



INITIATIVE ON

Aquatic Foods



Co-creating nutrition-sensitive development pathways with aquatic foods:

Consulting local food systems partners in Baucau and Lautem municipalities, Timor-Leste

A localized “aquatic food systems” future in Timor-Leste

Current global agendas have a strong focus on food systems transformation to address pervasive challenges of food and nutrition insecurity, poverty and environmental degradation. Defining what these global agendas mean in specific local contexts can help enable practical action for positive change. In Timor-Leste, the municipality level provides a practical scale at which to consider local food systems and to consult with local food systems actors and other stakeholders. In the municipalities of Baucau and Lautem, many foods – including aquatic foods – are produced in rural communities for both local consumption and to supply other places of demand or need. Government agencies and nongovernmental organizations (NGOs) are also active in the areas of nutrition-sensitive agriculture and food and nutrition security. As such, rural people, organizations and practices, together with other stakeholders, have a fundamental role in defining what a positive food systems future looks like and how aquatic foods can be included in the broader food and nutrition security agenda.

WorldFish has a focus on aquatic food systems and operates a transdisciplinary research-in-development program in Timor-Leste, hosted by the national government and the Directorate General of Fisheries, Aquaculture and Marine Resources (DG-FAMR). The CGIAR Initiative on Aquatic Foods supports this program by focusing on developing and strengthening partnerships that can enable research to be more effective.

On 23 June 2022, WorldFish held a consultation workshop in Baucau Vila to introduce its planned action research program (Box 1) in Baucau and Lautem municipalities to its diverse partners, including national, municipal and local government representatives, community members, and local and international NGOs. It also provided a platform for these partners to discuss aquatic food systems in their municipalities and provide input on how WorldFish work could be aligned with local priorities and ideas. The planned activities focus on strengthening aquatic food systems in Timor-Leste, including sustainable fish production, equitable and safe fish distribution, and consumption of nutritious aquatic foods to diversify diets. The workshop was also an opportunity to develop novel partnerships to integrate aquatic foods into broader food security and nutrition planning at the municipality level.

This brief provides a summary of the workshop and demonstrates the first steps towards co-developing a municipality-level food systems coalition for sustainable and nutrition-sensitive transformation that includes aquatic foods.

Consultation workshop objectives and process

Across both municipalities, 68 participants (32 women and 36 men) attended the workshop. Participants included national and municipal representatives from the DG-FAMR of the Ministry of Agriculture and Fisheries (MAF), the Nutrition Department of the Ministry of Health (MoH),



local authorities and community members who ranged from fishers, gleaners and aquaculture farmers to fish traders and sellers, as well as CARE International and TOMAK (*To'os ba Moris Di'ak*, or Farming for Prosperity – an agricultural livelihoods program supported by the Australian Government in Timor-Leste), local NGOs CFHD (*Centru Feto Haburas Dezenvolviment*, or Women's Growth and Development Centre) and Fraterna, and members of women's groups such as the Buruma producers.

The workshop had the following objectives:

- raise awareness about WorldFish activities in Baucau and Lautem municipalities and our partnership with the DG-FAMR
- understand the priorities of municipal-level partners and how WorldFish activities align
- strengthen partnerships in the municipalities and explore new ones
- co-define what nutrition-sensitive and sustainable aquatic food systems look like in these municipalities
- promote fish powder-making uptake among existing groups through peer-to-peer learning.

The day's proceedings comprised the following structure:

- The workshop was opened by a representative of the President of the Baucau Municipal Authority, Mr Francisco X da S Guterres, and a representative of the Director General of the DG-FAMR, Mr Joni Freitas.
- WorldFish introduced its current and new projects in Baucau and Lautem municipalities.
- The Commonwealth Scientific and Industrial Research Organisation (CSIRO), a partner on the nutrition-sensitive fisheries management (NSFM) project, gave a presentation on the nutritional value of fish for health and balanced diets, particularly for pregnant and lactating women and young children, followed by discussion and reflections by workshop participants.
- A women's group from Bobonaro Municipality gave a practical demonstration on how to make fish powder, an innovative fish-based product.
- Workshop participants worked in groups to identify the key actors in aquatic food systems in their municipalities and brainstormed how current systems could be made more nutritious, safer and sustainable.
- Closing remarks were given by Mr Moises Pereira, the Director of Agriculture in Baucau.

