Journal of Business and Entrepreneurship

[ISSN 2958-1125]
Volume: 05 Issue: 01 | November-2026

JBE

Effective Communication and Sustainability of Women's Small-Scale Fisheries: Implications for Livelihoods and Community Development in Homa Bay, Kenya

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Cite this article in APA
Okanga, P.A. (2026). Effective communication and sustainability of women's small-scale fisheries: implications for livelihoods and community development in Homa Bay, Kenya. *Journal of business and entrepreneurship, 5* (1), 251-267. https://doi.org/10.51317/wrehv191

OPEN ACCESS
A publication of Editon Consortium Publishing (online)

Article history
Received: 2026-09-10
Accepted: 2026-10-15
Published: 2026-11-20

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Abstract
The purpose of this study was to analyse the influence of effective communication on the sustainability of women's small-scale fisheries in Homa Bay County, Kenya. The sustainability of women-led small-scale fisheries enterprises is often constrained by inadequate communication and information-sharing mechanisms, which limit women's ability to access timely market information, share enterprise-related challenges, participate in collective decision-making, and identify solutions to emerging operational constraints. These communication barriers stand to undermine enterprise resilience, compromise the quality and nutritional value of fish products, and ultimately threaten the livelihood security of fishers' households. The study is anchored on the Magic Bullet Theory (Hypodermic Needle Model). Applying the mixed-methods approach, the study analysed quantitative and qualitative data collected from a sample of 330 small-scale women fishers with a ninety-six per cent response rate. The results from both data sources were triangulated and became the basis of the study findings and conclusions. Fisher's effective communication had a moderate and significant relationship with the sustainability of small-scale fisheries. The findings revealed that r=0.342, R^2= 0.117, F (1,341) =45.597, at P=0.000<0.05, confirming that fishers' effective communication had a statistically significant contribution to the sustainability of small-scale fisheries. The coefficient of determination, R^2= 0.117, indicates that fishers' effective communication activities explain 11.7 per cent of the variation in the sustainability of fisheries by women. The paper contributes to the literature on the role of effective communication in the sustainability of small-scale enterprises, poverty reduction among small-scale fishers, and nutritional value among families of women fishers. Furthermore, it adds to the importance of fishers engaging in a dialogue with the market and community.

Keywords: Effective communication, small-scale enterprises, sustainability, women fishers.

INTRODUCTION

Small-scale fisheries play a significant role in sustaining rural livelihoods, promoting food and nutritional security, and supporting economic activities among fishing communities. Women constitute a substantial proportion of the actors involved in these fisheries, particularly in fish processing, trading, distribution and marketing. Globally, approximately 44.7 million women participate in small-scale fisheries value chains and subsistence activities, representing 39.6 per cent of the total population engaged in the subsector. Women account for approximately 49.8 per cent of employment in post-harvest activities, compared with 18.7 per cent in harvesting and 15.4 per cent in pre-harvest activities (FAO, Duke University, & WorldFish, 2023). Despite this significant contribution, women's participation in small-scale fisheries enterprises remains constrained by unequal access to fish resources, productive assets, market information, financial services and fisheries governance structures. These inequalities expose women-owned fish enterprises to operational disruptions, unstable fish supplies, reduced profitability and limited opportunities for business expansion and reinvestment. Consequently, enterprise sustainability among women small-scale fish entrepreneurs requires effective linkages and communication between fishers, traders, processors, market intermediaries and fisheries management institutions.

In Homa Bay County, Kenya, women's small-scale fish enterprises operating along the Lake Victoria fisheries value chain experience persistent sustainability challenges, particularly in securing reliable supplies of fresh fish, maintaining product quality, accessing competitive markets and generating sufficient income to sustain their businesses. Women's participation is predominantly concentrated in post-harvest activities, including purchasing, processing, drying and trading. Men largely dominate harvesting activities and control important productive resources. This gendered division of labour makes women fish entrepreneurs dependent on communication and business relationships with male fishers, boat owners and other intermediaries for access to fish supplies. Abwao and Fonda (2019), in their assessment of women's participation in the fisheries and aquaculture value chain in Homa Bay County, observed that women were predominantly involved in processing and marketing, with limited participation in production and decision-making. The study further identified financial constraints, limited access to productive resources, inadequate capacity development and weak institutional support as important barriers to women's economic empowerment in the sector. These structural limitations restrict women's bargaining capacity and undermine their ability to establish stable and independently managed fish enterprises.

The sustainability problem is further reflected in difficulties associated with fish procurement, post-harvest handling and preservation. A Kenya Marine and Fisheries Research Institute (KMFRI, 2021) assessment of post-harvest losses in the Kenyan waters of Lake Victoria, which included Litare Beach in Homa Bay County, established that 97 per cent of the fish traders and processors surveyed across the five study sites experienced post-harvest losses, with 62 per cent of those affected reporting frequent losses. The reported causes included surface runoff during heavy rainfall (41%), fish spoilage (29%), lack of buyers (12%), inadequate preservation equipment (8%), delays in fish landing (8%) and high temperatures (2%). Although these findings were not disaggregated specifically for women in Homa Bay, they demonstrate the magnitude of post-harvest and market-related challenges confronting small-scale fish enterprises within the wider Lake Victoria fisheries system.

