CGIAR | CGIAR SCALING FOR IMPACT | GENDER EQUALITY AND INCLUSION | MULTIFUNCTIONAL LANDSCAPES

WorldFish

Training Report

Capacity Building on Fish Value Addition: Processing Technologies, Food Safety, Business Development, and Gender Inclusion: A Focus on Women-Led Enterprises in Homa Bay and Migori Counties

December, 2025

Photo Credit: Dr Everlyne Okoth

Acknowledgments

This work was undertaken as part of the CGIAR Scaling for Impact (S4I) program. We gratefully acknowledge the support and funding provided by the CGIAR Trust Fund.

We extend our sincere appreciation to our partners, stakeholders, and collaborators whose expertise, insights, and commitment have contributed significantly to shaping this work. Their contributions have been instrumental in advancing CGIAR's ambition to scale proven innovations across food, land, and water systems, fostering impact that is inclusive, sustainable, and transformative.

We also recognize the continued support and collaboration of national and regional partners, whose engagement ensures that the solutions developed are responsive to local needs, strengthen innovation systems, and contribute to building more resilient agrifood systems.

To learn more about CGIAR Scaling for Impact (S4I) program, please contact:

scaling@cgiar.org

About CGIAR Scaling for Impact (S4I) program

Scaling for Impact (S4I) is a CGIAR program (2025–2030) that tests, refines, and scales innovations in food, land, and water systems. It works to align those innovations with stakeholder needs to achieve transformative impact.

Website: https://www.cgiar.org/cgiar-research-porfolio-2025-2030/scaling-for-impact/

About CGIAR

CGIAR is a global research partnership for a food secure future.

Visit https://www.cgiar.org/research/cgiar-portfolio to learn more about the initiatives in the CGIAR research portfolio.

AUTHORS

Catherine Kilelu, ACTS
Kevin Ouko, ACTS
Caroline Bosire, ACTS
Everlyne Okoth, JKUAT
Olive Molo
Betty Mohe
Rahma Adam
Sara Bonilla
Brenda Gwada

SUGGESTED CITATION

Kilelu, C., Ouko, K., Bosire, C., Okoth, E., Molo, O., Mohe, B., Adam, R., Bonilla, A, S., and Gwada, B. (2025). Capacity Building on Fish Value Addition: Processing Technologies, Food Safety, Business Development, and Gender Inclusion: A Focus on Women-Led Enterprises in Homa Bay and Migori Counties. WorldFish.

PHOTOS

© WorldFish/Dr Everlyne Okoth, JKUAT

DESIGN SUPPORT

Brenda Gwada, WorldFish

Contents

List of acronyms and abbreviations

ACTS	African Centre for Technology Studies
BMC	Business Model Canvas
FAO	Food and Agriculture Organization of the United Nations
GALS	Gender Action Learning System
GMPs	Good Manufacturing Practices
KEBS	Kenya Bureau of Standards
NGAO	National Government Administration Officer
SDGs	Sustainable Development Goals
SMEs	Small and Medium-sized Enterprises
SOPs	Standard Operating Procedures
ToT	Training of Trainers
TVET	Technical and Vocational Education and Training
WHO	World Health Organization
ACTS	African Centre for Technology Studies
BMC	Business Model Canvas
FAO	Food and Agriculture Organization of the United Nations
GALS	Gender Action Learning System
GMPs	Good Manufacturing Practices
KEBS	Kenya Bureau of Standards
NGAO	National Government Administration Officer
SDGs	Sustainable Development Goals
SMEs	Small and Medium-sized Enterprises
SOPs	Standard Operating Procedures
ToT	Training of Trainers
TVET	Technical and Vocational Education and Training
WHO	World Health Organization
ACTS	African Centre for Technology Studies
BMC	Business Model Canvas
FAO	Food and Agriculture Organization of the United Nations
GALS	Gender Action Learning System
GMPs	Good Manufacturing Practices

Executive summary

A three-day capacity-building training on fish value addition was conducted from 16th to 18th December 2025 at Kakione Beach, Sindo, in Homa Bay County. The training targeted small-scale fish processors, traders, and other fish value chain actors, primarily drawn from women-led and mixed enterprise groups operating around the Lake Victoria region in Kenya. The intervention responded to persistent challenges in the fisheries sector, including high post-harvest losses, limited uptake of improved processing technologies, weak food safety compliance, low market competitiveness, and entrenched gender inequalities within household and enterprise decision-making.

In parallel with the training, a technology assessment of the solar tent dryer in Sindo and the smoking kiln in Nyachebe was undertaken to evaluate functionality, performance, and adoption readiness. The assessment identified critical design, operational, and energy-related constraints affecting drying efficiency, hygiene, airflow, and biomass fuel use. Targeted retrofitting and redesign interventions were implemented, resulting in improved airflow, hygiene conditions, thermal performance, and product quality for the solar dryer, while a newly redesigned smoking kiln demonstrated optimal operating temperatures and produced high-quality smoked fish products. However, the assessment also highlighted residual challenges, particularly related to biomass furnace efficiency, structural durability, and upfront technology costs, which have implications for long-term sustainability and scalability.

The overall objective of the training was to strengthen participants' technical, entrepreneurial, and gender-responsive capacities to produce safe, high-quality, and market-ready fish products. The programme integrated practical application of improved fish smoking and solar drying technologies, food safety and quality assurance (including hygiene, GMPs, SOPs, packaging, labeling, and regulatory compliance), business development using the Business Model Canvas, and gender-transformative learning through the Gender Action Learning System (GALS). A blended, experiential learning approach was adopted, combining short theoretical sessions, hands-on processing, group discussions, peer learning, and visioning exercises.

Key outputs included the training of 32 community participants, practical demonstration and performance testing of improved processing technologies, production and quality assessment of value-added fish products, enhanced understanding of food safety standards, and application of structured business planning tools to existing enterprises. The GALS sessions enabled participants to articulate shared household and group visions, identify gender-related constraints, and develop actionable plans to support equitable decision-making and enterprise growth. Immediate outcomes included improved technical processing skills, increased awareness of food safety and regulatory requirements, strengthened entrepreneurial capacity, and enhanced recognition of gender equality as a driver of sustainable enterprise performance. In the short to medium term, the intervention is expected to contribute to reduced post-harvest losses, improved product quality and market access, increased household incomes, strengthened women's economic empowerment, and alignment with Kenya's Blue Economy and food security priorities.

