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Making land-based aquaculture in Timor-Leste nutrition-sensitive



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RESEARCH PROGRAM ON Fish

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Citation

This publication should be cited as: Pant J, Thilsted SH, Teoh SJ, Gomes S, Byrd KA, Jesus LSD, Duarte A and Kam SP. 2020. Making land-based aquaculture in Timor-Leste nutrition-sensitive. Penang, Malaysia: WorldFish. Program Brief: 2020-23.

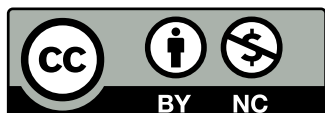
Acknowledgments

This work was undertaken as part of the [CGIAR Research Program on Fish Agri-Food Systems \(FISH\)](#) led by [WorldFish](#). Funding support for this work was provided by Ministry of Foreign Affairs and Trade (MFAT), New Zealand, in the framework of the Partnership for Aquaculture Development in Timor-Leste (PADTL) project. The authors would like to thank the participants of the focal groups and key informant interviews in Leohitu and Laubono. We thank Mario Pereira, country representative, WorldFish Timor-Leste, and MAF Fisheries officials from Bobonaro and Ermera for their inputs and support while conducting the fish consumption study.

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Front cover, UNICEF Timor-Leste; pages 1, 6, 8, Lucas Soares/WorldFish; pages 2, 4, 7, Silvino Gomes/WorldFish

Introduction

WorldFish has been actively engaged with the Ministry of Agriculture and Fisheries (MAF), Timor-Leste, since 2010 to promote aquaculture as a means of increasing fish production and improving livelihoods in the country. WorldFish assisted with the development of the [National Aquaculture Development Strategy \(NADS\) 2012–2030 \(NDAFA 2013\)](#). Subsequently, through the [Combating Malnutrition and Poverty through Aquaculture in Timor-Leste \(COMPAC-TL\)](#) project (2014–2016), WorldFish collaborated with I/NGOs Mercy Corps and Hivos to introduce aquaculture as well as integrated agriculture-aquaculture systems (IAA) to over 1500 small-scale farmers in six municipalities of Timor-Leste (Edwards and Pant 2016).

Side by side with the COMPAC-TL project, the New Zealand Aid Programme funded the [Partnership for Aquaculture Development in Timor-Leste \(PADTL1\)](#) project (2014–2019) to support implementation of the NADS. The PADTL1 project adopted a holistic approach to improve freshwater aquaculture production in the country. Technological interventions included: (1) enhancing seed quality and accessibility, (2) improving feeding and pond fertilization practices and developing sound management practices tailored to local conditions, and (3) providing structured and field trainings to participating farmers (Pant et al. 2020).

Encouraged by the achievements of the PADTL1 project (Pant et al. 2019a; Pant et al. 2019b), the New Zealand Aid Programme has continued its support for a second phase (PADTL2) of the project (2020–2023) to scale tilapia farming (Pant et al. 2020), in order to provide greater benefits to the livelihoods and nutrition of the Timorese people.

This brief outlines the rationale and focus of the PADTL2 project for enhancing the nutritional benefits of scaling out tilapia farming for targeted Timorese communities.



Photo credit: Lucas Soares/WorldFish

Weighing tilapia.

Background

Since gaining independence in 2002, Timor-Leste has seen improvements in overall human development and poverty reduction (GDS 2016; UNDP 2018). However, malnutrition rates continue to be high, particularly among children under five years of age, and anemia is prevalent among young children and women (GDS, MoF and ICF 2018).

Hence, the Timor-Leste National Strategic Development Plan (2011–2030), which aligns its development goals with the United Nations Sustainable Development Goals, highlights nutrition as essential to social and economic development (RDTL 2011). In recognition that the productive workforce required to drive the country's development hinges on the good health and nutrition of the Timorese population, the Timor-Leste National Nutrition Strategy (2014–2019) was developed (MoH 2014).