The study also established that only 35 per cent of respondents were satisfied with their fish handling, processing and preservation techniques. Furthermore, although 64 per cent reported awareness of appropriate fish handling and preservation techniques, knowledge was not consistently translated into practice, partly reflecting limited training and inadequate technical support (KMFRI, 2021). These findings demonstrate that enterprise sustainability is compromised not only by the availability of fish but also by weaknesses in procurement coordination, handling practices, preservation and market access.

More recent empirical evidence reinforces the specific vulnerabilities experienced by women fish entrepreneurs in the Lake Victoria region. Ouko et al. (2026), in a study involving 477 fishing households in Homa Bay and Migori counties, established that women's participation was largely concentrated in

post-harvest activities, including fish purchasing, frying, salting, sun-drying and retailing. In Homa Bay County, women reported spending longer periods away from home undertaking fish marketing activities and had comparatively limited ownership of fish storage equipment. These constraints increase the difficulties associated with preserving fish, coordinating market activities and maintaining consistent product quality. The study further identified limited access to productive assets, constrained decision-making power and unequal access to livelihood opportunities as structural factors affecting women's adaptive capacity. Such conditions are particularly important for women operating small-scale fish enterprises because their business continuity depends on their ability to secure fish supplies, preserve products, respond to market changes and retain sufficient earnings for reinvestment.

Communication deficits can intensify these existing sustainability challenges by weakening the coordination of activities across the small-scale fisheries value chain. Effective communication enables women fish entrepreneurs to obtain timely information concerning fish availability, species, catch quantities, landing schedules, procurement prices, quality and market destinations. However, inadequate communication between women traders and fishers at different landing beaches can result in uncertainty regarding the availability and timing of fish supplies. Such uncertainty may compel women to spend additional time and resources searching for fish, expose them to irregular procurement arrangements and reduce their ability to negotiate favourable prices. Similarly, inadequate communication between traders, processors and potential buyers may limit access to market information, delay sales and increase the risk of fish deterioration, particularly where appropriate storage and preservation facilities are unavailable.

Limited information-sharing networks can also restrict women's access to training, improved processing technologies, business opportunities and institutional support. Therefore, communication deficits should be understood not simply as weaknesses in interpersonal interaction but as institutional and market-linkage constraints that influence resource access, operational efficiency, product quality and the economic viability of women-owned enterprises. This relationship is consistent with the KMFRI (2021) recommendation that stronger stakeholder networks are necessary to improve information exchange, training, market identification and technical support across the dagaa value chain.

Empirical evidence from Homa Bay County further demonstrates the importance of networking and communication linkages in strengthening enterprise resilience. Okanga and Odek (2024), in a mixed-methods study involving 342 small-scale women fishers in Homa Bay County, established a statistically significant positive relationship between fishers' networking and enterprise resilience ($r = 0.591$, $R^2 = 0.349$, $F(1,341) = 184.93$, $p < 0.05$). The findings indicated that networking activities explained 34.9 per cent of the observed variation in the resilience of women's small-scale fisheries. The study emphasised the importance of dialogue and linkages among women fishers, markets, policy actors and local communities. Similarly, Okanga (2025), in a study involving 330 women small-scale fishers in Homa Bay County, established that collective action had a statistically significant influence on enterprise reinvestment, explaining 17.1 per cent of the variation in reinvestment decisions. These findings demonstrate the potential contribution of information exchange, participatory dialogue and collective engagement to enterprise resilience and continuity. Nevertheless, networking and collective action are broader constructs, and their findings do not independently establish the specific contribution of communication effectiveness to enterprise sustainability. Despite the growing recognition of networking and collective action in strengthening small-scale fisheries, the specific contribution of effective communication to the sustainability of women-owned fish enterprises in Homa Bay County requires further empirical examination.

In particular, the extent to which timely, accurate, reliable and continuous communication facilitates fish procurement, improves access to market information, strengthens business coordination and enhances enterprise continuity remains insufficiently established. This knowledge gap is important because women fish entrepreneurs operate within a value chain characterised by gender-based differences in access to fish resources, productive assets, market

opportunities and decision-making structures. Understanding how communication linkages influence these dimensions is therefore essential for identifying practical mechanisms for strengthening women's participation and economic benefits within the small-scale fisheries sector.

Against this background, this article examines the contribution of effective communication to the sustainability of women-owned small-scale fish enterprises in Homa Bay County, Lake Victoria, Kenya. Specifically, it focuses on how communication and information-sharing linkages among women fish entrepreneurs, fishers, landing beaches, market intermediaries and relevant fisheries institutions influence the reliability of fish procurement, business coordination, product quality, market access and enterprise continuity. The study recognises effective communication as an important business and institutional resource for strengthening enterprise resilience, improving women's economic participation and promoting sustainable small-scale fisheries value chains.