“Aquatic food systems” approach

The workshop introduced a localized concept of aquatic food systems that WorldFish applies throughout its activities and projects, and which covers the whole system when considered at the country level (Figure 1). For instance, WorldFish work supports fisheries and aquaculture production, promotes community-led governance models, strengthens distribution practices and supports livelihoods based on aquatic resources, while improving nutrition and promoting traditional knowledge on fisheries.

During the workshop, we identified the main actors involved in aquatic food systems: producers, distributors/processors, retailers (fish sellers) and consumers. This classification of actors was the basis of group work and learnings from this event.

Box 1. WorldFish-led projects and objectives

Nutrition-sensitive Fisheries Management (NSFM), funded by the Australian Centre for International Agricultural Research (ACIAR)

- To work with fishing communities, government agencies and key stakeholders to develop and pilot inclusive NSFM systems that are adaptable for diverse inshore tropical fisheries.
- Municipalities: Baucau, Lautem and Viqueque.

Fish Innovations (FI), funded by ACIAR

- To identify opportunities for innovation in aquatic food systems by improving handling and transportation and working with national agencies to develop tools and capacity to support community-led innovation and fish-based products.
- Municipalities: Baucau and Lautem.

CGIAR Initiative on Aquatic Foods – Work Package 2 (WP2) “Aqua Partners”, funded by CGIAR

- To support more resilient aquatic food systems through collaborative work with partners and integrated research, and foster equitable partnerships to leverage change coalitions and realize the benefits of aquatic foods in sustainable development.
- Municipalities: Baucau and Lautem.

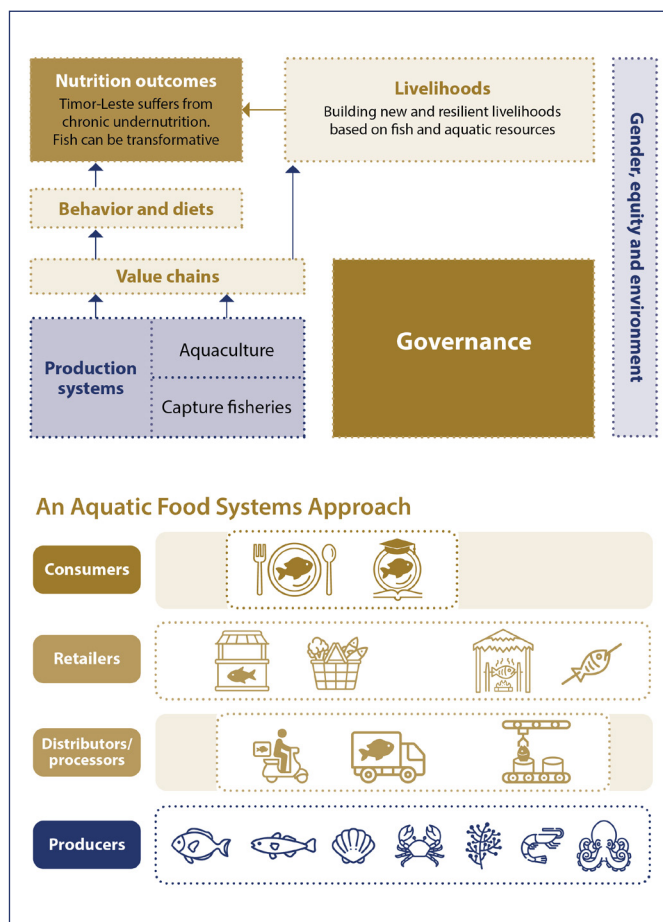


Figure 1. Diagrams of the “aquatic food systems” approach implemented by WorldFish.

With the aim to inform further dialogues towards co-developing a municipal food systems coalition for sustainable transformation, the projects listed in Box 1 were framed around the key actors of the aquatic food systems in Baucau and Lautem that each will involve:

- **ACIAR NSFM** – producers, consumers
- **ACIAR FI** – producers, distributors/processors, retailers
- **CGIAR WP2** – producers, distributors/processors, retailers, consumers.

Aquatic food systems actors in Baucau and Lautem municipalities

Workshop participants were divided by municipality into four groups based on the main sets of actors identified in

aquatic food systems. The aim of the group work was to discuss and describe who the key actors are at the municipal and rural levels and their distinguishing attributes (Table 1).