Introduction

Background and Context

Fish value addition is a critical pillar of Kenya's fisheries and Blue Economy agenda, contributing to food and nutrition security, employment creation, and income generation for coastal and inland fishing communities. At the local level, particularly in lakeside communities such as Sindo in Homa Bay County, fisheries provide livelihoods for a significant proportion of households engaged in fishing, processing, trading, and related services. However, the sector remains largely dominated by low-value, informal processing practices that limit income potential and expose actors to market and food safety risks.

Small-scale fish processors often experience substantial post-harvest losses due to inadequate preservation and processing technologies, poor handling practices, and limited access to cold chains and modern value addition equipment. Traditional sun-drying and rudimentary smoking methods, while widely used, frequently result in inconsistent product quality, contamination, reduced shelf life, and non-compliance with food safety standards. These challenges constrain processors' ability to access higher-value markets, including institutional buyers and formal retail outlets. In addition to technical constraints, limited knowledge of food safety requirements—such as hygiene standards, Good Manufacturing Practices (GMPs), Standard Operating Procedures (SOPs), proper labeling, packaging, and storage—further undermines product competitiveness. Weak business and entrepreneurial skills, including pricing, record keeping, market analysis, and quality assessment, reduce the profitability and sustainability of fish-based enterprises.

Gender inequality remains a cross-cutting challenge within fish value chains. Women are highly represented in fish processing and trading but often have limited control over productive resources, decision-making, income use, and access to training and markets. These inequalities are reinforced at the household and community levels, affecting enterprise growth and livelihood outcomes. Addressing gender dynamics is therefore essential for achieving inclusive and sustainable fisheries development.

Against this backdrop, the capacity-building training on fish value addition was designed to address interconnected technical, business, food safety, and gender challenges. The training aligns with national development priorities, including the Blue Economy Strategy, fisheries development policies, and food safety regulations, while also contributing to the Sustainable Development Goals (SDGs), notably SDG 2 (Zero Hunger), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth).

The training was conducted in Sindo (Kakione Beach) due to its strategic importance as an active fish landing and processing site and the presence of the newly installed solar-powered tent dryer by WorldFish. The area hosts a high concentration of small-scale fish processors and traders who face persistent post-harvest losses and limited access to appropriate processing technologies. Delivering the training within the community enabled practical, context-specific learning using locally relevant smoking and drying technologies, while facilitating immediate application of skills and peer learning among participants.

Purpose of the Training

The overall purpose of the training was to strengthen the technical, entrepreneurial, and gender-responsive capacities of fish value chain actors in order to enhance the production of safe, high-quality, and market-ready fish products.

Overall Objective

The overall objective of the training was to strengthen participants' technical, entrepreneurial, and gender-responsive capacities in fish value addition through practical training on processing technologies, quality assurance, business skills, and inclusive household decision-making.

Specific Objectives

The specific objectives of the training were to:

Build participants' technical knowledge and practical skills in fish value addition through smoking and drying technologies, including appropriate sample preparation, marination, processing, packaging, and storage practices.

Enhance participants' understanding and application of food safety and quality standards, including hygiene requirements, Good Manufacturing Practices (GMPs), Standard Operating Procedures (SOPs), labeling, packaging, and compliance with relevant government regulations.

Improve participants' ability to assess product quality and market viability, with emphasis on sensory attributes such as colour, flavour, taste, texture, and overall consumer acceptability.

Promote gender equality and social inclusion within fish value chains through the Gender Action Learning System (GALS), enabling participants to improve household decision-making, resource allocation, and equitable participation in income-generating activities.

Foster peer learning and experiential knowledge sharing among participants, trainers, and facilitators to support the adoption of improved fish processing technologies and best practices.

Support the uptake of value-added fish products by enhancing participants' readiness to meet market requirements and contribute to improved livelihoods and food security.

Target Participants

The training targeted key actors within the fish value chain, with emphasis on those directly involved in fish processing and marketing at the community level. Participants included:

1. Small-scale fish processors engaged in smoking, drying, and handling of fish products.
2. Fish traders and marketers are involved in local and regional fish markets.
3. Other value chain actors and community members who are supporting fish processing and enterprise activities.

Deliberate efforts were made to ensure the inclusion of women and youth, recognizing their central role in fish processing and household food security, as well as the structural barriers they face in accessing resources and decision-making spaces. Participant selection was based on active engagement in fish processing and demonstrated interest in enterprise development, ensuring that the skills and knowledge acquired could be immediately applied.

Gender and social inclusion considerations were integrated throughout the training design and implementation, particularly using the GALS methodology. This approach enabled participants to reflect on household and community dynamics, promote shared decision-making, and strengthen equitable participation in economic activities, thereby enhancing both livelihood outcomes and social cohesion.

Training Design, Content, and Methodology

The capacity-building training was designed as a practice-oriented, competency-based intervention aimed at addressing technical, food safety, business, and gender-related constraints across the fish value chain. The design deliberately integrated technical processing knowledge, food safety compliance, enterprise development, and gender transformation, recognizing that improvements in fish value addition require a holistic approach rather than isolated technical solutions.

The training content and delivery drew from a structured Food Safety and Business Training Manual, adapted to local conditions and learner needs. The manual provided standardized guidance on fish processing, hygiene, quality assurance, packaging, labeling, and business development, while the training contextualized this knowledge through demonstrations, hands-on practice, and group exercises.

A blended learning approach was adopted, combining:

- Short theoretical sessions to introduce key concepts and standards,
- Demonstrations and step-by-step practical exercises,
- Group discussions and peer learning,
- Experiential gender-transformative training using the Gender Action Learning System (GALS),
- Applied business tools to support enterprise viability through the Business Canvas Model.

This approach ensured that participants not only acquired technical knowledge but were also able to apply, test, and internalize skills relevant to their daily fish processing and business activities.

Training Session I

Day One: Foundations of Fish Value Addition and Processing Technologies

Opening and Welcoming Session

The training began with a series of opening and welcoming remarks from key project and government stakeholders, setting the tone for the engagement and underscoring its relevance to local livelihoods, public health, and the fisheries value chain. Dr. Kevin Ouko delivered the initial welcoming remarks, during which he invited participants to fully prepare themselves and commit to the entire training process. He emphasized that the success of the training depended not only on attendance but also on active participation, openness to learning, and willingness to adopt improved practices. Dr. Ouko provided a comprehensive background of the project, outlining its objectives, scope, and expected outcomes, and clarified the respective roles of ACTS and WorldFish in supporting capacity building, research, and community-level implementation. He further highlighted the key project deliverables and how the training fits within broader efforts to reduce post-harvest losses, improve fish quality, and enhance market access for fish actors.

