Leveraging Collective Action for Reinvestment in Small-Scale Fisheries by Women in Blue Economic Space of Homa-Bay County, Kenya

Okanga Patrick Asango
St. Paul's University

Abstract

Can collective action drive reinvestment in small-scale fisheries by women? Given the increasing demand for quality livelihood, food and nutritional security, and poverty alleviation, there are calls for reinvestment in small-scale fisher enterprises by women. However, given the rapidly growing number of women players in the sector, and their accumulated expertise in the recent past, the study's objective is to leverage collective action by women for the reinvestment in small-scale fisheries in the blue economic space of Homa-bay County. Borrowing from social capital theory and applying a mixed method approach study design, data from a sample size of 330 from small-scale women fishers was scientifically obtained and analysed. Focus on common business challenges, participatory dialogue, beach management units, and affirmative action, were dimensions of collective action used in the analysis. The null hypothesis was put to the test. Findings were anchored on parametric and thematic analyses on the influence of collective action on the reinvestment of women-owned small-scale fisheries in the blue economic space of Homa-bay County. It was established that collective action had a statistically significant influence on reinvestment in the sector. Collective action explained 17.1% (R^2=.171) variability in the reinvestment of small-scale fisheries, the model significance was reported by F (1,328) 67.752, $p<0.05$, and β= .272, $p<0.05$ which implied that a unit increase in collective action results into .272 units change in reinvestment. Small-scale fisheries space in the blue growth trajectory in the Lake-Victoria region of Homa-bay County in Kenya is scientifically established and therefore concluded that collective action has the potential to enhance reinvestment in the sector, improve household livelihood and address the women's poverty challenges.

Key Words: *Collective-Action, Reinvestment, Women, Small-Scale-fisheries, Blue-Economy*

1.0 Introduction

Globally, small-scale fisheries support sustainable livelihoods in inland and marine communities as well as food security(FAO et al., 2021). They are a significant source of income as well. But women who engage in small-scale fishing frequently don't enjoy the rewards of their contributions. Instead, they struggle to provide for their families and communities, under the stress that comes from poverty, powerlessness, and marginalization exacerbated by poor reinvestment as a means of sustaining the small-scale fisheries in which they engage. Such situations have several explanations and would require multiple remedies like engaging collective action of the women fishers.

In its most common definition, collective action is a "collaborative and sustained process of cooperation among stakeholders"(Jentoft & Finstad, 2018). It is the "structured efforts that bring small-scale women fishers together to sustain the working of fish enterprises in diverse dimensions and improve the business environment in a particular context. Collective action can be a solution to challenges along the fisheries value chain by taking measures to replace certain individual actions with group efforts and thus increasing leverage(Meinzen-Dick & Gregorio, 2021.). Furthermore, it can level the playing field by committing small-scale women fishers to similar standard competition, providing a platform to raise awareness, facilitate peer learning and contribute to dialogue(García Lozano & Heinen, 2016). If implemented successfully, collective action can strengthen alliances, establish trust between competitors, create common codes of conduct, and contribute to sustainable fisheries business through reinvestment.

The main contention of the article is that one of the most important steps toward strengthening underprivileged small-scale women fishers is to participate in collective action. Collective action empowerment serves as a goal in itself as well as a way to guarantee rights to inclusive value addition along the value (Torre et al., 2019). The relationship between collective activity and the eradication of poverty is examined through the composite character of poverty and the difficulties in determining its roots and consequences, the dynamics of group action, and creating an organization's self-regulations and sustainable working(Stacey et al., 2019).

According to the 2014 FAO Member States' endorsement of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (henceforth SSF Guidelines), among the remedies are safe tenure, access to more equitable markets, improved health care, education, and various steps to promote equity and correct power imbalances in the sector(FAO & Duke University, 2023). The paper examines how women fishers' organizations and their collective action might aid in the elimination of poverty and sustain their livelihoods in small-scale fishing operations by constantly reinvesting their fish business proceeds in the same enterprise. In this context, collective action is only understood to be fishers working together for a common goal. As Miller (2014) explains, the most sophisticated kind of collective action requires organization because it entails planning, mobilizing, and monitoring. On this account, the objective of the paper is to explore the role of collective action in contributing to reinvestment in small-scale Fisheries operated by women in Homa-Bay County, Kenya