The discussions noted a wide diversity of actors who participate in the municipal aquatic food systems and how their roles are shaped by gender, social relations and livelihood needs. For example, we observed that producers and retailers tend to be gendered. Typically, men fish on boats and women and young ones often glean during the low tides, while fresh fish retailers are mostly men while sellers of cooked fish are women.

Aquatic food systems actors	Municipality	
	Baucau	Lautem
Producers	<ul style="list-style-type: none"> • Fisheries: use netting and hooks as fishing methods, and often fish using boats. The boats are operated individually or in groups, and some use fish-aggregating devices (FADs). Gleaning is done individually (all age groups). • Marine Protected Areas: none exist. • Aquaculture: ponds are operated individually or in groups. Three farming clusters are active: Goa Hitu, Arafat and Waibada. 	<ul style="list-style-type: none"> • Fisheries: usually use fishing boat and gill net and hooks methods to capture pelagic fish, individually. Gleaning used to capture octopus, clams, sea urchin, etc. • Marine Protected Areas: some exist, and fishing is restricted in these. Some species are not allowed to be harvested, such as turtles. • Aquaculture: one fish-farming group, the Parlamento cluster, farms Nile GIFT (genetically improved farmed tilapia).
Distributors/processors	<ul style="list-style-type: none"> • Each distributor has their own way of selling the fish: • Mana Teresa usually collects/buys fish from the landing site and either sells the fish at the market or drops the fish to her regular customer at the Monastery, Pousada. She also sells the fish on the roadside. • Mana Ermelinda and maun Luis usually buy fish from fishers and sell the fish on the roadside. • Maun José buys fish from fishers and sells the fish at the market. 	<ul style="list-style-type: none"> • Middle-traders (pemborong) bring fish from each landing site at Lautem to Los Palos every day and the fish are kept with ice in a bucket/esky (portable icebox). • Each bucket can hold up to 30 kg fish, so in a day the middle-traders can take 60 kg of fish since they install a frame onto their motorbike that can hold two buckets at the same time. • If delivering to Dili (e.g. tuna, snapper and trevally), the fish are placed in an esky with 100 kg capacity and delivered by car. • High-value fish are sold to the Dili markets.
Retailers (fish sellers)	<p>Fresh fish, including dried fish:</p> <ul style="list-style-type: none"> • Fisheries: fish is sold at the market, and through mobile vendors with a motorbike. • Aquaculture: consumers buy directly from fish farmers. Some customers come from Baucau Vila as they don't trust the freshness of the fish sold in markets and the price is cheaper. <p>Cooked fish:</p> <ul style="list-style-type: none"> • Ikan saboko (fish baked in palm leaves) and fish on the stick are sold on the roadside. Sometimes restaurants sell these too. 	<p>Retailers get the fish from fishers and resell it to consumers (community, restaurants, orphanage, etc.).</p>
Consumers	<p>Fish consumers include:</p> <ul style="list-style-type: none"> • pregnant women • hospital • school (school feeding program). 	<p>The main consumers are:</p> <ul style="list-style-type: none"> • community – families, individuals, pregnant and lactating women, old and young • institutions – school feeding program, hospital, college, restaurants and food stalls on the roadside.

Table 1. Typical activities and characteristics of aquatic food systems actors by municipality.

Key findings of the group work included:

- Producers display different selling patterns, with fishers often selling on the side of the road or to middle-traders, while aquaculture farmers sell directly to consumers.
- The social organization of fishers' production – individual versus group-based – is different in each municipality and between separate locations.
- Distributors face barriers to cold-chain uptake, with limited use of ice. The role of innovations was identified as a potential solution, with opportunities within fish retailing and processing; for example, establishing an ice stop-point halfway to a main distribution location, and scaling up fish powder production, which has a long shelf life.
- Middle-traders have different clients and routes based on catch composition and volume, with higher value and larger fish sold to restaurants, hotels and in Dili, while smaller fish are sold within the municipalities.
- Consumers from the municipal capital expressed concerns about the freshness of fish sold in markets (local fish preferred over imported frozen fish) and some purchase farmed fish as more trusted source than marine capture fish.
- Fish affordability is a key driver among consumers and vulnerable groups, as well as for government programs such as school feeding, where the inclusion of fish in menus is limited by the price of fish.

