

Training approaches and manuals

Development and implementation of trainings in the fisheries and aquaculture sector

RELEVANCE

Small-scale aquaculture plays a critical role in global food security, livelihoods, and rural development. Particularly in rural and coastal communities, it serves as a vital source of income, nutrition, and employment. However, the sustainability and productivity of small-scale aquaculture operations are often hindered by challenges such as limited access to knowledge, lack of practical and inadequate training material, and the lack of standardised practices. Sustainable practices are essential not only for productivity but also for maintaining natural resources and biodiversity, while preventing illegal practices that could harm ecosystems. This is where training becomes a crucial element for building resilience.

The development of effective training approaches and manuals tailored specifically to small-scale aquaculture and fisheries addresses these challenges. Training materials translate complex technical information into accessible formats, incorporating local cultural contexts and practical examples. These resources provide fish farmers and aquaculture practitioners with skills to improve their practices, increase production efficiency, and adopt sustainable methods.

Well-designed training concepts and materials support the scaling-up of small-scale aquaculture operations by enabling the standardisation of practices across different regions. This not only contributes to increased productivity, but also improves the overall quality of aquaculture products and opens up new market opportunities for small-scale producers.

The Global Programme “Sustainable Fisheries and Aquaculture” is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development. The aim of the programme is an increase of fish supply from sustainable and resource-friendly fisheries and aquaculture to boost a healthy and diverse nutrition in Cambodia, India, Madagascar, Malawi, Mauritania, Uganda and Zambia. Sustainable production and processing techniques are promoted along the value chain in order to create jobs and income, with a special focus on youths and women. Local organisations are strengthened in their capacities to carry on programme interventions on a long-term basis. And policy advice is contributing to favourable framework conditions for a sustainable development of the fisheries and aquaculture sector in the implementing countries.



Additionally, the training concepts incorporate resilience measures to minimise the negative consequences of climate risks and protect natural resources for future generations. Where climate change is a growing threat, specific measures to mitigate risks – such as adjusting harvest cycles and improving water management – must be included in training materials. This focus on climate resilience ensures that small-scale aquaculture operations can continue to thrive despite shifting environmental conditions to ensure food and nutrition security and livelihoods for future generations.

The following approach has been drawn upon experiences of implementing capacity building and extension services in the aquaculture and fisheries sector from Cambodia, India, Madagascar, Malawi, Mauritania, Uganda, and Zambia.