2.0 Literature Review

The study is guided by the theory of social capital associated with the works of Bourdieu (1986), The concept expresses the sociological essence of communal energy, focusing on the solution to the problem that requires a common approach and voluntary collective action(Tenzin et al., 2015). Forms of collective action are general moral resources of the community, which include collective trust, social norms and obligations, and collective networking. The theory contends that forms of collective relationships are resources that yield reproductive benefits to groups or individuals in a society or an organization (Zhang et al., 2017). The scholars argued that social groups exist as nodes of convergence and interactions which results in social ties, linking groups and individuals who share similar beliefs and values within the context of social action. The social capital theory posits that there exists a relationship in the form of collective action among and between individuals, groups, organizations, and the entire society (Matthews & Besemer, 2015). These actions symbolize structures comprising actors or ties that bring linkages to different nodes.

These collective actions result in an exchange of resources such as information flows and behaviour patterns such as networking and Trust among individuals, groups, and organizations; therefore, it is about the relationships that individuals who are actors in a group maintain in terms of their networking with others(Hanifan, 1916). In 1998, Woolcock expanded the theory by building on its three components which include bonding, bridging, and linking social actions. Bonding social capital results in solidarity within or between a group with common characteristics such as family members, friends, and neighbors while bridging social capital links people across groups, races, classes, or religious affiliations and as such, results in the creation of collective action within the group which is perceived to have a common aim or objective. Linking social capital on the other hand focuses on the networks of the relationship between people, groups, or institutions with formal authority. It has the potential to embrace the relationship between individuals or groups through sharing a common interest with the help of passing information to different components (Andriani & Christoforou, 2016). Modern institutions have operationalized social capital dimensions from traditional authors (Coleman, Bourdieu, Putnam, and Burnt) perspectives. Social capital theory embraces dimensions of social capital such as group

networking, group solidarity, group collective action, and group information sharing. This study, therefore, uses social capital theory in advancing the argument that small-scale fisheries ought to be alive to the fact that unless they balance their exploitation of social capital through collective action resources for enterprise reinvestment, making small-scale sustainability for future generations would be a challenge.

2.1 State of Fisheries and Women Fishers in Kenya

Fisheries have traditionally taken a marginal space in national economic and policy dialogue in Kenya. Kenya Marine and Fisheries Research Institute (2018) suggested that this is due to its low impact on the national economy compared to other food production sectors such as agriculture and livestock. However, the fisheries sector remains a contributor to economic growth and offers livelihoods to many Kenyans and needs to be managed with a comprehensive policy that guides and influences sustainable development and utilization of the fisheries resources for the benefit of the present and future generations of the Kenyan people (G.O.K, 2008).

Kenya's fishing industry contributes about 0.5 per cent of the country's GDP and about 2 per cent of the national export earnings. The industry employs over 60,000 fishers directly, over 60% being women, and an estimated 1.2 million people directly and indirectly within the fishing, production, and supply chain with 70% being women. The fishing capacity is constituted of about 3,000 small-scale fishing crafts. In 2000, there were about 38,000 fishers while in 2016, the number of fishers was estimated to have increased to slightly over 43,000. In addition, the total number of fishing crafts increased from 11,515 in 2000 to 14,365 in 2016, indicating that activities in the sector are on the rise. According to G.O.K (2018) and KEMFRI (2018), small-scale fishing crafts are dominated by traditional fishing gears, mostly owned by women, of which less than 10% are motorized.

About 96% of the total fish production in Kenya is derived from inland freshwaters, with Lake Victoria, the largest inland freshwater contributing about 80%. This constitutes 1% of the world's captured fish and 8% of the world's inland harvest fish. However, only 6% of the lake is in Kenya. The Indian Ocean contributes 5%, with the remaining coming from other water sources. Fish trade in Kenya is largely small-scale and revolves around women small-scale fishers(KMFRI, 2018). They are engaged in both pre- and post-harvesting activities including fish product transportation to the markets, usually with some value addition such as drying, smoking, and deep-frying.