The Suba South Sub-County Fisheries Officer and the Public Health Officer also gave opening remarks and formally welcomed participants to the meeting. The Fisheries Officer emphasized the importance of adopting improved fish handling and processing practices to enhance product quality, reduce losses, and strengthen compliance with fisheries regulations. The Public Health Officer highlighted the public health implications of poor fish handling, stressing the need for hygiene, sanitation, and food safety standards to protect consumers and safeguard community health. Both officers encouraged participants to take advantage of the training and align their practices with existing regulatory and health requirements.

The capacity-building workshop was officially opened by the Senior Chief of the area, who acknowledged the collective efforts invested in the project by the WorldFish team and other partners. He called upon all participants and stakeholders to align their activities with donor expectations and to uphold accountability in the implementation of project interventions. In his remarks, he observed that fish preservation has historically been underemphasized in the area, despite recurring post-harvest losses experienced by fish traders, particularly during the rainy seasons. He concluded by reaffirming the community's readiness and willingness to embrace the project and to support initiatives aimed at improving fish handling, preservation, and livelihoods.

Participants during the opening session at Kakione Beach, Sindo, Homa Bay County, marking the start of the capacity-building training on fish value addition and food safety.

Pre-training Engagement

During the pre-training engagement, participants shared their existing fish handling and processing practices, as well as their perceptions of fish safety and quality. These discussions revealed varying levels of awareness and highlighted common challenges such as inadequate preservation methods, limited access to clean water, and weak compliance with hygiene standards. Participants also articulated their expectations from the training, which included learning improved processing and techniques, understanding regulatory requirements, and acquiring practical skills that could be applied immediately in their daily operations.

Foundations of Fish Value Addition and Food Safety

The first day of the training focused on establishing a strong foundation for fish value addition by introducing participants to the objectives of the course, core concepts in fish processing, and the linkages between food safety, shelf life, marketability, and consumer trust. Participants were guided through the fundamentals of fish and food value addition, with emphasis on how processing can significantly reduce post-harvest losses and improve the economic returns from fish products.

Food safety was presented as a central pillar of value addition. Facilitators explained the standards and critical steps required to ensure that fish is safe for consumption, from harvesting through processing, storage, and marketing. Participants actively contributed to discussions by sharing their experiences and perspectives on how they currently handle fish and omena, the challenges they face in maintaining quality, and the risks associated with unsafe practices. These exchanges provided an opportunity to clarify misconceptions and reinforce the importance of adopting consistent and standardized safety measures.

Fish Processing, Handling, and Regulatory Compliance

The training further explored fish processing as a series of interconnected operations that begin at the point of capture and extend to final delivery to consumers. Participants described their daily routines, including cleaning, cutting, drying, smoking, storage, and packaging, which allowed facilitators to contextualize technical guidance within existing practices. Modern fish preservation and processing methods—such as drying, smoking, freezing, salting, and canning—were introduced and discussed as effective strategies for preventing spoilage, extending shelf life, enhancing product quality, and creating diversified value-added products.

Significant attention was given to regulatory compliance and certification requirements within the fish value chain. Facilitators engaged participants on the need to obtain and regularly renew food handlers' certificates and to undergo periodic medical examinations as required by public health regulations. These requirements were emphasized as essential not only for legal compliance but also for building consumer confidence and safeguarding public health. The role of hygiene standards and proper documentation in accessing formal and higher-value markets was also highlighted.

Practical Sessions, Sanitation, and Value Addition

The training transitioned into practical sessions that allowed participants to apply theoretical knowledge through hands-on activities focused on smoking and drying technologies. Participants were guided through the selection of appropriate raw fish materials, sorting and grading based on freshness and size, sample preparation and marination, and hygienic handling during processing. These sessions reinforced the importance of following Standard Operating Procedures (SOPs) to ensure consistency, product quality, and safety.

Facilitators engaging participants in a pre-training discussion on existing fish handling and processing practices.

Demonstration of hygienic fish handling and sample preparation during the practical smoking and drying session.

Sanitation and hygiene were emphasized throughout the practical sessions, with facilitators highlighting potential contamination risks at different stages, including handling at the boat, processing sites, storage facilities, and during transport. Participants were sensitized on the need for clean and sanitized processing environments, access to safe water, use of personal protective equipment, proper handwashing, and avoidance of cross-contamination. Discussions also covered the nutritional benefits of fish consumption, with participants noting its contribution to health and brain development.

The training concluded by reinforcing the importance of fish value addition as a strategy for preventing spoilage, given the highly perishable and protein-rich nature of fish. Smoking and drying were highlighted as effective methods for moisture control, reduction of spoilage microorganisms, and production of convenient, market-ready products that require less preparation time for consumers.

Training Materials

All participants were provided with a comprehensive training manual to support continued learning and application of the skills acquired during the training. The manual serves as a practical reference for small and medium-sized enterprises engaged in agro-processing and fish value addition and can also be used in Training of Trainers (ToT) programs. It covers key technical areas, including fish hygiene and safety handling measures, Good Manufacturing Practices (GMP), packaging and labeling requirements, and step-by-step practical procedures for producing solar-dried omena (silver cyprinid) and smoked fish products such as Tilapia and Nile perch.

Training Session Two

Day Two: Fish Processing Training and Gender-Transformative Learning

The second day of the training was highly practical and experiential, combining hands-on fish processing activities with structured gender-transformative learning through the Gender Action Learning System (GALS). The design of the day intentionally linked technical competencies in fish smoking, drying, and handling with social and household dynamics that influence enterprise performance and sustainability.

Practical Fish Processing and Quality Control

The morning session focused on intensive practical fish processing activities. Participants actively engaged in loading fish into drying and smoking systems, monitoring processing conditions, and observing critical parameters such as temperature, processing time, and airflow. Trainers guided participants through the application of hygiene and safety principles at each stage of processing, emphasizing the importance of cleanliness, protective handling, and orderly workflow. Through close interaction with the trainers, participants learned how variations in processing conditions directly affect moisture content, product quality, shelf life, and compliance with food safety and market standards. The session underscored the role of controlled and standardized processing in reducing post-harvest losses and improving the marketability of fish products.