Theoretical Framework

This study is informed by the Hypodermic Needle Model, commonly referred to as the Magic Bullet Theory, an early perspective on communication that emerged from the development of mass communication research during the 1920s and 1930s. The model is associated with early assumptions that communication messages can exert direct, powerful and relatively immediate effects on audiences by influencing their knowledge, perceptions, attitudes and subsequent behaviour. The model is associated with Harold D. Lasswell. His contribution to early communication and propaganda scholarship is particularly evident in his seminal publication, *Propaganda Technique in the World War* (1927. His analysis helped establish the significance of communication as an instrument of influencing public opinion and behaviour. However, Lasswell did not formally coin the terms Magic Bullet Theory or Hypodermic Needle Theory. These expressions were subsequently used in communication scholarship to describe the early strong-effects perspective. Therefore, the model is more accurately understood as an early conceptualisation of media influence associated with the propaganda research tradition, rather than a formally articulated theory originating exclusively from Lasswell (Lasswell, 1927; Bineham, 1988; Sproule, 1989).

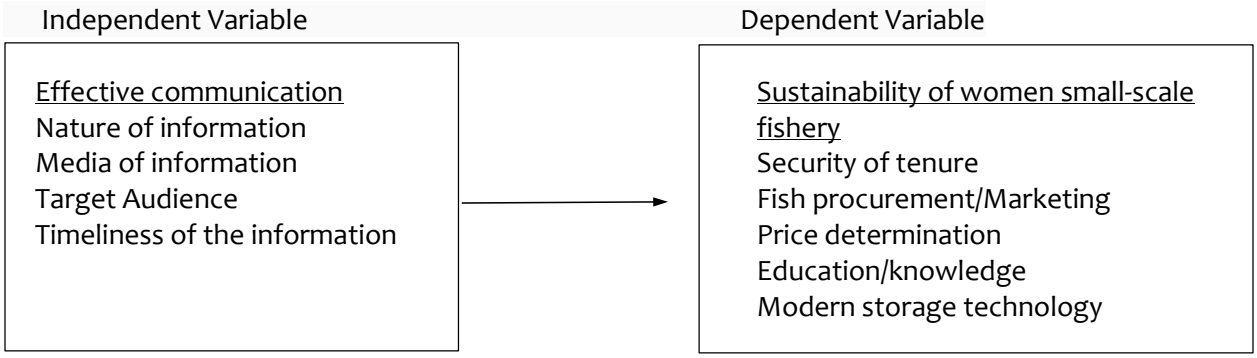
The central assumption of the Hypodermic Needle Model is that a message transmitted by a communicator can directly influence its intended audience, which is generally conceptualised as relatively passive and susceptible to external persuasive influences. The analogy of a hypodermic needle suggests that communication messages are injected into the audience, while the magic bullet analogy implies that a message can penetrate audience perceptions and generate a particular response. Within this perspective, communication effectiveness is associated with the communicator's ability to formulate and transmit an understandable, persuasive and relevant message capable of influencing the recipient's knowledge, attitudes and behaviour. The model consequently emphasises the relationship between the source of communication, the message transmitted, the channel used, the audience reached and the resulting effects. Subsequent empirical developments, however, challenged the assumption that audiences always receive and respond to communication messages in a uniform, passive and immediate manner. Lazarsfeld, Berelson and Gaudet (1944), through their study *The People's Choice*, demonstrated the importance of interpersonal relationships and social influences in shaping the way individuals receive and interpret information.

In the context of this study, the Hypodermic Needle Model provides a basis for examining how the effectiveness of communication messages can influence the sustainability of women's small-scale fish enterprises in Homa Bay County, Kenya. Women fish entrepreneurs depend on access to accurate, timely and relevant information concerning fish availability, catch quantities, species, landing schedules, procurement prices, product quality and market opportunities. Communication of such information among fishers, women traders, processors, market intermediaries and fisheries management institutions can influence business awareness, procurement decisions, market responses and enterprise management practices. For instance, timely communication concerning fish availability and landing

schedules may enable women traders to plan procurement, minimise unnecessary search costs and secure more reliable supplies. Similarly, information concerning fish handling, processing, preservation and market prices may strengthen their capacity to maintain product quality, reduce post-harvest losses and make informed marketing decisions. The model is particularly relevant in explaining the influence of communication content, channels and message reception on the working decisions of women fish entrepreneurs.

Effective communication can enhance the transmission of business-critical information, while inadequate, delayed or unreliable communication may create information asymmetries, procurement uncertainties, weak market coordination and missed business opportunities. These conditions may ultimately undermine enterprise profitability, operational continuity and the capacity to reinvest in business activities. However, the application of the model in this study recognises that communication among women fish entrepreneurs is not exclusively a one-way process. The effectiveness of information exchange also depends on the credibility of information sources, trust among value-chain actors, opportunities for feedback, access to communication channels and the capacity of women to act upon the information received. Gender-related inequalities in access to fish resources, markets and decision-making may further determine whether communicated information translates into meaningful economic benefits. Accordingly, the model is used as a conceptual lens for understanding the potential influence of communication on knowledge, perceptions and business decisions, rather than assuming that every communication message automatically produces a uniform behavioural response. It provides a theoretical foundation for investigating how effective communication contributes to reliable fish procurement, improved market coordination, product quality, operational performance and the overall sustainability of women-owned small-scale fish enterprises in Homa Bay County.

Conceptual Framework



METHODOLOGY

This study adopted a cross-sectional mixed-methods research design, integrating quantitative and qualitative approaches to examine the contribution of effective communication to the sustainability of women-owned small-scale fish enterprises in Homa Bay County, Kenya. The cross-sectional design was considered appropriate because it enabled the collection of data from the study respondents at a single point in time, providing a snapshot of existing communication practices, information-sharing linkages and enterprise sustainability conditions. It also facilitated the examination of relationships between effective communication and enterprise sustainability without manipulating the study variables or introducing experimental interventions.