The challenges facing Kenya's fishery sector are enormous, ranging from environmental alteration and inconsistency, aggressive species, overfishing, declining stocks, and catches. Furthermore, increasing fishing pressure, increasing illegalities due to weak enforcement management measures, encroachment of fishers into fish breeding areas, inadequate infrastructure for fish processing, quality, and safety assurance, as well as climate change together with postharvest loss have caused an impediment to the business(Anderson et al., 2015; G.O.K, 2008; KMFRI, 2018).

These challenges negatively affect women whose involvement in the sector cuts across the supply chain. Management interventions developed over the years include the introduction of co-management structures through the Beach Management Units (BMUs) and the Community Conservation Areas (CCAs). In these structures, women have not been given an equal hearing and their opinions have not been listened to, even though they are stakeholders in the industry.

2.2 Fisheries Policy and Sustainability (reinvestment) of SSF in Kenya

Kenya's fisheries sector operated without a fisheries policy from 1963 until 2005. When the government undertook a decision to develop a policy for the sector. Fishery resources in Kenya are currently managed by the Department of Fisheries through the Fisheries Act (Cap 378) and Maritime Act (Cap 250) of the Laws of Kenya (Ministry of Livestock and Fisheries Development, 2005).

The fisheries policy focuses on the need to promote, implement, and monitor sustainable management and responsible fishing practices. It also focuses on the modalities of promoting fish consumption as a means of increasing food security, employment, income, foreign exchange earnings, and related activities. This policy further states the Government's commitment to promoting gender equity and integrating HIV/AIDS prevention and management which has threatened the fisheries sector for a while(G.O.K, 2008, KMLFD, 2005).

To achieve the above policy objectives, the government has invested in the programs for appropriate technology necessary for the sustainable exploitation of fisheries resources. Such action is aimed at ensuring a sustainable supply of fish resources to the fish business community including women fishers owning small-scale enterprises and consumers. The policy equally emphasizes joint ventures between foreign investors and local fish entrepreneurs to promote modalities of responsible fish handling standards that minimize post-harvest losses. With such policy initiatives, fishers stand to benefit from the businesses thus enhancing sustainability(G.O.K,

2008; KMFRI, 2018; MLFD, 2005). The policy further highlights the need to monitor and ensure the safety of fishers and their fishing gears, addressing the perennial problem of double or triple licensing which escalates the cost of fish business, especially for small-scale fishers.

The government's intention is aimed at expanding fish enterprises, making them modern and relevant to contemporary needs. However, for the investment support for the growth of small-scale fisheries, the policy emphasizes the role of government in promoting women and youth participation in fisheries business, thus contributing towards sustainability in the sector. The policy furthermore prioritizes infrastructure development including storage facilities around the fishing waters to ensure better fishing and trade opportunities and preserve fish quality days after harvesting(G.O.K, 2008, 2022; Ministry of Livestock and Fisheries Development, 2005). Capacity building through training of fishers, and young entrepreneurs to join the fishing industry has been provided for in the policy. This includes strengthening the BMUs' management skills to improve the working conditions and income earnings of small-scale fishers.

In addition, the government avails health care measures including HIV/AIDS voluntary counselling and testing along the landing beaches(Kenya Marine and Fisheries Research Institute, 2018, 2018; Ministry of Livestock and Fisheries Development, 2005). This will be accompanied by post-testing support and provision of antiretroviral where applicable. The policy emphasizes the need for information sharing, collaboration among the fishing groups, and the formation of the fishers database in aiding decision-making towards achieving sustainability in the sector (Kenya Marine and Fisheries Research Institute, 2018). These policy dimensions can be considered drivers of the sustainability of small-scale women-owned fish enterprises. However, this study will focus on leveraging social capital for the sustainability of women-based fisheries.

2.3 Collective Action and Sustainability (reinvestment) in Small-Scale Fisheries

Collective action refers to the most acceptable action taken by a group through their participation in pursuit of the member's or establishment's interest(Ochieng et al., 2018). It permits individuals and enterprises to assemble their human and physical resources to achieve a common goal or objective through teamwork, coordination, and individual responsibility. This study postulates that collective effort could result in small-scale fish enterprise sustainability and may generate enormous benefits to participating individuals, by sharing fishers' values. At an enterprise level,

fish firms promoting collective actions stand a chance to improve their reputation and management capabilities (Vidal & Van Buren III, 2020).