Participants loading fish into the solar tent dryer as part of hands-on training on improved drying technologies.

Monitoring temperature and airflow during the fish smoking process to ensure quality and food safety compliance.

Product Handling, Packaging, and Reflection

Later in the afternoon, participants returned to the processing area to remove the finished fish products and undertake initial packaging. This practical session reinforced the importance of careful handling of processed products to prevent contamination and quality deterioration. The day concluded with collective reflections, during which participants discussed how the integration of technical skills and gender awareness can influence enterprise success, income stability, and household wellbeing.

Gender Action Learning System (GALS) Sessions

The GALS sessions were conducted as part of the broader training programme on food safety, value addition, and enterprise development within the fish smoking, drying, and frying value chains. The sessions aimed to strengthen participants' capacity to articulate shared visions, identify gender-related opportunities and constraints, and develop practical household- and group-level action plans to support fisheries-based processing enterprise development.

Participants and Group Composition

The sessions brought together a diverse mix of women-led and mixed enterprise groups actively engaged in fish harvesting, processing, and trading. Participating groups included Kakione Self-Help Group, Sori Women Self-Help Group, Sori Individual Fish Frying Traders, Homa Bay BMC, Goodstart Self-Help Group, Ziwani Fish Frying Business Group, Samaki, and Wacho Gi Timo. This diversity enabled rich peer learning across different business models, scales of operation, and household contexts.

Application of the GALS Vision Journey Tool

All groups worked with the simplified GALS Vision Journey (Vision Road Map) tool. During the introduction, facilitators emphasized inclusive participation, the use of drawings and symbols, and discussions in simple, locally understood language. Participants jointly reflected on their current situation, articulated realistic one-year actions, and mapped the steps required to move from the present to their desired future. The facilitation approach deliberately positioned trainers as facilitators rather than instructors, allowing groups to work collaboratively and ensuring that all members participated in drawing, explaining, and discussing their visions. Discussions explicitly addressed workload sharing, decision-making, and resource mobilisation within households and groups.

Emerging Visions, Opportunities, and Constraints

Across all group presentations, participants demonstrated a strong ability to link future aspirations with improvements in both business performance and household wellbeing. Common themes emerging from the drawings and narratives included aspirations for improved fish processing infrastructure, such as cleaner frying areas, improved smoking kilns, drying racks, and better access to clean water. Enhanced food safety and hygiene practices were emphasized, including the use of protective clothing, cleaner utensils, and improved storage to reduce contamination and post-harvest losses. Participants also expressed business growth ambitions, including increased volumes of processed fish, diversification into value-added products, access to new markets, and improved income stability. Group strengthening featured prominently, with many self-help groups highlighting savings, access to credit, and collective investment as critical steps towards achieving their visions. Participants identified access to the lake as a key opportunity, alongside the availability of labour across different stages of the value chain. However, major constraints were also highlighted, notably poor road infrastructure, limited access to capital for expansion, and challenges in acquiring appropriate equipment for rapid fish preservation.

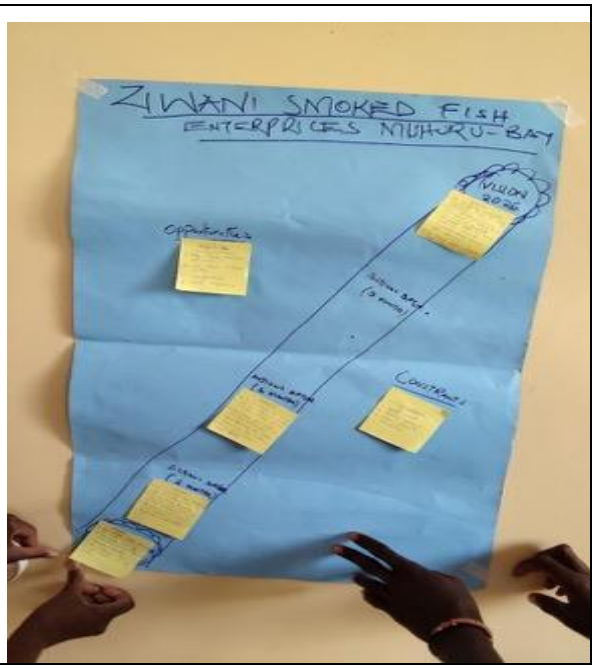
Gender Dimensions and Learning Outcomes

The GALS process enabled participants to openly discuss gender-related barriers affecting their enterprises, including limited access to capital, unequal decision-making power, and inadequate spousal support. At the same time, the sessions helped groups identify practical solutions, such as involving family members in business planning, improving communication within households, and strengthening women's leadership within groups. The use of vision drawings provided a non-threatening and inclusive platform for expressing aspirations and constraints that might not easily emerge in conventional discussion-based training. Overall, the process reinforced the understanding that strong, cooperative households and cohesive groups are foundational to successful and sustainable fish processing enterprises.

Action Planning and Follow-Up

Each group concluded its presentation by identifying concrete short- and medium-term actions, the support required, and the key actors responsible for follow-up. These action points were closely aligned with the technical training components on food safety, value addition, and business development, ensuring that gender considerations were integrated into enterprise planning rather than treated as a stand-alone issue. Overall, the GALS sessions were well received and effectively complemented the technical training, providing participants

with a structured yet flexible framework to align business ambitions with household dynamics and enhance the likelihood of sustained adoption of improved fish processing and enterprise practices.



Presentation of group vision road maps highlighting business aspirations and gender-inclusive action plans.