Target Population

The target population for this study comprised women fish entrepreneurs registered with Beach Management Units (BMUs) operating along the Kenyan shores of Lake Victoria in Homa Bay County. Registered women fish entrepreneurs were considered an appropriate study population because

they are directly involved in small-scale fisheries value-chain activities. Their engagement in these activities makes them particularly relevant to examining how communication and information-sharing linkages influence enterprise sustainability. Furthermore, their registration with BMUs provides an identifiable population and an accessible sampling frame through which respondents could be traced and selected systematically. Furthermore, this selection was also informed by the institutional role of BMUs in facilitating fisheries management, stakeholder coordination, information dissemination and the organisation of fishing-related economic activities. Women registered within these structures are positioned to provide relevant empirical information regarding their experiences in accessing fish supplies, communicating with fishers and market actors, obtaining market information and responding to operational challenges affecting their enterprises.

According to the BMU registration records used for this study, Homa Bay County had 137 registered BMUs, with a total of 2,385 registered women fish entrepreneurs. The target population of 2,385 registered women fish entrepreneurs was therefore considered suitable because it comprised individuals with direct operational experience in small-scale fisheries enterprises and relevant exposure to the communication networks and institutional relationships that influence business sustainability. (Table. 1)

Table 1: Target Population Frame for Women Entrepreneurs and Beach Management Units

Sub-county	No. of women entrepreneurs	Beach Management Units
Suba-South	412	31
Suba-North	780	42
Homa-Bay Town	692	34
Rachuonyo	501	30
Total	2385	137

Source: Homa Bay County Beach Management Unit Registration Roll (2021)

Sampling Technique and Sample Size

The study employed a combination of multistage, stratified and simple random sampling techniques to select respondents from the target population of 2,385 registered women fish entrepreneurs operating within 137 Beach Management Units (BMUs) in Homa Bay County. The combination of these techniques was considered appropriate because the target population was geographically dispersed across different sub-counties and BMUs, necessitating a systematic approach to ensure adequate geographical representation and fair selection of individual respondents.

Multistage sampling was employed to facilitate the systematic identification of respondents at different geographical and institutional levels. The sampling process was organised around the four sub-counties bordering Lake Victoria included in the study: Suba South, Suba North, Homa Bay Town and Rachuonyo North. The BMUs operating within these sub-counties constituted the intermediate sampling units, while registered women fish entrepreneurs constituted the final units of analysis. This approach enabled the researcher to move progressively from the broader geographical study area to the BMU structures and, ultimately, to individual women fish entrepreneurs.

Stratified sampling was applied to ensure that the different geographical segments of the target population were adequately represented. The population was divided into four strata based on the respective sub-counties. These comprised Suba South (412), Suba North (780), Homa Bay Town (692) and

Rachuonyo North (501). This technique was appropriate because the number of registered women fish entrepreneurs varied considerably across the four sub-counties. Stratification therefore provided a basis for capturing the geographical distribution of the population and reducing the possibility of disproportionate representation of respondents from any particular sub-county. Where proportionate allocation was applied, the sample drawn from each stratum reflected its corresponding share of the total target population.

Simple random sampling was used to select individual women fish entrepreneurs from the respective sampling frames within the selected BMUs and sub-county strata. The BMU registration records provided the sampling lists from which eligible respondents were identified. Each registered woman fish entrepreneur within the relevant sampling frame was accorded an equal opportunity of selection. This procedure minimised personal selection bias and enhanced the objectivity of respondent selection. The three techniques were therefore complementary and sequentially applied. Multistage sampling facilitated the geographical and institutional identification.

Multi-stage Sampling

Given that BMUs are the unit of observation, in the first stage, the 137 BMUs were sampled using the small population sampling formula/technique recommended by Nassiuma (2000),

Sample size was:

$S=\frac{138\ (0.21)^2}{(0.21)^2 + (138-1)\ 0.02^2} = 61.53488 \approx 62$ Beach Management Units

The sample size of Beach Management Units, along with the Sub-Counties in Homa Bay County, was 62 BMUs. (See Table 2).

Table 2: Sample Frame for BMUs

Sub-County	BMUs	Sample Size
Suba-South	31	14
Suba-North	42	19
Homa-Bay Town	34	15
Rachuonyo	30	13
Total	137	62

Source: Homa Bay County Beach Management Unit Registration Roll (2021)

In the second stage, given that women fish entrepreneurs are the unit of analysis, out of the 62 BMUs sampled, the researcher arrived at a total of 2385 women fish entrepreneurs (BMU Register Roll, 2020). Since 2385 women fish entrepreneurs are a large population size, of>1000, the researcher adopted Yamane's (1967) formula to obtain the sample as shown below.

$$N=\frac{N}{N\ (e)2}$$

Where n is the sample size, N is the population, and e is the tolerance at a desired level of confidence, at a 95 per cent confidence level.

$$\frac{2,385}{2,385\ (0.05)2}N=342.5493 = 343$$

Based on the total number of 2,385 women fish entrepreneurs in Homa Bay County, the researcher arrived at a sample size of 343 women fish entrepreneurs (see Table 3.3). The researcher selected 15 BMUs per sub-county except for Suba-North, where 17 BMUs were selected based on the fact that it had comparatively more BMUs and landing sites than other sub-counties (see Table 3).