The act of collective action is pervasive in society and this makes it an instrument for natural resources management and stability when it comes to common-pool resources such as forestry and fisheries (Ratner et al., 2017). A study by Ratner et al., (2017) in Latin America established that collective action among fishers has the potential to bring sanity to the collective management of the fish resource, resulting in collective benefit and resilience among the players. But whether the benefits and resilience result in sustainability in the fish business among women is a matter of investigation for this study.

Collective action among the small-scale fisheries has been considered a solution to enterprise growth impediments and may be considered an effective affirmative action. Nthane et al., 2020b in their study, on the sustainability of South African small-scale fisheries leveraging ICT transformation pathways, established that collective action assembles institutions' capacities to take common action through new technology and expertise needed to salvage those challenges of SSF-related to marginalization and resource constraints. With collective action, reform among the fishers is initiated. The study focused on the role of collective action on marginalization and resource constrain among the small-scale fishers in South Africa.

Accordingly, the lack of collective action among the Beach Management Units (BMU) has resulted in poor participation of the fishers, in the co-management of fish resources(Etiegni et al., 2020a). The study concluded that collective action and cooperation from both formal and informal groups are needed as a means to enhance fish resource use, address conflict among the fishers, and enhance co-management of the fish resources. Furthermore, strengthening collective action improves fish marketing performance with stable external links, resulting in collective gains among the fishers (Ochieng et al., 2018). However, situations, where collective action drives the sustainability of women's fisheries, remain widely unexplored. This study will contrast collective action and the sustainability of small-scale fisheries among women. It will tend to bridge this gap by focusing on the extent to which collective action among women in small-scale fisheries enterprises in Homa Bay County may realize sustainability.

3.0 Methodology

This research was guided by the pragmatism philosophy. For pragmatists, understanding and knowledge arise out of individual or group actions, situations, and consequences (Patton, 2010). It allows the use of qualitative and quantitative techniques in data gathering. This study applied a mixed-method design (Tashakkori and Teddlie, 2000). This study was conducted in selected sub-counties in Homa-bay County with Beach Management Units; Homa Bay Town, Rachuonyo, Suba-South, Suba-North, and Rangwe. Homa Bay County is one of the 47 counties in Kenya established after the promulgation of the new constitution in 2010. The target population of the study was the women fish entrepreneurs registered in the Beach Management Units (BMUs) in Homa Bay County. The Beach Management Units are found along the Sub-Counties that border Lake Victoria; Suba-South, Suba-North, Homa-Bay Town, Rangwe, and Rachuonyo.

The proposed research used a combination of probability sampling (multi-stage, stratified, and simple random sampling techniques), and non-probability sampling (Purposive and convenience sampling).

Given that BMUs are the unit of observation, the study was based on the 62 sampled BMUs from a total of 137 BMUs in the first stage. This was done using the small population sampling formula/technique recommended by Nassiuma (2000). Sampling of BMUs was essential given that all respondents were registered in different BMUs. It is from the sampled BMUs, that the researcher settled on a population from which the sample would be determined. This was the basis of multistage sampling, where the first stage involves BMUs, and then the second stage is the population from the sampled BMUs.

$$S = \frac{N(Cv)^2}{(Cv)^2 + (N-1)e^2}$$

Where S = the sample size

N = the population size

Cv = the Coefficient of Variation

e = standard error

Therefore, the sample size was:

$$S = \frac{138\,(0.21)^2}{} = 61.53488 \approx 62 \text{ Beach Management Units}$$

$$(0.21)^2 + (138\text{-}1)\ 0.02^2$$

The sample size of Beach Management Units along with the Sub-Counties in Homa Bay County will be 62 BMUs. (See Table 3.3).

Table 1.0: 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 large population size, of>1000, the researcher adopted Yamane's (1967) formula to obtain the sample as shown below.