Table 1: Summary of Road Map Visioning Exercise by Groups and Individual Enterprises

1.	Group name	Current status	3-month target	6-month target	9-month target	Vision for December 2026
2.	Kakione Self-Help Group	There is a solar tent dryer We have the skills to operate the dryer We are a registered group	Operationalise the tent dryer	Liaise with other NGOS Packaging of products for other markets	Expansion of the solar tent dryer Creating awareness through social media Presence at the national shows	Be a hub of quality fish products
3.	Sori Women Self-Help Group	A small smoking kiln that is being used daily Currently being trained on food safety	Training other members and increasing product awareness	Increase capital for the expansion of the business Collaboration with other counties to increase the smoked fish stock	Increase the places the fish is sold Opening a bank account	Have a large kiln smoking machine
4.	Goodstart Self-Help Group	28 women who are securing 20 basins of omena in a day	Increase their capital available for business, and increase the number of basins per day	Acquire a solar tent drier Train our members on how to use it	Prepare for the operation of the tent drier by having an account, ensuring food is safe and of quality, and that proper means of transport are secured.	To be the biggest supplier of quality and safe dried fish in Kenya
5.	Ziwani Fish Frying Business Group	Not food-grade quality fish Low capacity To improve some functions of the kiln	Produce quality smoked fish To improve the fundamentals of the small kiln Effective operations Engage the local customers	Increase the size of the kiln to produce a larger volume Look for inter-county markets Involvement of KEBS	Open other markets	Produce quality smoked fish in large volumes Employ many members in the community Export quality smoked fish to other counties

Day Three: Quality Assessment, Business Development, And Closure

Product Quality Assessment and Market Readiness

The morning session of the final day focused on quality assurance and market readiness, consolidating technical skills acquired during the earlier processing sessions. Participants undertook a guided assessment of the smoked and dried fish products developed during the training. Using trainer-provided criteria, they evaluated product appearance, colour, uniformity, texture, moisture content, aroma, flavour, and adherence to hygiene and safety standards. The session also covered Standard Operating Procedures (SOPs), proper labeling, packaging, and storage practices, with strong emphasis on regulatory compliance and market expectations. Participants learned how appropriate packaging and labeling enhance product differentiation, build consumer trust, and support compliance with food safety regulations, thereby improving competitiveness in formal and informal markets.

Packaging and labeling of processed fish products to enhance market readiness and regulatory compliance.

Business Literacy Training

Introduction and Objectives

On the final day of the training programme, 32 community participants took part in a comprehensive business literacy training session with a strong emphasis on enterprise development within the fisheries value chain. The session was designed to strengthen participants' entrepreneurial capacities by deepening their understanding of enterprise development, equipping them with practical business planning tools, and enabling them to translate technical processing skills into viable and sustainable income-generating ventures. Specifically, the training aimed to enhance participants' understanding of the concept and importance of enterprise development, introduce the Business Model Canvas (BMC) as a structured and practical tool for enterprise planning and growth, and support participants to apply the BMC in developing tailored business models for their existing or planned enterprises.

Training Approach and Participatory Engagement

The training adopted an interactive and participatory approach to ensure relevance and ownership of the learning process. The session commenced with an open discussion in which participants were invited to share the types of businesses they were currently engaged in, as well as new business ideas that had emerged through their interaction with the project and the preceding technical training sessions. This approach fostered active participation, encouraged peer learning, and allowed the facilitator to ground theoretical concepts in real-life experiences drawn directly from the participants' socio-economic and enterprise contexts. By anchoring the training in lived experiences, participants were better able to relate business concepts to their daily operations and long-term aspirations.

Existing and Emerging Enterprise Activities

Discussions revealed that the majority of participants were already engaged in fish-based enterprises, predominantly involving dried omena, fried fish, and traditionally smoked fish. Rather than expressing interest in shifting to entirely new sectors, participants demonstrated a strong inclination toward upgrading and strengthening their existing enterprises. Emerging business ideas largely remained within the fisheries value

chain, with a notable emphasis on adopting improved processing technologies, smart equipment, and enhanced quality control practices. Participants articulated aspirations to transition from traditional processing methods to technology-enhanced smoking and drying systems, with the aim of improving efficiency, product quality, shelf life, and access to higher-value markets. These insights underscored the project's role in stimulating innovation-led upgrading rather than enterprise substitution.

	Sample responses to the question, *"What businesses are you doing?"*	Sample Responses to the Question: *What New Businesses Do You Want to Start?*
1st Participant	*Dried Omena Business*	*Smoked Fish*
2nd Participant	*Fish Grilling Business*	*Smoked Fish*
3rd Participant	*Deep Fried Tilapia*	*Smoked Fish*
4th Participant	*Smoked Fish*	*Fried Fish*
5th Participant	*Traditionally Smoked Fish*	*New Technology Smoked Fish*
6th Participant	*Dried Omena*	*Smoked Fish*
7th Participant	*Fried Fish*	*Stick With Fried Fish*
8th Participant	*Traditionally Dried Omena*	*New Technology Dried Omena*

Introduction to the Business Model Canvas

The Business Model Canvas was introduced as a practical, one-page strategic management framework that enables entrepreneurs to visualize, design, and refine their business models in a structured yet simplified manner. Emphasis was placed on the BMC's usefulness in enhancing understanding of how different components of a business interact to create and deliver value, generate revenue, and ensure sustainability. The facilitator systematically explained each of the key components of the BMC—Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, Cost Structure, and Impact—highlighting how these elements collectively contribute to enterprise viability. Participants were guided step-by-step on how to apply each component to their own enterprises, using examples drawn from their fish processing and marketing activities. This hands-on approach enabled participants to appreciate the BMC not only as a planning tool for new ventures but also as a framework for improving, formalizing, and scaling existing businesses.

Group Work: Developing BMC Tailored for their Businesses

In their groups, the participants developed their BMC as follows, as per the counties:

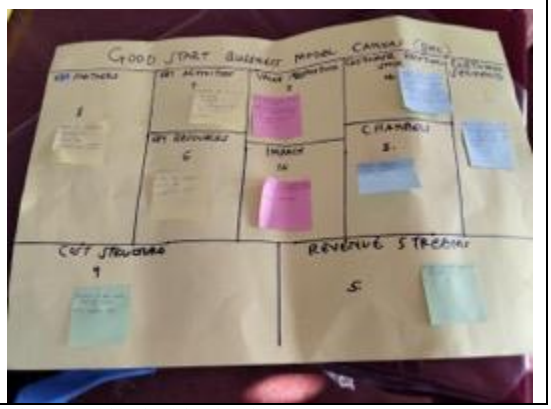
A. Homabay County:

