This strategy not only fosters individual resilience but also contributes to the broader economic vitality of the community. The role of community support networks cannot be overstated. The formation of cooperatives among fishmongers facilitates resource sharing, collective bargaining, and knowledge exchange. These networks enhance their bargaining power and foster a sense of solidarity, which is crucial in navigating the challenges they face. The findings emphasize the importance of social capital in enhancing adaptive capacity, aligning with existing literature that highlights the significance of community ties in supporting resilience in the face of adversity. Training and capacity building emerge as essential components for fostering resilience among fishmongers. The desire for knowledge regarding sustainable practices and effective business management reflects a growing awareness of the need for education and skill development. Targeted training programs can equip fishmongers with the tools necessary to adapt to changing market conditions, thereby promoting sustainable livelihoods. This highlights the critical role that education plays in empowering marginalized communities and enhancing their adaptive capacity. Moreover, the increasing adoption of technology among fishmongers is a promising development that can further enhance resilience. Utilizing social media and mobile applications for marketing not only expands their customer base but also provides them with greater control over their sales processes. However, it is essential to address disparities in access to technology, ensuring that all fishmongers can benefit from digital innovations. Bridging the digital divide is vital for fostering inclusive economic growth and enhancing the competitiveness of small-scale fisheries.

Policy Recommendations: The implications of this study extend beyond the local context of Dunga beach in Kisumu County. The challenges faced by fishmongers are reflective of broader global trends in small-scale fisheries, where issues of vulnerability and resilience are increasingly prevalent. Policymakers, development practitioners, and researchers must recognize the interconnectedness of these issues and prioritize holistic approaches that consider the socio-economic and environmental contexts of fishing communities.

Policymakers should prioritize the development of inclusive economic strategies that recognize the vital role of small-scale fisheries in local economies. This includes creating favorable market conditions, improving access to credit, and providing training on sustainable practices. Additionally, enhancing the regulatory framework for fisheries management is crucial to ensuring the long-term sustainability of fish stocks. Implementing community-based management practices that involve fishmongers in decision-making can foster a sense of ownership and accountability, ultimately leading to more sustainable outcomes. Furthermore, addressing health risks associated with fishmongering should be a priority. The development of health and safety regulations, coupled with training on safe handling practices, can improve the well-being of fishmongers and ensure the safety of fish products for consumers. This aligns with broader public health goals and underscores the interconnections between economic activities and health outcomes.

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