The National Nutrition Strategy adopts a life cycle and multi-sectoral approach. It recognizes the nutritional requirements at critical stages of human growth, and therefore emphatically targets young children and pregnant and lactating women. It adopts a multi-sectoral approach in implementing nutrition interventions, with agriculture being a key sector with respect to food production and supply.

The objective of the nutrition strategy is to reduce malnutrition and micronutrient deficiencies among children and women. While malnutrition is caused by multiple factors, food and nutrition insecurity is a major one. Low availability, accessibility and affordability of nutrient-rich foods are faced by poor households, and further exacerbated in the lean months of food production. Hence, a key aspect in the multi-sectoral approach is to ensure nutritious foods are available and accessible to those in greatest need, at all times (Provo et al. 2017).

As fish plays an important role in contributing to a nutritious diet (Thilsted et al. 2016), it is imperative that the PADTL2 project adopts a nutrition-sensitive approach, delivering both livelihood and nutritional benefits. This brief articulates the strategy and planned activities of the PADTL2 project, which will complement and augment other ongoing governmental and non-governmental initiatives on nutrition and nutrition security in the country.



Fish and vegetables are grown alongside each other in integrated agriculture-aquaculture systems.

Past achievements, ongoing nutritional interventions

The PADTL1 project established the foundations for farming Genetically Improved Farmed Tilapia (GIFT) in ponds in Timor-Leste (Pant et al. 2019a; Pant et al. 2019b). A holistic approach to developing, promoting and introducing GIFT farming technologies was adopted. This was done through testing and validating appropriate seed, feed and grow-out technologies, as well as establishing the foundations for disseminating these technologies for widespread adoption. Major activities included: (1) upgrading the facilities and capacity of the government-run Gleno hatchery for maintaining the genetic quality of broodstock through rotational breeding of the GIFT cohorts; (2) facilitating the establishment of GIFT multiplication hatcheries through a Public-Private Partnership model (PPP); and (3) building local capacity to

support the adoption of tilapia aquaculture by small-scale farmers (Pant et al. 2020). These technologies are also available for uptake in other aquaculture-related initiatives—by MAF as well as I/NGOs, including Mercy Corps, the Catholic Relief Services (CRS) and CARE— to improve food and nutrition security and diversify livelihoods among poor households.

Figure 1 shows the three interconnected pillars of PADTL2—increasing the availability, accessibility and consumption of fish. The third pillar highlights the nutrition-sensitive approach to be adopted. In implementing activities under this third pillar, PADTL2 will align with the thrusts of the National Nutrition Strategy (2014–2019). The project will contribute to strengthening ongoing nutrition