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

Where n is the sample size

N is the Population

e is the tolerance at a desired level of confidence, at a 95% confidence level

$$\frac{2{,}385}{2{,}385\ (0.05)2} \quad N= \cong 342.3493 = 342$$

Based on the total number of 2385 women fish entrepreneurs in Homa Bay County, the researcher arrived at a sample size of 342 women fish entrepreneurs, (see Table 3.3). The researcher will select 15 BMUs per sub-county except for Suba-North, where 17 BMUs will be selected based on the fact that it has comparatively more BMUs and landing sites than other sub-counties, (see Table 2).

Table 2: 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)

From every stratum, every unit of the study population will have an equal opportunity to be studied. Thus, the researcher will use probability sampling, the simple random sampling technique to pick the respondents from each stratum to ensure that every respondent has an equal chance of being selected and that each stratum is adequately represented to take care of variation within the population. Random sampling is unbiased and representative.

In addition to quantitative data sampling, the study applied a qualitative approach to qualitative sampling and data collection to understanding the in-depth relationship between the predictor (social capital) and the outcome (sustainability of small-scale fisheries by women) variable. The qualitative study analyzes data in the form of natural words and expressions of experiences like social interactions and artistic presentations (Levitt et al., 2018). Moreover, the analysis provides a clear understanding of the phenomena under investigation. The study focused on the population of small-scale informal fish enterprises by women in Homa-Bay County, Kenya. The study sample was drawn from each sub-county's sampled Beach Management Units (BMUs),.The result is shown in Table 3 (Homa-Bay County BMU Registration Roll, 2021).

Table 3: Sample Frame for Focus Group Discussion and Key Informants

County	Sub-county	BMUs	Sampled BMUs	Focus Group for Discussion	Key Informants

					for Interview
Homa-Bay	Suba-North (SN)	42	19	1FG-SN	1KI-SN
	Homa-Bay Town (HBT)	34	15	1FG-HBT	1KI-HBT
	Suba-South(SS)	31	14	1FG-SS	1KI-SS
	Rachuonyo(R)	30	14	1FG-R	1KI-R
Total	**4**	**137**	**62**	**(n=4FGs)**	**(n=4KIs)**

***Note –FG-Focus Group (respective sub-counties), KI-Key Informant (Respective Sub-County*)**

Scientific qualitative data collection through non-probability and non-random sampling techniques is applicable when the richness and depth of the data are more important to the researcher than the generalizability of the findings(Creswell, 2009). The study applied two qualitative sampling techniques; purposive and convenient sampling.

The focus group for discussion was sampled through a purposive sampling technique. The approach was convenient to the research since it allowed the researcher to constitute a group by purposively selecting from different BMUs in each sub-county. Members with unique knowledge and experience concerning business in small-scale fisheries were selected. One group from each sub-county was selected, making a total of four focused groups for discussion (Table 10). However, the number of members in each group was ranging between six and eight. With the help of purposive selection, the respondents gave narrow and deep information regarding information-sharing and the sustainability of their fisheries.

Furthermore, this sampling method involves selecting participants based on their availability and accessibility. The convenience selection of the respondents provided an easy way to gather data, given that it was based on the individuals who were readily available and willing to be interviewed. The approach was used to select key informants for the interview. From each sub-county, one key informant was selected. From the county fisheries officer to the sub-county fisheries in charge, to

the BMU chairman, BMU committee members' names were given. Note that according to fisheries laws, 30% of members in a BMU committee are women. Furthermore, a woman is either chairperson if not, a deputy of every BMU committee. Therefore it was convenient to select a women chairperson as a key respondent from every sub-county, making a total of four key respondents.

4.0 Discussion and Findings

Analysis of Sustainability (reinvestment) in Small-Scale Fisheries Operated by Women

Sustainability is the dependent variable in this study. It is measured through reinvestments of earning proceeds by women fishers. EFA was used to reduce the item dimensions of sustainability measures from nine (9) to six. Therefore Kaiser-Meyer-Olkin (KMO) and Bartlett's Tests were conducted to test sample adequacy for sustainability factors and item correlation respectively. The sustainability or reinvestment measure was narrowed down to six items of reinvestment.