APPROACH

➔ Needs assessment and gap analysis to decide training content and formats

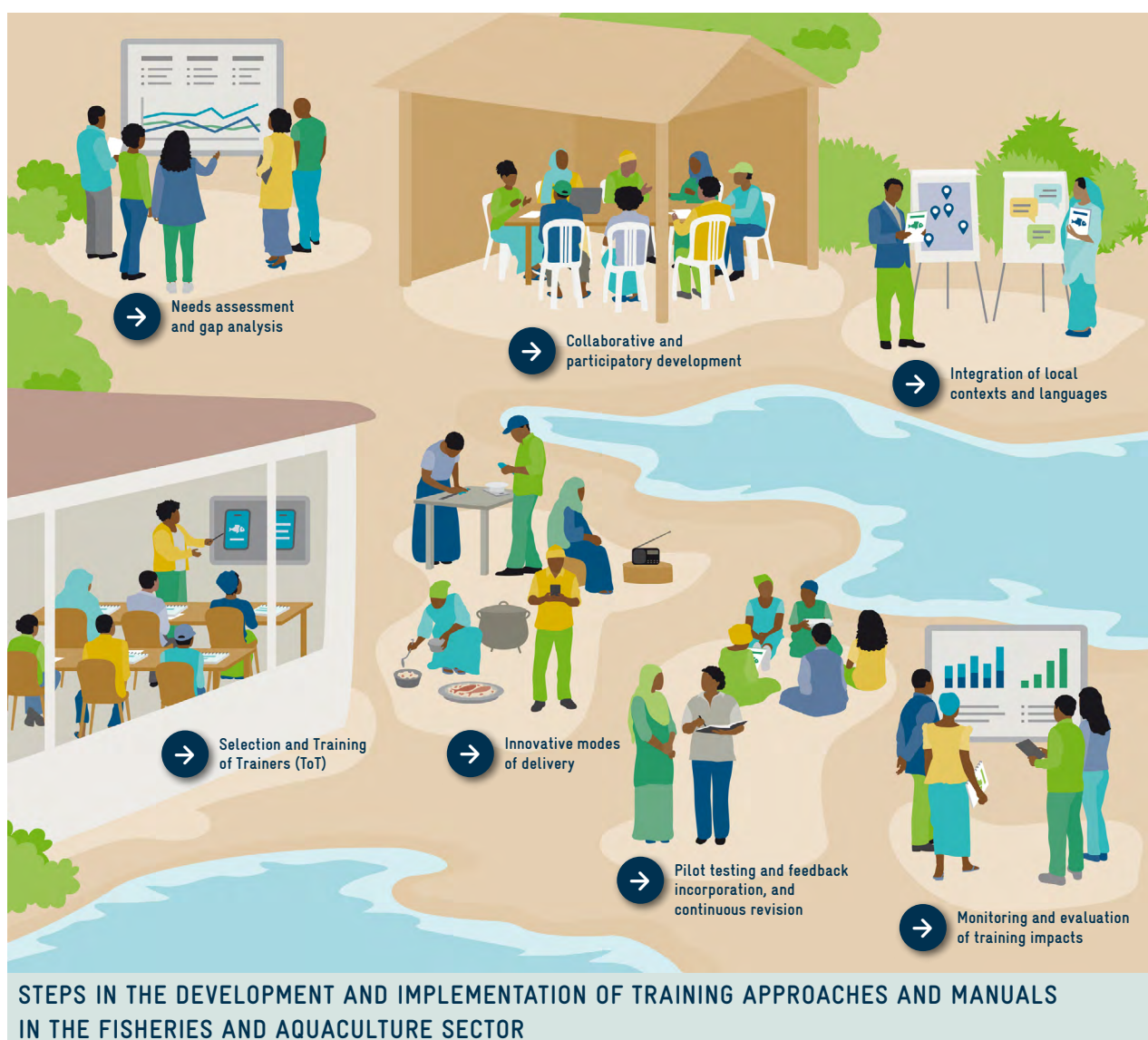
The initial step is conducting a thorough needs assessment and gap analysis by experienced technical team members from the project and partners. This process involves screening existing materials, consulting with stakeholders and actors in the fish value chain and identifying gaps in knowledge and practice. A field survey can be conducted to collect data on the needs of the beneficiaries and necessary framework requirements for training, e.g. technology availability, training duration, and intervals.

For instance, while the needs assessment in Zambia identified gaps in existing aquaculture training manuals that could be addressed through hands-on training, in Uganda, the survey led to the development of a fisheries business

training manual. The identification of weak points in Mauritania emphasized a need for hygiene and quality training in the fish value chain. Due to climate risks, Malawi's project recognized the importance of intermittent harvest methods and a fish trap manual. The main topic of the different training programmes as well as the used formats can therefore vary greatly.

➔ Collaborative and participatory development

A collaborative and participatory approach is central to the development of training materials. To ensure relevance, practicability and ownership, a task force is typically formed, including ministry representatives, academia, fish farmers, value chain actors, and researchers. Iterative processes, validation workshops, and stakeholder consultations are used to refine the materials, ensuring they reflect local needs.