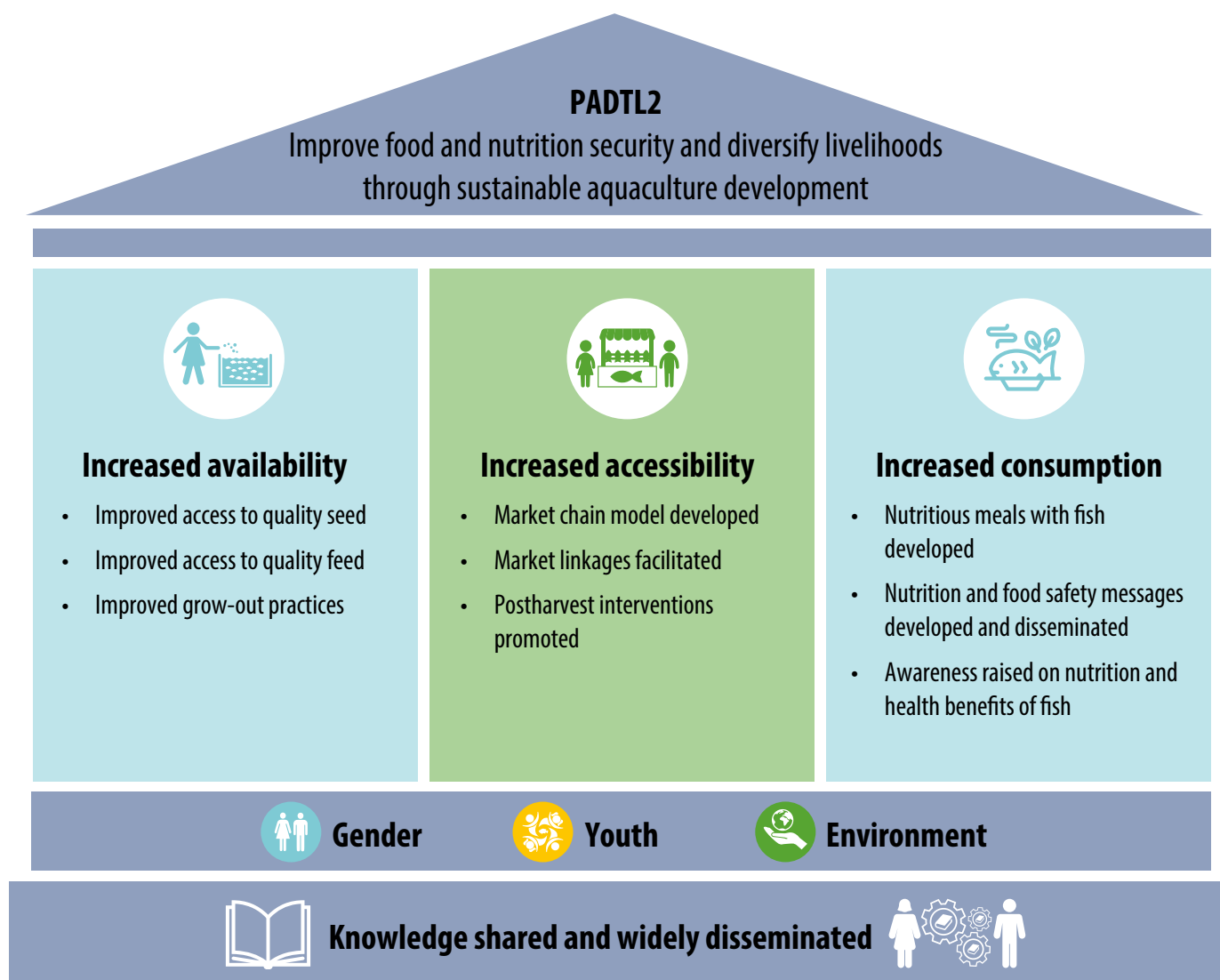


Figure 1. The three interconnected pillars of PADTL2.

interventions through the inclusion of fish in diets, making them more nutritious and diverse.

Implementation of the National Nutrition Strategy is spearheaded by the Ministry of Health (MoH) under the guidance of the Inter-Ministerial National Council for Food Security, Sovereignty and Nutrition in Timor-Leste (KONSSANTIL). The council oversees nutrition-related policy and strategy implementation through inter-sectoral coordination. Some of the key challenges to improve the nutrition of the Timorese people lie in making nutritious food available and overcoming deep-rooted social and cultural biases in consuming certain foods. The MoH disseminates recommended dietary guidelines to the public, which includes a minimum per capita consumption of 150 g serving of fish, two to three times per week. However, much of the population consume far less than this amount (Edwards and Pant 2016).

The World Food Programme (WFP) provides support to the MoH by conducting nutrition programs, including nutrition messaging and cooking demonstrations that are primarily targeted at mothers. In December 2018, the WFP organized a Social Behavior Change Communication (SBCC) symposium to explore the use of interactive SBCC tools to influence behavior transformation toward better health and nutrition practices among the Timorese people. The [findings of this symposium](#) guided the development of a national SBCC strategy (WFP 2018).

It is opportune for PADTL2 to identify opportunities for inserting fish into the agenda of the nutrition-related strategies and programs for Timor-Leste.



Tilapia soup and grilled tilapia.