Sustainability (Reinvestment) of Business Proceeds from Small-Scale Fish Enterprises Operated by Women

Reinvestment is a measure of sustainability (dependent variable) in the small-scale women fishers' enterprise. The study assessed the practice of women fishers reinvesting their earnings from their fish business enterprises. The findings were a pointer to the sustainability opinion or otherwise. The finding is presented in Table 4.

Table 4: Reinvestment of Business Proceeds (%), N=330 (100)

Statement	SD	D	UD	A	SA
I use part of my income from the fish business to increase additional stock	57 (17.3)	58 (17.6)	51 (15.5)	47 (14.2)	117 (35.5)
My fish business had employed additional worker	65 (19.7)	86 (26.1)	61 (18.5)	83 (25.2)	35 (10.6)
I have been able to pay more to my employee	81 (24.5)	32 (9.7)	13 (3.9)	56 (17.0)	148 (44.8)
My business has enabled me to buy fish processing equipment	67 (20.3)	164 (49.7)	49 (14.8)	10 (3.1)	40 (12.1)

I use the profit from the fish business to open up other business	77 (23.3)	3 (0.9)	13 (3.9)	85 (25.8)	152 (46.1)
I can reach many market outlets because of good returns from my business	79 (23.9)	32 (9.7)	13 (3.9)	56 (17.0)	150 (45.5)

Source: Research Data (2023)

Table 4.31 shows results in percentage on questions relating to proceeds reinvestment by the respondents. Of 330 respondents, 46.1% used profit generated from the fish business to diversify to other businesses. This implies that they used profits from the fish business to open up other businesses. Even though diversification of proceeds from fish business may contribute to the weakening of fish enterprises. 45.5% could access some market outlets due to profit earnings from their business. This indicates a strong agreement thus suggests that profitable returns from their fish businesses support logistics to different market outlets and enhances business networking. Furthermore, this implies that small-scale fish enterprises struggle to have a market share of sales, by a way of reinvesting their profit proceeds. 44.8% strongly agreed to have increased payment to their employees. This is an indication of employee retention strategy and human resource investment. This could result to fish enterprise sustainability, expansion, and additional profit proceeds for reinvestment.

Furthermore, 35.5% of the respondents used part of their profit income to increase their fish stock. The study also sought the small-scale fish business capacity to use earned profit to increase additional fish stock. The results indicate that the entrepreneurs observe business principles of keeping the business alive by restocking the fish products, thus reinvesting part of the proceeds to keep the enterprise stock.

Analysis of Women Fishers Collective Action and sustainability (reinvestment) in Fish Enterprises

Collective action was the second construct or dimension of social capital (independent variable) measured, using nine dimensions which were reduced to six items on account of exploratory factor analysis. Ultimately, the data collection instrument included: solving common business

challenges, participatory discussion, and the role of BMUs, group interaction, affirmative action, and shared values.

Factor Analysis for Collective Action among Small-Scale Women Fishers

The exploratory factor analysis was conducted to establish the factor loading level. Table 5. shows the findings.

Table 5: Factor Analysis for collective action among women fishers

Factors	Statements	Factor Loadings
CA1	All members of our BMU cooperate in solving common business challenges	.825
CA2	I participate in discussing issues affecting our fish business	.751
CA3	BMUs act as group platforms that advocate for collective solutions to challenges facing women fishers at the landing sites	.840
CA4	The interaction in our group makes us innovative along the fish value chain	.884
CA5	We use our group platform to push for affirmative action like women's representation in committees and fishers' community projects	.808
CA6	Shared values in our group have assisted my fish enterprise to grow	.590
Extraction Method: Principal Component Analysis		

The six items determined by EFA drawn from the theory and empirical sources were assigned to measure the independent construct, collective action. In addition, the six items of collective action were subjected to a reliability test where Cronbach's Alpha value of 0.75 was obtained.

Analysis of the Association between Collective Action and Sustainability (reinvestment) of Small-scale Fisheries Managed by Women

The objective of this study was to assess the contribution of collective action to the sustainability of small-scale fisheries operated by women. The literature and empirical evidence suggested that fishers' collective action could be associated with the reinvestment of small-scale women's fisheries. The sustainability of small-scale fisheries of women had been operationalized as reinvestment by women fishers.