Table 3: Sample Frame for Women Fish Entrepreneurs in the BMUs

Sub-County	BMUs	The population of Women Fish Entrepreneurs	Sample Size
Suba South	15	412	59
Suba North	17	780	112
Homa Bay Town	15	692	99
Rachuonyo	15	501	72
Total	62	2,385	342

Source: Homa Bay County Beach Management Unit Registration Roll (2021)

Simple Random Sampling (Probability)

Simple random sampling was employed as the probability sampling technique to select individual women fish entrepreneurs from the four geographical strata: Suba South, Suba North, Homa Bay Town and Rachuonyo North. The specific population units randomly selected were individual women fish entrepreneurs registered with the Beach Management Units (BMUs), rather than the BMUs themselves. To establish the sampling frame, the registration records of women fish entrepreneurs from the BMUs operating within the four sub-counties were obtained. The records were organised into four separate sampling lists corresponding to the respective sub-counties. Each list contained the names of registered women fish entrepreneurs and their respective BMU affiliations. The records were checked to establish eligibility and minimise duplication, after which each eligible individual was assigned a unique identification number. This process generated four sampling frames reflecting the distribution of the target population: Suba South (412), Suba North (780), Homa Bay Town (692) and Rachuonyo North (501).

Following the preparation of the sampling frames, simple random sampling was applied independently within each stratum to select the required number of respondents. Each eligible individual was assigned an identification number, and random selection was undertaken using a random-number selection procedure to identify the respondents. The process ensured that selection was not influenced by the researcher's personal preferences or the location of individual women entrepreneurs. By conducting random selection separately within each stratum, the study maintained the representation of the four geographical segments of the target population while minimising selection bias.

The application of simple random sampling therefore provided an objective and transparent mechanism for selecting individual respondents from the established sampling frames. It enhanced the fairness of respondent selection and strengthened the representativeness of the sample in relation to the registered women fish entrepreneurs in the four sub-counties.

Data Collection Instrument

Given that the study adopted a mixed-methods research design, three complementary data collection instruments were employed: a structured questionnaire, a focus group discussion (FGD) guide and a key informant interview schedule. The instruments were designed to generate both quantitative and qualitative evidence on the contribution of effective communication to the sustainability of women-owned small-scale fish enterprises in Homa Bay County. Their selection was informed by the need to examine measurable communication practices and enterprise sustainability indicators while also capturing the experiences, perceptions and institutional circumstances influencing communication within the small-scale fisheries value chain.

Structured Questionnaire

A structured questionnaire was administered to the sampled women fish entrepreneurs registered with the Beach Management Units (BMUs) in the four study sub-counties. The questionnaire primarily generated quantitative data on respondents' demographic and enterprise characteristics, communication practices and indicators of enterprise sustainability. Specifically, it collected information on the nature of information, media of information, target audience frequency, and timeliness of communication used by women fish entrepreneurs when interacting with fishers, fellow traders, processors, buyers and fisheries management institutions. It also examined the extent to which respondents accessed and shared information concerning fish availability, catch quantities, landing schedules, procurement prices, product quality and market opportunities. Regarding enterprise sustainability, the questionnaire elicited information on the reliability of fish supplies, procurement arrangements, post-harvest handling and preservation, market access, business performance, income continuity and capacity for enterprise reinvestment. These indicators enabled the researcher to establish patterns and examine the statistical relationship between effective communication and the sustainability of women's small-scale fish enterprises.

Focus Group Discussion Guide

A focus group discussion guide was used to facilitate guided discussions among selected women fish entrepreneurs. The discussions generated qualitative information concerning their shared experiences, perceptions and challenges relating to communication and information exchange within the small-scale fisheries value chain. Specific areas explored included the nature and communication channels commonly used among women fish entrepreneurs, the media and target information from different landing beaches, and the timeliness of communication with fishers and market intermediaries, and challenges associated with accessing timely information on fish supplies and market prices. The discussions also examined how communication barriers influence fish procurement, product quality, market coordination, business relationships and continuity of enterprise operations. Participants were further encouraged to discuss the role of interpersonal networks, collective action and institutional linkages in improving information sharing and addressing communication-related challenges. This instrument provided an opportunity to explore issues that could not be adequately captured through structured questionnaire responses and facilitated a deeper understanding of the social and gender-related circumstances shaping women's communication experiences.

Key Informant Interview Schedule

A semi-structured interview schedule was used to collect qualitative information from selected key informants with relevant knowledge and experience in small-scale fisheries management and the women fish enterprise value chain. These included relevant BMU officials and fisheries management personnel, as well as other institutional or market actors involved in supporting fisheries-related activities. The interviews sought information on existing communication and information dissemination structures, institutional mechanisms for sharing fisheries information, stakeholder coordination and women's participation in fisheries management and decision-making. Particular attention was given to institutional support for disseminating information concerning fish availability, market opportunities, fish handling and preservation, training and business development. The interviews further explored institutional perspectives on communication barriers, gender-related constraints, market coordination challenges and possible interventions for strengthening information-sharing linkages among women fish entrepreneurs and other value-chain actors. This instrument provided an institutional perspective that complemented the experiences reported by women entrepreneurs during questionnaire administration and focus group discussions.