Fish consumption among PADTL households: Key learnings

The PADTL1 project introduced tilapia farming to nine farmer clusters comprising over 250 households in three municipalities (Figure 2). This involved providing them with quality GIFT fingerlings and training on better management practices following a Farmer Field School (FFS) approach (Pant et al. 2019c). At the end of the project in 2019, focal group discussions (FGDs) were conducted in two *sucos* (villages) with women and men from households that participated in the project as well as from households that did not participate. The extent to which adoption of tilapia farming had increased household consumption of fish as well as income was assessed.

The FGDs were conducted in Batugade, a coastal village in Bobonaro municipality, and in Laubono, an inland village in Ermera municipality. An earlier survey among adopters in the PADTL1

project indicated that fish farming households in Batugade consumed over 80% of the farmed fish and sold just 11%; in contrast, less than 30% of farmed fish was consumed and nearly 60% sold in Laubono (Pant et al. 2019d) (Figure 3).

It was expected that farmed fish consumption would have been higher in Laubono due to low access of marine fish in the inland areas. However, the findings from the FGDs suggested that in Batugade, fish farming households, being coastal and more culturally attuned to fish as a food source (Andersen et al. 2013), consumed a large proportion of their farmed fish. On the other hand, in Laubono, where fish consumption is traditionally infrequent¹, fish farmers prioritized selling a large proportion of their farmed fish for income. Respondents in both villages were generally aware of the nutritional benefits of