For example, in India, the development of aquaculture training materials involved multiple workshops and participatory feedback from local fish farmers, government agencies, NGOs, and researchers. This collaborative process was vital to creating modular training sessions that suited the seasonal constraints of fish farming, particularly for women and small-scale farmers. The materials were continuously tested and revised to ensure their relevance, written in local languages, and tailored for field-based learning without the need for technology. This inclusive approach enabled farmers to take ownership of the training content and ensuring its effectiveness in the long term.

If necessary, consultants can be incorporated to harmonise the outcomes and accelerate the process, but a variety of relevant stakeholders of the sector and value chain should always be involved in reviewing the content.

→ Integration of local contexts and languages



Incorporating the local context – like environmental and cultural conditions in the regions and local languages – is essential when designing training manuals. This ensures accessibility and

relevance of training content and alignment with the realities of the target audience's environment. In India, for instance, the modular training sessions were developed with a specific focus on the available time of farmers and their farming calendar. The developed approach allows the training to be broken down into short, 2-hour modules. This ensures that farmers, particularly women, can participate without disrupting their ongoing livelihood and household activities. The modular setup also enables farmers to select sessions based on the season, such as pond preparation, stocking, or cultivation periods, maximising the relevance and timing of the information provided. Adding fitting illustrations, especially of local commodities and practices, to the training materials enhances comprehension by grounding the content in familiar visuals.

→ Selection and Training of Trainers (ToT)

The Training of Trainers (ToT) method is a widely used approach in capacity-building programmes to ensure the effective dissemination and anchoring of knowledge and skills in communities. Trainers are selected based on criteria such as experience, communication skills, and community engagement. Experience from India has shown that younger trainers, particularly those with up to five years of experience and graduate-level education, were rated highly by farmers. These trainers were found to be more relat-

able to the farmers' learning levels, as they were not too distant in terms of educational understanding and could effectively bridge the knowledge gap. They undergo a structured qualification programme that includes classroom sessions and hands-on learning to prepare them to conduct sessions aligned with adult learning principles and discovery-based approaches.



Detailed trainer manuals should be created to provide future trainers with clear guidance on how to deliver specific training content effectively. The development and refinement of these manuals should follow a participatory approach, incorporating feedback from early training sessions and continuous feedback loops from participants.

The Master Trainer model, as used in the Aquaculture Business School in Malawi and the Community Resource Person model in India, plays a crucial role in ensuring consistent quality and calibration of training standards. Master Trainers not only lead the initial ToT programmes, but also support ongoing quality assurance by mentoring the trainers and monitoring the effectiveness of training delivery.

The establishment of a network of trainers within communities is essential for ensuring the long-term availability of training and advisory services. These trainers act as intermediaries, translating technical concepts into practical solutions for farmers. By embedding this network locally, capacity building efforts become more sustainable and more responsive to the needs of the community.

→ Innovative modes of delivery

Training in sustainable fisheries and aquaculture needs to include both practical skills and theoretical knowledge, with a strong emphasis on flexible teaching methods and hands-on learning. Practical training often takes place on demo-farms or participants' own farms, where group mentoring and on-site technical input from trainers and experts occur. This hands-on training covers essential topics such as site selection, pond excavation, stocking, feed and pond management, fish health monitoring, water quality management, and fish processing. By engaging in real-life situations, participants gain the skills to independently apply the training content in their own operations. This experiential learning enhances their ability to manage pond aquaculture and fishing throughout the season. While field demonstrations offer practical, hands-on learning, classroom-based training provides theoretical knowledge.



Training formats extend to different modes of delivery. In India, for example, training materials such as flipbooks, posters, pamphlets, along with 2D animated films have been developed to ensure that training can be delivered without relying on technology or electricity, which is crucial for remote and rural locations. To reach rural households in Zambia, cooking demonstrations were held to inform about the benefits of the nutrients found in fish and their importance for muscle, brain, and bone development, while also teaching new recipes such as porridges for infants based on fish powder and providing taste-testing sessions.