4. Homabay Individual Entrepreneurs

Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	Description
Customer Segments	▪ Local community members and households ▪ Hotels and restaurants ▪ Schools and institutions
Value Proposition	▪ High-quality fish products ▪ Diversified flavors and preparation options ▪ Timely and reliable delivery ▪ Improved access to affordable and nutritious fish
Channels	▪ Word of mouth ▪ Social media platforms ▪ Local markets and direct sales ▪ Institutional supply (schools and hotels)
Customer Relationships	▪ Direct and personalized customer engagement ▪ After-sales follow-up ▪ Customer feedback mechanisms ▪ Trust built through consistent quality
Revenue Streams	▪ Sale of fried fish ▪ Group savings and loaning activities
Key Activities	▪ Sourcing fish from suppliers and fishers ▪ Cleaning, grading, and pricing fish ▪ Sales and distribution ▪ Record keeping and bookkeeping
Key Resources	▪ Access to Lake Victoria ▪ Skilled labor and practical experience ▪ Business and financial management skills ▪ Equipment (knives, jikos, cooking pans)
Key Partners	▪ Fish suppliers and local fishers ▪ Transporters (motorbike operators) ▪ County and National Government (licenses, health certification) ▪ Savings and loan groups
Cost Structure	▪ Purchase of fish ▪ Cooking oil ▪ Fuel ▪ Transport ▪ Labor
Expected Impacts	▪ Improved household income and livelihoods ▪ Enhanced food security and nutrition ▪ Community-level economic empowerment

2. Good Start Women's Group



Business Model Canvas group work session focused on enterprise development within the fish value chain.

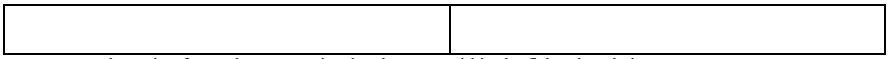
BMC Component	Good Start Women's Group Details
Customer Segments	• Local community members • Households purchasing omena (small fish) • Market customers
Value Proposition	• Delivery of quality omena products • Value addition through cleaning and drying • Reliable supply of affordable fish products
Channels	• Local markets • Direct sales to customers
Customer Relationships	• Direct interaction with customers • Building trust through quality products • Customer feedback to improve services
Revenue Streams	• Sale of cleaned, dried, and packaged omena
Key Activities	• Purchasing omena from suppliers • Drying and cleaning omena • Packaging and selling • Marketing and customer engagement
Key Resources	• Access to Lake Victoria • Boats and fishing nets • Skilled manpower
Key Partners	• WorldFish and other fisheries organizations • BMU (Beach Management Units) • Fisheries Department • Transport service providers
Cost Structure	• Purchase of omena (highest cost) • Cost of spreading/drying nets
Impact	• Improved household income • Women economic empowerment • Strengthened local economy

3. Wacho Gi Timo Women Group

Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	Wacho Gi Timo Women's Group Details
Customer Segments	•Women'sl community members • Individual household consumers • Local market buyers
Value Proposition	• Affordable and accessible fish products • Availability of processed fish (smoked) • Consistent quality for local consumers
Channels	• Direct sales within the local community • Local markets • Community-based distribution
Customer Relationships	• Direct engagement with customers • Relationship-building through trust and reliability • Personalized service within the community
Revenue Streams	• Sale of smoked fish products • Income based on production volume and pricing calculations
Key Activities	• Purchasing fish from suppliers • Cleaning and processing fish • Smoking and drying fish • Packaging and selling to customers
Key Resources	• Access to Lake Victoria • Smoking kilns and processing equipment • Mobile phones for customer communication • Human labor and skills
Key Partners	• Fisher groups and suppliers • Public administrators and fisheries officers • Community leadership and local networks
Cost Structure	• Charges related to fish production • Transport costs, especially during rainy seasons • Firewood for fish smoking • Labour and handling costs
Impact	• Job creation, especially for women • Improved household incomes • Increased availability of fish in local markets • Strengthened local economy and livelihoods

4. Kakione Women's Group



Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	KakionWomen'sen Group Details
Customer Segments	•Women'sl community members • Individual household consumers • Market customers
Value Proposition	• Large volumes of fresh fish products • Proper packaging • Prompt and reliable delivery • Skilled and attentive customer service
Channels	• Road transport • Local markets • Water transport (boats, ferries)
Customer Relationships	• Good communication with customers • Advertising through media • Good customer care and responsiveness
Revenue Streams	• Sale of packaged fish products • Income linked to product quality and affordability
Key Activities	• Fish purchasing • Cleaning and drying of omena • Transportation and logistics • Marketing and selling of products
Key Resources	• Lake Victoria • Skills and experience • Omena fish products

	• Drying areas and basic equipment
Key Partners	• BMU (Beach Management Units) • Fishermen • Fisheries Department • Customers as repeat buyers
Cost Structure	• Fuel for boats and transport • Sourcing of fish • Hiring of labour • Packaging and transportation costs
Impact	• Creation of job opportunities • Improved household incomes • Enhanced food security in the community • Economic empowerment, especially for women

B. Migori County

1. Ziwani Self Help Group Muhuru

Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	Ziwani Self Help Group Muhuru Details
Customer Segments	• SHG members • Small-scale traders and farmers • Local community members
Value Propositions	• Access to affordable loans • Financial inclusion • Improved livelihoods • Economic empowerment
Channels	• Group meetings • Word of mouth • Local community networks
Customer Relationships	• Trust-based relationships • Regular meetings • Member participation and peer support
Revenue Streams	• Member savings/contributions • Interest from loans • Income from group projects
Key Resources	• Group members • Financial savings • Skills and knowledge • Community assets
Key Activities	• Savings and lending • Income-generating activities • Training and capacity building • Community mobilization
Key Partners	• Local community groups • NGOs and development partners • Local authorities • Suppliers
Cost Structure	• Operational expenses • Training costs • Administrative costs • Project inputs
Impact	• Increased household income • Stronger savings culture • Improved financial resilience • Community development

2. Sori Self-Help Women's Group

Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	Sori Self-Help Women's Group Details
CustomeSelf-Helps	• Local community members • Households • Schools • Hotels and eateries • Individual consumers
Value Propositions	• Quality grilled fish products • Affordable and reliable supply • Fresh and hygienically prepared fish • Convenient access to fish products
Channels	• Local markets • Direct sales • Home delivery • Institutional delivery (schools, hotels)
Customer Relationships	• Good communication with customers • Trust and reliability • Customer care and feedback • After-sales support
Revenue Streams	• Sale of grilled fish • Sale of fried fish • Sale of fish pieces • Catering and bulk supply orders
Key Resources	• Capital • Grilling machine • Fish stock • Charcoal • Group members' labor and skills
Key Activities	• Sourcing fish • Grilling and frying fish • Marketing and sales • Bookkeeping and record keeping • Auditing
Key Partners	• Fishermen • Health officers • County Government of Migori • Banks and SACCOs • NGOs and Women Development Funds • Group members
Cost Structure	• Cost of fish • Transport costs • Grilling machine maintenance • Firewood/charcoal • Credit/loan repayments
Impact	• Women economic empowerment • Improved household income • Job creation • Improved food security • Community development