Correlation between Collective Action and Sustainability (reinvestment) of Small-Scale Fisheries

Correlation analysis using Pearson's correlation technique was computed to determine the strength and direction of the relationship between the collective action activities of women fishers reinvestment of small-scale fisheries, the reinvestment. It was meant to establish the strength and direction of the association between collective action and reinvestment. The results are summarized in Table 6.

Table 6: Correlation Matrix for Fishers' Collective Action and Sustainability (reinvestment) of Small-Scale Fisheries

		Reinvest	Fish waste recycling	Security of Tenure	Knowledge in Fisheries	Technology in fisheries
Collective Action	**Pearson Correlation**	**.257****	.255**	.442**	.085	.277**
	Sig. (2-tailed)	**0.000**	0.000	0.000	0.124	0.000
	N	**330**	330	330	330	330

***. Correlation is significant at the 0.01 level (2-tailed).*

Source: Research Data (2023)

The results indicate a positive and significant (give the overall figures here) correlation between women fishers' collective action and the indicator of reinvestment of small-scale fisheries (reinvestment). Women's Fisher collective action was found to have a positive and statistically significant relationship with reinvestment ($r = 0.257$, p-value< 0.05). However, it was equally reported that other possible dimensions of enterprise continuity had a significant correlation with collective action. Fish waste recycling($r = .0.255$, p-value< 0.05), Security of tenure($r = .0.442$, p-value< 0.05), and technology in fisheries ($r = .277$, p-value< 0.05): while knowledge in fisheries showed an insignificant relationship ($r = .085$, p-value> 0.124) with collective action.

For the objective, the following hypothesis was tested using a simple linear regression model.

Ho_2: Collective action does not significantly contribute to the sustainability (reinvestment) of small-scale fisheries operated by women.

$$SUS=\beta_o+\beta_1 CA+\varepsilon_1$$

Where: **SUS** = reinvestment by small-scale fisheries representing a dependent variable.

β_o = Regression constant,

β_1 =Regression Coefficient of Collective Action

CA = Collective Action representing independent variable

ε_1= Error term

The results are presented in Table 7.

Table 7: Regression Results of Collective Action on Sustainability of small-scale Fisheries

Summary of Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.414[a]	.171	.169	.32973

a. Predictors: (Constant), Collective Action(CA)

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.366	1	7.366	67.752	.000[b]
	Residual	35.660	328	.109		
	Total	**43.027**	**329**			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.753	.147		18.677	.000
	Collective Action	.272	.033	.414	8231	.000

a. Dependent Variable: SUS=Sustainability(reinvestment)
b. Predictors: (Constant), Collective Action (CA)

Source: Research Data (2023)

The results show that. Collective action significantly predicted reinvestment, F (1,328) 67.752, p=0.000<0.05, which indicates that collective action had a significant influence in shaping women fishers enterprise reinvestment (β =0.272, t = 8.231 p=0.000<0.05). The **β** value of 0.272 implies that as collective action increases by one unit, then reinvestment in small-scale women's fish

enterprise will increase by .272 units. Moreover, R^2 = .171, implies that collective action explains 17.1% of the variance in reinvestment, while the remaining 82.9% was accounted for by other factors not captured in the model.

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

$SUS=\beta_o+\beta_1 CA+Ɛ_1$

Where: **SUS** = sustainability of small-scale fisheries representing a dependent variable.

β_o = Regression constant,

β_1 =Regression Coefficient of Collective Action

FCA = Collective Action, the independent variable

$Ɛ_1$= Error term

$SUS=\beta_o+\beta_1 CA+Ɛ_1$

SUS=2.753+0.272CA

Drawing on the above findings, it can therefore be concluded that there was a significant positive relationship between fishers' collective action activities and reinvestment in fisheries enterprises by women. This led to the rejection of null hypothesis two ($H0_2$**)** which stated that Fishers Collective action does not have a significant contribution to the sustainability of small-scale fisheries operated by women.