Influenced by the restrictions due to the COVID-19 pandemic, some countries adopted innovative methods to deliver training content and reach a broader audience. In Mauritania, for example, the training content was disseminated via a mobile application, allowing target groups to access the information conveniently. Meetings, visits to fish landing sites, and training workshops in the field were restricted. Some projects developed specifically designed interactive radio shows for remote listeners or special training videos to spread their training content and sensitise about fish consumption and sustainable practices. These videos furthermore have the benefit of being re-watched, therefore guiding fish and aquaculture farmers even after the training cycle or assisting other farmers who couldn't participate.

In some countries, the assessment and gap analysis highlighted the need for awareness campaigns on nutrition and health benefits of fish and sea products, targeting groups like schoolchildren and young families. For example, the project in Zambia developed the “Let me tell you” series – a combination of videos, comics, and radio-shows to spread knowledge in a target group-oriented and easily understandable way. Similarly, the “Fish for Nutrition” campaign

in Malawi used posters, comic books, wall murals, and competitions especially developed for schoolchildren to raise awareness about fish for a healthy diet.

➔ Pilot testing and feedback incorporation, and continuous revision

Pilot testing of the training materials is an important step to refine and improve the content based on real-world feedback from various stakeholders, especially trainees and trainers. This process is enhanced through practical methods such as field visits and demonstrations, where trainers showcase specific techniques. Trainees are then encouraged to apply these methods in real-life scenarios, allowing trainers to assess the applicability and relevance of the training content.



Through test training sessions, necessary adjustments and challenges can be identified, supplemented by anecdotal insights and direct feedback from farmers. This iterative approach ensures that materials remain practical and relevant to local conditions, incorporate new knowledge, and adapt to changing environmental and market conditions. Importantly, feedback collection should ideally span one full cultivation cycle, covering key phases such as pond preparation, stocking, water quality management, feeding, harvesting, and post-harvest activities. This comprehensive timeframe allows trainers to gather detailed insights into the challenges faced by farmers and adjust the training accordingly.

At the conclusion of pilot sessions, participants are invited to reflect on their experiences by addressing key questions such as, “What went well?” and “What can be improved?”. This structured feedback process not only strengthens the content but also helps improve the delivery methods. As a result, the materials are better aligned with the real needs of the target audience, enhancing their overall impact.

➔ Monitoring and evaluation of training impacts

To measure the long-term effectiveness of training, monitoring and evaluation (M&E) processes are essential. Beyond collecting immediate feedback from participants, a more holistic approach involves assessing the application of learned practices over time.

Feedback loops play a valuable role in the evaluation process. Surveys conducted immediately after the training capture participants' initial reactions, while periodic follow-ups provide insights into the rate of adoption and



From theory to practice: hatchery operators in Phalombe district, Malawi, attending the practical training session on fish sampling, including weighing and measuring sizes of pond fish.

adaptation of practices. For instance, data on the adoption rate of specific techniques – such as improved water management or sustainable feeding practices – can serve as an indicator of training success.



Field visits also help trainers to identify barriers to adoption, such as resource constraints or contextual challenges, which can then inform future revisions of the training materials. This ensures that the training remains dynamic and responsive to the evolving needs of farmers.

Rather than merely counting the number of participants trained, the focus shifts to measuring the qualitative impacts of the training. This includes evaluating how the acquired knowledge translates into tangible outcomes such as increased productivity, improved resource management, and enhanced livelihoods. By systematically tracking these outcomes, the effectiveness of the training programme can be continuously assessed and improved.

➔ Anchoring of training approaches and manuals in local institutions

To ensure the sustainability and widespread adoption of the training materials, these materials were closely aligned with the needs and priorities of local institutions. The content from the fisheries and aquaculture manuals was collaboratively integrated into national curricula and technical training colleges, ensuring both relevance and local ownership. In Madagascar, the training manuals were anchored in local institutions by integrating them into national curriculums, translating them into the local language, and facilitating their adoption through partnerships with the Ministry of Aquaculture, training centres, and guided sessions for adaptation.