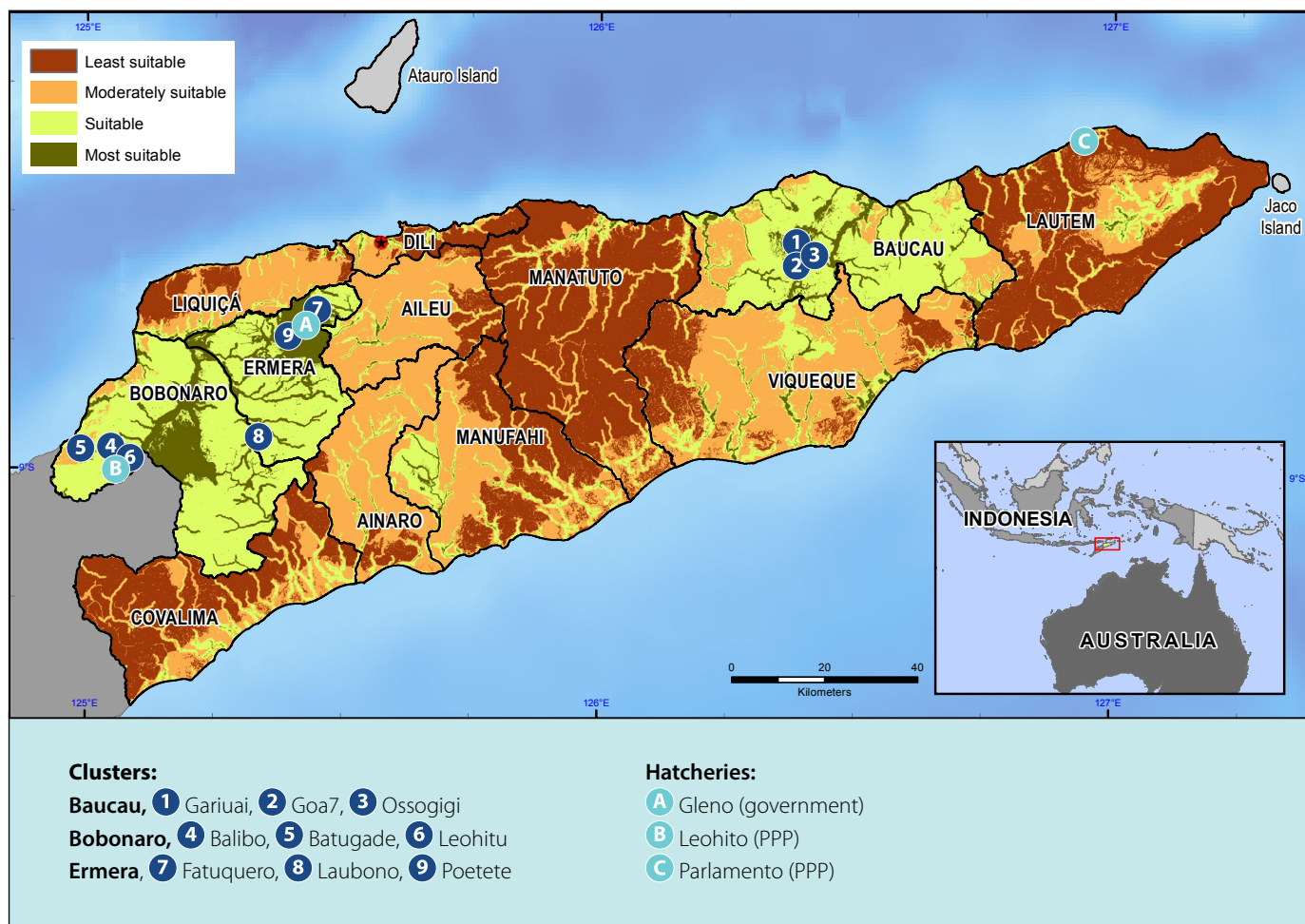


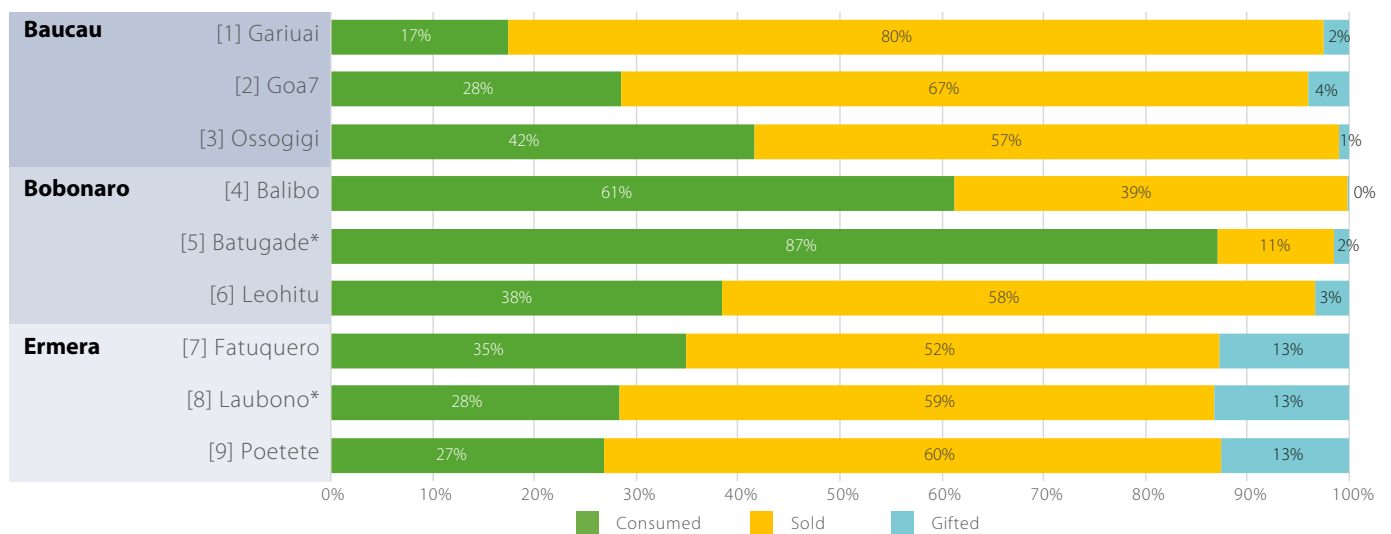
Figure 2. Freshwater aquaculture suitability map of Timor-Leste showing locations of PADTL farmer clusters and GIFT hatcheries.

consuming fish, especially for young children and women, but nonetheless, stated that they would sell more fish if they were able to produce more from their ponds.