3. Samaki Muhuru Group


Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	Samaki Muhuru Group Details
Customer Segments	• Schools • Local market • Companies (fish & animal feed industries) • External markets (e.g. NGOs, hospitals, hotels)
Value Propositions	• Reliability (consistent supply) • Branding • Premium quality products • Sustainability (environmentally friendly practices)
Channels	• Direct sales • Home delivery • Retail outlets
Customer Relationships	• Creating rapport • Engaging customers • Giving discounts • Reliability • Social media communication
Revenue Streams	• Selling dried omena for human consumption • Selling omena for animal feeds (local and external markets)
Key Resources	• Lake (source of fish) • Boats • Store • Omena • Trained personnel (business skills)
Key Activities	• Proper cleaning • Record keeping • Sorting and grading • Packaging
Key Partners	• Fishermen • Well-wishers • NGOs • Government bodies • Local boats
Cost Structure	• Fishing gear and nets • Store rent • Transportation costs • Labourers
Impact	• Environmental conservation • Improved living standards • Women empowerment • Children support

4. Sori Individual Entrepreneurs


Business Model Canvas group work session focused on enterprise development within the fish value chain.

BMC Component	Sori Individual Entrepreneurs Details
Customer Segments	• Local customers • Community members • Buyers who value affordable fish products
Value Propositions	• Adding flavor to the product • Improving product quality to attract customers • Appealing taste and better packaging
Channels	• Road transport • Motorbikes • Vehicles (direct delivery to customers)
Customer Relationships	• Good reception and customer care • Listening to customer needs and feedback • Giving customers attention and appreciation
Revenue Streams	• Selling fish at a higher price • Income from fish product sales
Key Resources	• Lake (main source of fish) • Boats • Fish stock • Human labor
Key Activities	• Cash handling and availability • Bookkeeping and record keeping • Proper business management
Key Partners	• Administrators (key partners) • County government • Local customers
Cost Structure	• Transport costs (very high) • Capital/start-up costs (expensive) • Difficulty in accessing funds
Impact	• Supporting community activities • Supporting education • Improving livelihoods and businesses within the community

Analysis Summary

The groups in HomaBay County primarily operate with a strong emphasis on fish-based value chains linked to Lake Victoria. They primarily serve local communities, focusing on affordable, nutritious fish products through various forms of processing (smoking, drying, cleaning, frying).

Their business models are shifting from traditional subsistence methods toward more commercialized, technology-driven enterprises to reduce post-harvest losses. Access to fish resources, processing skills, and local networks are critical enablers, while costs are driven mainly by fish purchase, transport, fuel, and labor. The overall impact is economic empowerment, improved food security, and strengthened local livelihoods in Homabay County.

Closure and Reflections

The training concluded with a closing session during which key lessons from the three days were summarized, participant reflections and feedback were shared, and appreciation was extended to facilitators, partners, and participants for their active engagement. All the participants were awarded participation certificates. The session reinforced the importance of applying the knowledge and skills gained beyond the training period to strengthen livelihoods, enhance food security, and promote inclusive and sustainable enterprise development within the fisheries sector.

Key Outputs and Immediate Outcomes

Key Training Outputs

Key outputs included:

- Trained fish value chain actors:
  Participants successfully completed training on fish phonologies, food safety, business development, and gender inclusion, enhancing their technical and entrepreneurial competencies.

- Practical demonstration of processing technologies:
  Participants collectively processed fish products using solar drying and hot smoking technologies, applying standardized procedures for sorting, cleaning, marination, drying, smoking, packaging, and storage.

- Improved understanding of food safety and hygiene standards:
  Participants were equipped with practical knowledge on hygiene, sanitation, Good Manufacturing Practices (GMPs), and Standard Operating Procedures (SOPs) applicable across the fish value chain.

- Processed fish products developed during the training:
  Solar-dried omena and hot-smoked fish products were produced and assessed, providing real examples for quality evaluation, packaging, and market readiness discussions.

- Enhanced awareness of packaging and labeling requirements:
  Participants gained practical insights into appropriate packaging materials, labeling requirements, and regulatory compliance necessary for accessing formal and higher-value markets.

- Business development tools introduced and applied:
  Participants were introduced to enterprise development concepts, product costing, profitability assessment, the Business Model Canvas, and basic business planning frameworks.

- Gender-transformative learning outputs:
  Through the GALS sessions, participants developed shared visions for equitable household decision-making and enterprise growth, strengthening gender awareness within fish value chains.

Technical Capacity Outcomes

The training resulted in notable improvements in participants' technical knowledge and skills related to fish value addition. Participants demonstrated enhanced capacity to:

- Select and handle raw fish materials based on freshness and quality indicators.
- Apply standardized processing procedures for solar drying and hot smoking to reduce post-harvest losses.
- Monitor critical processing parameters such as time, temperature, and moisture content to ensure product safety and consistency.
- Identify common quality defects and contamination risks during processing and storage.
- Implement basic quality control measures to improve product shelf life and consumer acceptability.

These technical outcomes are expected to contribute to improved product quality, reduced spoilage, and increased confidence among participants to adopt improved processing technologies.

Food Safety and Quality Assurance Outcomes

Participants exhibited improved awareness and understanding of food safety principles and regulatory requirements. Key outcomes included:

- Increased knowledge of hygiene and sanitation practices for food handlers and processing environments.
- Improved ability to identify biological, chemical, and physical food safety hazards along the fish value chain.
- Enhanced understanding of Good Manufacturing Practices (GMPs) and their role in protecting consumer health.
- Greater appreciation of the importance of proper packaging, labeling, and storage in maintaining food safety and compliance.

These outcomes position participants to produce safer fish products that meet minimum food safety standards, thereby improving consumer trust and market access.

Business and Market Readiness Outcomes

The integration of business development training strengthened participants' capacity to view fish processing as a viable enterprise rather than a subsistence activity. Outcomes included:

- Improved ability to calculate production costs and determine appropriate pricing for processed fish products.
- Enhanced understanding of profitability assessment and value addition margins.
- Increased awareness of customer needs, market requirements, and product differentiation strategies.
- Exposure to structured business planning tools that support enterprise growth and sustainability.

Participants demonstrated greater confidence in exploring new market opportunities and improving the competitiveness of their fish-based enterprises.