Theoretical pond preparation training in Madagascar.

HOLISTIC TRAINING AND CAPACITY BUILDING

Technical training alone is not enough to ensure the long-term success and sustainability of fisheries and aquaculture practices. Trainings should include the answer to ‘why’ and not just ‘how’. By explaining the reasons behind specific practices – such as reducing environmental impacts or ensuring food and nutrition security, farmers gain a deeper understanding and can make informed decisions that align with sustainability goals. This goes beyond simply following instructions, fostering critical thinking and adaptive problem-solving. To create resilient and thriving enterprises, training should also incorporate elements such as business education, innovations along the value chain, and the use of decentralised renewable energy technologies. These aspects enable fish farmers to improve their financial literacy, adapt to market and environmental challenges, and apply innovative solutions for increased productivity and sustainability.

Business education

In addition to technical training, business fundamentals should also be taught in training courses. Special training books were created for such purpose, like the Farmer Records Book, that includes calculation examples and templates for the beneficiaries to use.

In Uganda, for example, the training manual included enterprise training, business financial management, and sustainable fisheries, helping fish business owners along the value chain to improve their financial literacy and management skills. In Malawi’s and India’s Aquaculture Business School, farmers were taught how to diversify income sources and manage risks across multiple agricultural ventures. This holistic approach empowered them to make informed investment decisions, reduce market risks (such as price fluctuations) or production risks (like partial or complete production losses) and improve their profitability, ensuring long-term sustainability.

Innovations along the value chain

To improve the productivity in sustainable ways or to adapt to climate change, different innovations and their use were included into the training programmes. The innovations benefited the farmers and fishers through better fish management possibilities, improved preservation, or the reduction of post-harvest losses.

One example is the use of an innovative fish trap for the intermittent harvest method. The size-selective and low-cost fish trap was designed for easy and regular harvest

of juvenile fish in mixed-sex tilapia cultures, mitigating the risk of a total loss of fish crop due to extreme weather events. Next to the better management of the pond's carrying capacity, the low-cost fish trap improves household nutrition and cash flow of small-scale aquaculture farmers. After successful trials, the fish trap was integrated into existing training programmes for fish farmer groups in Zambia and Malawi as a harvesting method. Additionally, special training contents and materials about its construction and use were developed.

To increase the supply of nutritional foods such as fish into local markets without contributing to overfishing and loss of biodiversity, a reduction of post-harvest losses is necessary. For example in Mauritania, this aspect was therefore integrated into the trainings through theoretical and hands on lessons in hygiene and quality measures as well as preservation of caught fish.

A common way to preserve fish is through smoking. To reduce the need for firewood or charcoal and health risks due to excessive smoke, innovations such as the “Chitofu 3in1” were included into the training approach in Malawi. This mobile and climate-friendly stove allows the preparation of high-quality and tasty food by frying, boiling, baking, roasting, and smoking while reducing the need for firewood up to 80 % in contrast to traditional methods and without a need for charcoal. It is also constructed in a way to prevent the development of harmful smoke. Beneficiaries organised themselves in groups to share the use of one “Chitofu 3in1” and received training in the use and maintenance of it.



A women-led fish farmer group in Malawi receives training on the climate-friendly Chitofu 3-in-1 stove.



Women self-help groups engaging in community-driven training & knowledge exchange on sustainable aquaculture, India.

IMPACTS

The development of tailored training concepts and manuals has significantly increased capacities of small-scale aquaculture and fisheries producers and led to the implementation of improved practices and innovations along the value chain.

The pilot testing, adoption, and roll-out of improved practices and innovations contributed to increased productivity, the maintenance of natural resources and biodiversity, and the prevention of illegal practices. It has also led to an improved quality of aquaculture and fishery products and a reduction of post harvest losses.