Questionnaire Response Rate

This is the percentage of duly filled surveys by the eligible respondents in the research process (Kothari, 2018). This is a mechanism for determining the success of data sourcing and establishing a preliminary idea about the quality and sufficiency of collected data. The study administered 342 questionnaires in four sub-counties: Suba-South, Suba-North, Homa-Bay Town, and Rachuonyo. Of these, 330 were properly filled out and returned. This represented a 96 per cent

successful return rate. This outcome compares well with other previous empirical works which were undertaken utilising analogous methodology; for example, Bernt (2014) recommends an 89 per cent return rate, and Minyiri and Muchelule (2018), 83 per cent. Zikmund (2013) argues that a response rate of 60 per cent is exceptional while 70 per cent is enormously good. Indeed, Chen (1996) further argued that the larger the return rate, the smaller the non-response error.

The summary of the questionnaire response rate is presented in Table 4.

Table 4: Questionnaire Return Rate

Sub-County	Sample size	Return	Return rate (%)
Suba-South	59	57	96.6
Suba-North	112	109	97.3
Homa-Bay Town	99	96	96.9
Rachuonyo	72	68	94.4
Total	342	330	96

Source: Research Data (2023)

Demographic Information of the Respondents

The benchmarks used to define the participants for the quantitative component of the study were based on the women's commitment to small-scale fisheries. All fisherwomen qualified to take part in the study. This section presents demographic information on the respondents, fisherwomen, in the four sub-counties of Homa Bay County. It presents the personal information of the respondents who participated in the research study. These features could logically be tied to the social capital or sustainability construct, dimensions, and training as a moderating factor within the broader study and understanding of this research.

Age Distribution

The study sought to establish the age of the respondents; the results in Table 4.2 show that those whose age falls at 30 years and below accounted for 10.2 per cent, while most of the respondents (40%) were aged between 40 and 49 years. 27.7 per cent were aged between 31 and 39 years, while 22.1 per cent were aged 50 years and above; this means that the greatest number of middle-aged (40 to 49 years) women engaged in small-scale Fisheries in Homa Bay County. The age distribution seems to cut across, bringing together the young, middle-aged, and elderly women in the business. This could be partly on account of networking and collective action that benefits the business membership in matters relevant to marketing or price setting, among others.

In the work by Sappleton, N. (2009), it was established that women who operate enterprises in traditional sectors such as fisheries demonstrate a high level of community engagement (networking), solidarity, and trust, which has the potential to strengthen and bring longevity to their enterprises. The collective action narrative is a weapon with the strength to cover the weak and the strong, young and old, in sustaining a struggle. In this dimension, the study will further the role of networking, collective action, and trust in the sustainability of small-scale fish enterprises by women. (Table 5)

Table 5: Age Distribution

Category	Frequency	Percentage
Below 30 years	35	10.2%
31 – 39 years	95	27.7%
40 – 49 years	137	40.0%
50 years & above	75	22.1%
Total	342	100.0%

Source: Research Data (2023)

Period of Engagement in Fishing Enterprise.

The respondents were asked to indicate the period they have been engaged in the fishing enterprise. This looks into the years they have been working as fish entrepreneurs. Table 6 illustrates the period of engagement. (Table 6)

Table 6: Period Engaged in Fishing Enterprise

Period took in the fish enterprise	Frequency	Percent
Less than 2 years	18	5.3
2-4 years	50	14.6
5-7 years	55	16
8-10 years	78	22.8
Over 10 years	141	41.2
Total	342	100.0

Source: Research Data (2023)

The results in Table 6 show that the majority (41.2%) of fishers indicated over 10 years of engagement with the enterprise, 22.8 per cent indicated 8-10 years, 16 per cent indicated 5-7 years, 14.6 per cent indicated 2-4 years, while a few 5.3 per cent indicated less than 2 years of engagement. Probably, benefits arising from diverse information sources and sharing, and collective action and informal training in the small-scale fish business could be partly the reason making women stay in the business for longer periods. In the words of Vosta (2014), the lengthy period of engagement is normally built on account of trust and bonding social capital. one would stay in an enterprise for a longer period not only due to profit benefits but also intangible resources such as relevant information and strong bonding over time. This study borrows these narratives to investigate how sustainability could be realized.

Number Of Schooling Years

The respondents were asked to indicate the number of years they have spent in school or other training institutions. Table 7 indicates the frequency of the responses.

Table 7: Number Of Schooling Years

Schooling/Training Years	Frequency	Percent
Between 1-8 years	110	32.1
Between 9-12 years	170	49.7
13 years and above	62	18.1
Total	342	100.0

Source: Primary Data (2023)

According to the results in Table 7, 32.1 per cent of the respondents indicated that they had attended basic school/training and stayed between 1 and 8 years in school. 49.7 per cent indicated that they had attended between 9 and 12 years in high school or other forms of training institutions, while 18.1 per cent indicated that they had attended more training after formal school. This could partly imply that the fisheries business could be one of the readily available opportunities, and its occupation is due to relevant information dissemination and networking among ongoing women fishers, as well as literate women looking for opportunities for income generation. In their analysis, Hassan and Almubarek (2016) explained the role of information and networking spill-overs in the success of business among educated and semi-illiterate people. This study will further investigate whether the sustainability of small-scale fishers could be driven by business information sharing and networking activities.