The dimension of this view was also resonated in qualitative data through focus group discussion and Key informant interviews as narrated below;

> *"…BMU as a unifying umbrella addresses common challenges affecting our business sites, mainly at the landing sites. When the catch is in short supply, there are people with priority to be given, this is on account of the species trade arrangement. This solves the problem of women traders fighting over a small catch supply. Activities taking place along the beach are deliberated on by consulting all members and a collective agreement is reached. Collectively we can register as BMU members with manageable monthly subscriptions and contributions. Collectively we have built some capital base which are essentially used to support the needy members to grow by supporting their business, through such initiative, our businesses have grown and remained more sustainable……"* ***(FGD, Liundah, Ongalo, Kababa Beaches)***

These findings demonstrated that collective action is an important component of the fisherwomen's business success.

> *"… We receive complaints as a committee from different women fishers who are BMU members, list them and set a date when all members are present, discuss the complaints or challenges together, listen to suggestions and come out with solutions collectively. We solve our challenges as a family, and we are all on this beach for the goodness of one another. The success of the fish business is a success of all of us……"* ***(KI, Kababa Beach).***

Fishers' Collective Action and Sustainability (Reinvestment) of Small-Scale Fisheries

The research objective of the study was to assess the leveraging of fishers' collective action on the sustainability/ reinvestment of small-scale fisheries by women. The null hypothesis tested was that fishers' collective action does not have a significant contribution to the reinvestment of small-scale fisheries by women.

Factor analysis was done to reduce collective action items to a practicable and meaningful size. All the six collective action factors registered thresholds factor loading above 0.5 and were thus considered for further statistical analysis. Descriptive statistics were used to analyze this research objective, where results showed an average mean of 3.9 and a standard deviation of 1.14, this meant that most of the respondents agreed with statements on collective action in their enterprise. There was a positive significant linear relationship ($r = 0.414$) between the predictor and outcome variable, Table 4.24. A simple linear regression analysis was carried out and the research findings indicated that collective action affected the sustainability of small-scale fisheries. Collective action significantly predicted sustainability, $F(1,328)$ 67.752, $p<0.001$, the coefficient of determination, $R^2 = 0.171$, implies that collective action explains 17.1% of the variance in sustainability. This indicates that collective action has a significant influence in shaping sustainability. $\beta = 0.272$, implies that one unit increase in the fishers' collective action results in a 0.272 unit increase in sustainability performance ($\beta = 0.272$, $t = 8231$, $p<0.001$). The focus group discussions and key informant interviews yielded comparable results. The null hypothesis was rejected, and it was determined that the fishers' collective action made a statistically significant contribution to the sustainability of small-scale fisheries by women.

6.0 Conclusion and Recommendations

Recommendations for Policy

The fisheries sector plays an important role in the global economy. In Kenya, the sector provides food, employment, and income to a large population and earns the country substantial income from the domestic market and foreign exchange. These earnings are likely to increase if the under-exploited areas such as small-scale fisheries are tapped and supported for reinvestment. Considering that the government of Kenya keeps on reviewing fisheries policy through fisheries acts. This study has implications for government implementation agencies and the fishing community as a whole

Findings from the study also affirmed the role of collective responsibilities, actions, to be statistically significant and therefore instrumental in driving the reinvestment of small-scale fisheries.

Given that the sector faces several challenges including uncoordinated development and low investment in fisheries infrastructure such as storage facilities, over-exploitation of fish, and catching of underage fish. The policy review should strengthen the principle of effectively coordinating development and investments in acquiring essential facilities in support of the fisheries. This could lead the fishers to use modern fishing technology which cannot interfere with premature fish species. Such policy measures would support sustainable growth, demand, and supply of the catch.

The findings from this study reveal that the reinvestment of small-scale fisheries is strongly influenced by social capital dimensions namely fishers' networking, fishers' collective action, fishers' information sharing, and fishers' social trust.

Suggestion for Further Study

The study brought to light various issues and sentiments that require further navigation and investigation. On this account, some of the implications and limitations of this study open up recommendations for further studies. While this study successfully established the leveraging social capital to the reinvestment of small-scale fisheries by women, it equally presented enormous prospects to direct future research. The analysis from this study established that fishers' training moderated the relationship between social capital and the sustainability of small-scale fisheries.

Further research can also investigate other variables that could moderate this relationship. In addition, further research may also take the initiative to navigate the possibility of the presence of mediating variables in establishing the relationship between social capital and sustainability in small-scale fisheries by women.

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