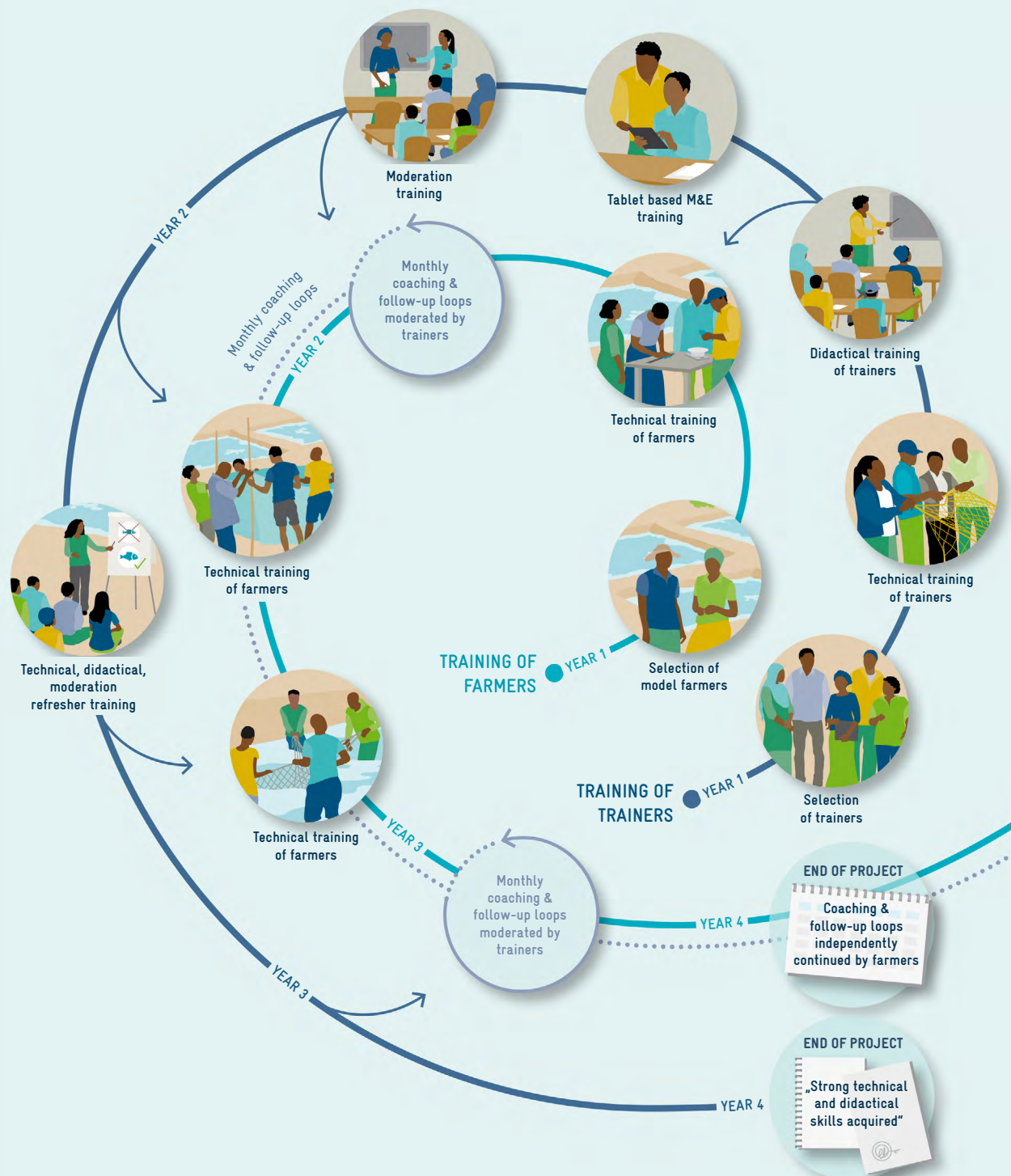
The combination of technical knowledge and business management skills encouraged farmers to explore new market opportunities and contributed to both economic growth and community resilience.