Sources of Business Information

The respondents were asked to indicate the source of business information they rely on for decision-making. Their responses have been captured as given in Table 8.

Table 8: Sources of Business Information

Schooling/Training Years	Frequency	Percent
Between 1-8 years	110	32.1
Between 9-12 years	170	49.7
13 years and above	62	18.1
Total	342	100.0

Source: Research Data (2023)

FINDINGS AND DISCUSSION

The results indicate that 35 per cent of the respondents indicated that Chama meetings are their main source of business ideas, 32.1 per cent look up to business associates, and 29.2 per cent depend on fisheries officers for developing issues in the industry. At the same time, 1.8 per cent rely on social media, radio, and TV. Information dissemination is instrumental as a driver of sustainability. The group that banks on reliable information sources can perform better. (Table 8)

The objective of the study was to examine the contribution of effective communication to the sustainability of small-scale fisheries of women in Homa Bay County. The literature and empirical evidence suggested that fishers' communication would be associated with the sustainability of women's fisheries. The sustainability of small-scale fisheries of women was the dependent variable in the study and had five measures, namely: profitability reinvestment; fish waste recycling; security of tenure; knowledge of fisheries activities; and relevant

technology in fisheries. A composite index for sustainability in small-scale fisheries was computed.

Effective communication was the independent variable in the study. Being a latent variable, it was measured using seven items, namely: increase in sales, setting fish prices, selling different fish species, getting adequate sales, selling fish waste, acquiring loans, and fish market expansion. From these items, data were collected. Each item consisted of a statement that was measured on a five-point Likert-type scale. To assess the overall contribution of effective communication to enterprise sustainability, the study computed a composite effective communication index from the responses obtained through the structured questionnaire. The index was constructed by aggregating respondents' scores on the measured communication indicators, including the frequency, timeliness, accessibility and reliability of information sharing, as well as the communication channels used by women fish entrepreneurs. The computation followed a systematic procedure.

Hypothesis

Null Hypothesis *(H_0)*: Effective communication does not have a statistically significant influence on the sustainability of women-owned small-scale fish enterprises in Homa Bay County, Kenya.

Alternative Hypothesis ***(H_1)***: Effective communication has a statistically significant influence on the sustainability of women-owned small-scale fish enterprises in Homa Bay County, Kenya.

Statistical decision rule: The null hypothesis was rejected when the p-value was less than the 0.05 significance level ($p < 0.05$). Where the p-value was greater than or equal to 0.05 ($p \geq 0.05$), the null hypothesis was not rejected.

The hypothesis was tested using the following simple linear regression model:

$SUS=\beta o+\beta 1FEC+\varepsilon 1$

Where: SUS = sustainability of small-scale fisheries, representing the dependent variable.

β_o= Regression constant, β_1=Regression Coefficient,

FEC = Composite Index of Fisher's Effective Communication, representing the independent variable

ε_1 = Error term

The results are presented in Table 9

Table 9: Regression Results of Contribution of Fisher's Effective Communication on the Sustainability of Small-Scale Fisheries

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.342	.117	.114	.36131
a. Predictors: (Constant), Fishers effective communication				

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	p-value
	Regression	5.953	1	5.953	45.597	.000
	Residual	45.039	341	.131		
	Total	50.992	342			

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	p-value
		β	Std. Error	β		
	(Constant)	2.918	.150		19.396	.000
	EFC	.229	.034	.342	6.753	.000

Dependent Variable: Sustainability of Small-scale fisheries

Predictors: (Constant), (EFC) Fishers Effective Communication Source: Research Data (2023)

The effect of fishers' effective communication on the sustainability of small-scale fisheries by women is shown in Table 4.37. The analysis established a weak positive association between fishers' effective communication and the sustainability of small-scale fisheries by women (R =.342). The coefficient of determination (R =0.117) indicates that the fishers' effective communication construct explains 11.7 per cent of the variation in the sustainability of small-scale fisheries. The β coefficient of fishers' effective communication is 0.342, which was statistically significant, where β= 0.342, t =6.753, p=0.000<0.05. β value implies that a one-unit change in the sustainability of small-scale fisheries is associated with a 34.2 per cent change in fishers' effective communication. The Model was significant, as indicated by the overall F-statistic, where F (1,341) =45.597 with p=0.000<0.05, indicating that there was a statistically significant relationship between fishers' effective communication and sustainability of small-scale fisheries by women.

Using the statistical findings, the regression model can be substituted as follows;

SUS=2.91 +0.342EFC

Where: SUS = sustainability of small-scale fisheries by women.

EFC = Composite Index of Fisher's Effective Communication.