In the context of the municipal food systems, food and nutrition security is a priority by many stakeholders, including the government, so the role of these actors in enabling nutritious diets, particularly among women and young children, was discussed. Overall, aquatic foods are important for the livelihood of these municipal actors and contribute to diets and local economies. Enabling more aquatic foods to be produced and distributed safely to consumers requires, first, that different actors are recognized, and second, that they are included in food systems change agendas and nutrition programs.

Demonstration of fish-based product by a women's group

The workshop included a practical demonstration by a women's group from Beacou in Bobonaro Municipality on how to make fish powder, as an example of an innovation in aquatic foods processing. This group aspired to establish a small business producing fish powder, and has received training and mentoring from WorldFish since 2018. This innovative processing idea turns aquatic foods into a



fish-based product suitable for any age group, including young children, due to its powder form. To make the product, fresh fish and prawns are dried, ground and then fried with other nutritious ingredients such as sesame seeds and *Moringa oleifera* leaves.

The fish powder has a shelf-life of three months, which extends the availability of fish throughout the year without refrigeration and can overcome distribution barriers. It is rich in protein and contains essential micronutrients such as iron, zinc, calcium and Vitamin A. These nutrients are an important source of nutrition for better health, particularly for children in their early development. The fish powder has generated interest among several government and NGO partners due to its potential inclusion in the school meals program.

Consultation outcomes and participant feedback

The workshop was successful in generating discussion on aquatic foods and their role in local food systems in Baucau and Lautem municipalities from diverse perspectives. Comments and reflections by workshop participants identified several areas where WorldFish work could be aligned with local context and priorities to deliver more effective research and outcomes:

The MoH recognizes that malnutrition rates are high in Timor-Leste. The MoH in partnership with the MAF and other partners like TOMAK have worked on ways to improve the local production of nutritious foods to combat malnutrition cases. We have developed a nutrition-sensitive agriculture training curriculum for extension and health officers. As a suggestion, we could include fish – as a nutrient-rich protein source – in this curriculum to also support fisheries officers in making nutrition-sensitive recommendations, and for nutrition officers to promote fish consumption. Moreover, the MoH would be interested in developing a nutrition calendar that can be used to inform communities about the nutritional value of fish and seaweed and their seasonal and geographical availability.

Dircia Maria Soares, Nutrition Department, MoH





Photo credit: Holly Holmes/WorldFish

Enterprises and the private sector are important to improve the fisheries sector in the country. This can help to empower and motivate fisheries officials and particularly fishing communities.

Joni Freitas – DG-FAMR Representative, MAF

Fish has crucial nutritional value so I think we must look for ways to improve our current fishing industry from artisanal to semi-industrial through these projects in order to achieve our fish production objectives.

Sergio Jose Cristovão – Village Chief, Com (Lautem Municipality)

Training is important. I hope that these projects can provide management training to the Ililai fishing groups and help to find ways to reactivate the groups' activities in Ililai that have been abandoned by its members.

Jaime da Costa – Village Chief, Ililai (Lautem Municipality)

Programs need to work closely with partners to improve the program delivery in the field. In addition, collaboration can help to strengthen municipal fisheries officers to work with fishing communities in the municipality and overcome obstacles together.

Benjamin Freitas, Territorial Fisheries and Aquaculture Officer (Baucau Municipality), MAF

Next steps

During 2023–24, WorldFish will build on outcomes from this workshop, co-creating action research that seeks to integrate aquatic foods with partnerships that span multiple sectors of society and government. A key feature of the program is localizing tools and techniques in support of municipality-level services for food and nutrition security with safe and accessible aquatic foods. Partnerships are being strengthened with municipality government officers to support their services for safe and effective aquatic food distribution, while developing partnerships with women-led grassroots NGOs and groups seeking to aid integration of aquatic foods into information, education and communication about food and nutrition security.

Acknowledgments

This publication is funded as part of the [CGIAR Initiative on Aquatic Foods](#). We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: www.cgiar.org/funders. In Timor-Leste, the initiative is implemented together with research financed by the Australian Centre for International Agricultural Research (ACIAR) through projects FIS/2017/032 and FIS/2019/124.

Citation

This publication should be cited as: Bonis-Profumo G, Alves Almeida CJ, Simões, N, Duarte A, Hunnam K and Eriksson H. 2023. Co-creating nutrition-sensitive development pathways with aquatic foods: Consulting with local food system partners in Baucau and Lautem municipalities, Timor-Leste. Penang, Malaysia: WorldFish. Program Brief.

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