A high demand orientation, the incorporation of local contexts, practical examples and demonstrations as well as a participatory development process ensured the accessibility, relevance, practicability, and sustainability of developed training concepts and materials. This contributed to a high adoption rate of training contents and the sustainable development of the aquaculture and fisheries sector in the implementing countries.

CASE STUDY: COACHING AND FOLLOW-UP

The Coaching and Follow-up Loop (CFL) was implemented in the northern, central, and southern region of Malawi from 2020 on to ensure the ongoing application of knowledge gained during training among fish farmers and aquaculture entrepreneurs. Follow-up visits were conducted to confirm the understanding and imple-

mentation of new concepts, fostering innovation rather than rigid adherence to fixed formulas. Throughout the season, community-based trainers acted as mentors, offering guidance and tailored recommendations to address individual challenges faced by fish farmers. This approach empowered beneficiaries to develop a deep understanding of their operational systems, enabling them to find long-term solutions independently.



Unlike traditional training, which often positions farmers as passive recipients of information, the CFL promotes continuous learning and active participation. After the basic training in both technical and organisational aspects, trained Fish Farmers (FFs) and Fish Farmer Groups (FFGs) receive further extension advice through coaching and follow-up loops. These sessions address challenges arising during the implementation of improved aquaculture techniques and organisational issues within the FFGs.

In the Malawian context, where many FFs may have limited education but possess practical farming knowledge, coaching becomes a vital tool for empowerment. Coaches facilitate discussions in a group setting, helping FFs articulate their problems, backgrounds, and seasonal contexts that may influence their challenges. This participatory approach contrasts with past top-down outreach efforts, which often failed to resonate with farmers. By enhancing participation and valuing local knowledge, the CFL fosters a more effective knowledge transfer and strengthens self-esteem among the beneficiaries.

Coaching is a process where the coachees take ownership of the discussions. Coaches employ various tools to stimulate productive dialogues, including purposeful questioning, mirroring, feedback, visioning, and analysis of strengths, weaknesses, opportunities, and threats (SWOT). Purposeful questioning, through open-ended inquiries, encourages coachees to explore the context of their problems and identify solutions. Mirroring and feedback clarify vague ideas and reinforce the coachees' contributions, while visioning prompts them to consider their future aspirations. SWOT analysis helps coachees reflect on their strengths, weaknesses, opportunities, and threats, aiding in problem identification.

This cross-learning approach often resonates more with farmers than traditional instruction. The management of technical coaching sessions emphasizes local ownership and sustainability, with planned monthly or bimonthly sessions for FFs over two years. Each group of up to 25 farmers includes a model farmer who exemplifies high knowledge and commitment, serving as a practical reference during coaching. Technical coaching sessions last around three hours, with two hours dedicated to coaching processes and the remainder for administrative and monitoring issues. Coaching sessions follow basic training on organisational development and are ideally conducted with 10–20 group members who already know each other. Coaches gather background information on the group to tailor their facilitation effectively, encouraging group members to discuss their challenges and collaboratively devise solutions. A successful coach inspires the group to pursue their solutions while providing support and guidance.

This coaching process fosters a positive atmosphere, where group members actively participate in finding solutions, enhancing their management and fish production. By employing participatory tools and facilitating open discussions, coaches enable FFs and FFGs to address their challenges, ultimately leading to improved outcomes in aquaculture practices.

Chisomo Kumwenda from Lilongwe District shares her experience: »Through the knowledge that I have now, I will be able to impart it to the farmers. By doing so I know that they will be changed as well. They will improve in their farming.«

Sibeli Chilemba, a fish farmer from Kasungu district, values the coaching and follow-ups she participated in: »These coachings help in reminding us on different topics that we learnt during fish farmer trainings.«

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