> *……every morning, I have to reach out to my business partners, fishermen, and customers. This enables me to ascertain the supply and type of species that have landed. Through effective communication, I came to know whom to supply and the price to charge for different species, since different customers require different fish species. Others need Omena, others Tilapia, others Nile perch, etc.; others need sun-dried variety, others need fried or fresh. Furthermore, nowadays we sell even fish waste like 'Mgongowazi', and wild catch such as crabs, Ochonga, and Mondo, as long as we can inform those with such waste to bring them to a common sales place. With this, we get extra*

income from the business …… (FGD, Kisiambi and Waondo Beaches)

To settle their financial constraints, effective communication regarding sources of borrowing is used by fishers to a much greater extent.

A similar situation applies to a much greater extent when it comes to market expansion. A similar sentiment was echoed by a Key Informant in the interview conducted at Roowo Beach in Suba South.

…… every quarter, our BMU committee usually announces opportunities to lend credit to support business for the business people registered in the BMU, priority being given to women fishers. With such information dissemination, fishers can access credit to support their business to get more fish stock and reach the market to enhance business stability and market expansion…… (KI Roowo landing beach)

Discussion

The findings demonstrate that effective communication makes a positive and statistically significant contribution to the sustainability of women-owned small-scale fish enterprises in Homa Bay County at the 5 per cent significance level. The regression results indicated that a one-unit increase in effective communication was associated with a 0.342-unit increase in enterprise sustainability, demonstrating a positive relationship between the two variables.

Furthermore, effective communication explained 11.7 per cent of the variation in enterprise sustainability, suggesting that communication is an important, although not exclusive, determinant of business continuity and performance. The null hypothesis was therefore rejected. Descriptive findings further reinforced the importance of information sharing, which recorded the highest composite mean of 4.30 and a standard deviation of 0.69. This indicates strong respondent agreement regarding the importance of information exchange in facilitating fish procurement, price determination, marketing, access to credit information and identification of market opportunities. Effective communication also enables women entrepreneurs to exchange knowledge concerning fish species, catch variations, preservation technologies and emerging business opportunities. Focus group discussions and key informant interviews further reinforced these findings, highlighting how communication linkages facilitate effective business coordination and ensure continuity of operations. Overall, the results establish effective communication as an important resource for strengthening enterprise sustainability, particularly through improved information accessibility, market coordination and informed business decision-making.

CONCLUSION AND RECOMMENDATIONS

Conclusion: Effective communication plays a crucial role in promoting the long-term sustainability of women-owned small-scale fish enterprises in Homa Bay County, Lake Victoria, as demonstrated by the study findings. Effective communication emerges as an important resource for coordinating activities across the fisheries value chain. This is made possible by facilitating the timely exchange of information, strengthening business relationships and improving access to relevant knowledge among fishers, traders, processors, and buyers. The sustainability of women's small-scale fish enterprises is therefore closely associated with the effectiveness of communication linkages through which business-relevant information is accessed, shared and utilised.

Furthermore, effective communication supports market access and enterprise performance by improving the exchange of information regarding market demand, prevailing prices, customer preferences and business opportunities. Stronger communication networks enable women fish entrepreneurs to coordinate marketing activities, establish relationships with buyers, negotiate better procurement and selling arrangements and respond to variations in fish supply and market conditions. The sharing of indigenous knowledge and experiential information among fishers also contributes to understanding seasonal variations in fishing activities, changes in fish availability and emerging environmental and operational challenges. These communication processes enhance the ability of women entrepreneurs to anticipate business disruptions and adjust their enterprises.

Overall, the study establishes effective communication as an important component of sustainable women-

owned small-scale fish enterprises. Its contribution is reflected in the interconnected relationship between reliable fish procurement, improved product quality, effective post-harvest management, market access, operational continuity, income generation and enterprise reinvestment. However, communication alone cannot eliminate the structural challenges facing women in small-scale fisheries, particularly unequal access to fish resources, productive assets, finance and decision-making opportunities. Its contribution to enterprise sustainability is strengthened when accompanied by supportive institutional arrangements, gender-responsive fisheries governance, access to appropriate technologies and functional market linkages.

Recommendations: The study underscores the need to strengthen communication instruments among women fish entrepreneurs, fishers, BMUs, market actors and fisheries management institutions as part of broader interventions aimed at promoting economically viable, socially inclusive and environmentally sustainable small-scale fisheries in Homa Bay County.

Although this study established a positive and statistically significant contribution of effective communication to the sustainability of women-owned small-scale fish enterprises in Homa Bay County, several areas warrant further empirical investigation. First, future studies should examine whether fishers' training moderates the relationship between effective communication and enterprise sustainability. Although training may strengthen women's capacity to interpret and apply information received, its moderating effect was not established by the present study and therefore remains an area for further investigation.

In addition, future research should investigate other potential moderating variables, particularly access to financial resources, digital literacy, institutional support and market access. These factors may determine the extent to which effective communication translates into improved procurement arrangements, business performance and enterprise sustainability. Examining their moderating effects would provide a deeper understanding of the institutional, technological and economic conditions that strengthen or constrain the contribution of communication to women's fisheries enterprises.

Finally, further studies should explore potential mediating variables in the relationship between effective communication and enterprise sustainability. In particular, social capital, collective action, bargaining power, trust and the utilisation of market information could be investigated to establish the mechanisms through which communication influences enterprise outcomes. Such investigations would extend the present study by moving beyond establishing the relationship between communication and sustainability to explaining the pathways through which effective communication generates sustainable enterprise outcomes among women small-scale fish entrepreneurs.

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