Gender and Social Inclusion Outcomes

The GALS training sessions contributed to meaningful gender-related outcomes, including:

- Improved awareness of gender roles and power relations within fish processing households and enterprises.
- Increased recognition of the importance of joint decision-making and equitable sharing of benefits.
- Enhanced participation of women in discussions on enterprise planning and income use.
- Strengthened commitment among participants to apply gender-equitable practices in their household and business activities.

These outcomes are expected to support more inclusive and sustainable livelihood improvements within the fish value chain.

Anticipated Short- to Medium-Term Outcomes

While the training primarily focused on immediate capacity strengthening, it is anticipated that, in the short to medium term, participants will:

- Adopt improved fish processing technologies and hygiene practices.
- Reduce post-harvest losses and improve product quality and shelf life.
- Increase household incomes through better-priced, value-added fish products.
- Strengthen market linkages through improved packaging, labeling, and compliance.
- Promote more equitable gender relations and shared decision-making within households and enterprises.

Contribution to Broader Development Goals

The training outcomes contribute to broader development objectives, including:

- Enhanced food and nutrition security through improved availability of safe fish products.
- Livelihood diversification and income generation for fishing communities.
- Advancement of gender equality and women's economic empowerment.
- Support for national fisheries and Blue Economy priorities.

Participants List

S/R	NAME	ORGANIZATION	COUNTY
1	Ruth Nawire	Samaki Women Group	Migori
2	Mireri Mary Akinyi	Samaki Women Group	Migori
3	Roseline A. Opiyo	Sori Kiranda (Entrepreneur)	Migori
4	Rosemary Ogola	Homa Bay Town(Enterprenuer	Homa Bay
5.	Pamela Ojhoro	Homa Bay (Entrepreneur)	Homa Bay
6.	Beatrice Akinyi	Ziwani Self Help Group	Migori
7.	Pamela Ocholla	Sori Self Help Group	Migori
8.	Nancy Orimba	Sori Self Help Group	Migori
9.	Quinter Awicho	Wacho Gi Timo Women's Group	Homa Bay
10.	Dorothy Anyango	Wacho Gi TimoWomen'sn Group	Homa Bay
11.	Janet Barongo Onyinkwa	Sori Kiranda	Migori
12.	Gucha Gilbert Mandela	Samaki Women Group	Migori
13.	Ogidi S. Suna	Ziwani Self Help group	Migori
14.	Maryanne Abayo	KakionWomen'sen Group	Homa Bay
15.	Lilian Akinyi	KakionWomen'sen Group	Homa Bay
16.	Roseline Auma	KakiWomen'somen Group	Homabay
17.	Meroline Atieno	KakiWomen'somen Group	Homa Bay
18.	Mercy Akoth	KaWomen's Women Group	Homa Bay
19.	Ouma Hempstone	Women'sne Women Group	Homa Bay
20.	Edwin Okello	Women'sne Women Group	Homa Bay
21.	Beryl Auma	Good Start Women Group	Homa Bay
22.	Margaret Atieno Oswago	,Women'sstart Women Group	Homa Bay
23.	Fransisca Odero	Kakione Women Group	Homa Bay
24.	Jocinter Akinyi	Kakione Women Group	Homa Bay
25.	Ngere CaroWomen's	Kakione Women Group	Homa Bay
26.	Ezra Omondi	Kakione Women Group	Homa Bay
27.	Mercellus OWomen's	Kakione Women Group	Homa Bay
28.	David Onyango Kinaga	Kakione Women Group	Homa Bay
29.	Grace Auma	Kakione Women Group	Homa Bay
30.	Charles Okoth	Fisheries Department	Suba Central Sub -County.
31.	Kennedy Amayo	Public Health Officer	Suba Central –Sub County.
32.	Daniel Magadi	NGAO	Suba Central Sub county
33	Dr. Eveleen Okoth	Facilitator	ACTS

34.	Dr. Kevin Kouko	Facilitator	ACTS
35.	Dr. Caroline Bosire	Facilitator	ACTS
36.	Dr. Catherine Kilelu	Facilitator	ACTS
37.	Betty Mohe	Facilitator	ACTS
38.	Mathenge	Facilitator	ACTS

Annex 1: Workshop Programme

Capacity Building on Fish Value Addition: Processing Technologies, Food Safety, Business Development, and Gender Inclusion

16th – 18th December 2025

KAKIONE BEACH –SINDO

Date	Day	Time	Activity	Person(s) in Charge
16/12/2025	Tuesday	8:30–9:00 am	Participants' arrival and registration	Dr. Ouko
		9:00–10:00 am	Opening ceremony and general introduction of participants	Designated persons (Area Chief, Fisheries Officer, Public Health Officer)
		10:00–11:00 am	Health / Tea break	All
		11:00 am–1:00 pm	General information on course requirements and food & fish value addition	Dr. E. Okoth
		1:00–2:00 pm	Lunch break	All
		2:00–4:30 pm	Introduction to practical sessions on smoking & drying; sample preparation and marination	Dr. E. Okoth, Assistant & Participants
		4:30–5:00 pm	End of day	All
17/12/2025	Wednesday	8:00–8:30 am	Arrival and registration	All
		8:30–10:00 am	Practical processing: loading, drying, smoking & monitoring	Trainers & Participants
		10:00–11:00 am	Health / Tea break	All
		11:00 am–1:00 pm	GALS Training – Session I	Dr. Kilelu / Olive
		1:00–2:00 pm	Lunch break	All
		2:00–5:00 pm	GALS Training – Session II	Dr. Kilelu / Olive
		5:00–5:30 pm	Removal of products and packaging	Trainers & Participants
		5:30 pm	End of day	All
18/12/2025	Thursday	8:30–10:00 am	Product quality assessment, SOPs, labeling & storage	Trainers & Participants
		10:00–11:00 am	Health / Tea break	All
		11:00 am–1:00 pm	Business Training – Session I	Betty Mohe
		1:00–2:00 pm	Lunch break	All

2:00–4:00 pm	Business Training – Session II	Betty Mohe
4:00–5:00 pm	Closing session	Dr. Kilelu

Photo Credit: Dr Everlyne Okoth

Disclaimer

CGIAR SCALING FOR IMPACT

CGIAR GENDER EQUALITY AND INCLUSION

CGIAR MULTIFUNCTIONAL LANDSCAPES

WorldFish