Key informant interviews were also conducted with relevant stakeholders, including school teachers and nutrition officers, to assess the extent to which fish features in school feeding and nutrition programs. In both villages, school lunches generally consist of rice, beans and fresh vegetables. In Batugade, fish is provided once or twice weekly in school lunches, depending on availability. In Laubono, school lunches include meat only occasionally, but not fish, due to its

high price relative to the allocated budget. In both villages, fish is not included in demonstration cooking programs organized by the government and INGOs.

These findings suggest that some households adopting fish farming may not necessarily derive nutritional benefits from consuming the fish they produce, depending on economic, social and cultural circumstances. In PADTL2, therefore, emphasis is placed on better realizing the impacts of aquaculture on improving the food and nutrition security of the Timorese people, in line with the goal and objectives of the National Nutrition Strategy.



* Selected suco (village) for focal group discussions

Figure 3. The proportion of consumed, sold and gifted farmed fish by PADTL farmer cluster members.



Boy holding a bag with fresh tilapia bought from the farm.

The way forward

As shown by PADTL1 outcomes, the integration of aquaculture in farming systems increases farm productivity and augments household income. The PADTL2 project strives to further improve pond productivity, reduce production costs and improve the marketing chain so that locally produced fish will be more widely available, and at affordable prices, for consumers at large.

Through the adoption of a nutrition-sensitive aquaculture approach, households will be encouraged to produce a greater diversity of foods, including micronutrient-rich vegetables and fruit, in IAA systems. The project aims to use pond aquaculture as an effective entry point for messaging about better nutrition practices and influencing changes in social behavior among the Timorese people. The project will strive to achieve these in two ways: (a) directly, by home consumption of fish and other farm products produced by themselves, and (b) indirectly, by generating income from the sale of farm products from which nutrient-rich foods could be purchased for consumption. As the PADTL2 project will lead to greater fish production, more fish will be accessible and affordable to the Timorese people, thereby resulting in greater nutritional benefits.

The PADTL2 project will benefit from WorldFish's technical expertise in food and nutrition security research and experience in working with a wide range of global, regional and national partners. The strong ties with multiple sectors that have been established through the PADTL1 project, will be further strengthened in the PADTL2 project. This is through, for example, collaboration with other UN organizations—in particular UNICEF and FAO—with respect to nutrition messaging and SBCC initiatives to ensure that fish is an integral component of a diverse and nutritious diet.

The project will prepare and disseminate nutrition and food safety messages regarding fish and fish-based products, with specific information on the recommended quantity, frequency and preparation methods of fish for optimal consumption. The messages will be tailored for and conveyed via multi-platform communication channels that can be deployed through nutrition-related campaigns in coordination with other organizations to ensure that fish is included in the diets of diverse population groups, and also those in institutions.



Photo credit: Silvino Gomes/WorldFish

Harvested GIFT tilapia.

Scope for expansion

Should there be a commitment of additional funding from development partners for the PADTL2 project, there is scope for expanding the nutrition-sensitive approach. Additional nutrition interventions would include expanding the pond aquaculture technology to incorporate diverse fish species, including carp species. Fish polyculture maximizes use of food web resources within the ecology of a pond and, at the same time, the nutritional benefits through the production of diverse species.

With the increased availability of fish, the PADTL2 project would further work with government partners and development agencies to ensure that fish becomes an integral component in national policies, strategies and initiatives that target the

poor and vulnerable. For instance, the focus of the present National Aquaculture Development Strategy (2012–2030) on improving fish productivity and production would be expanded to encompass strategies for promoting nutrition-sensitive aquaculture as an explicit policy for bringing nutritional benefits to the Timorese people.

Lessons learnt from the PADTL2 project could also be shared more widely across Pacific Island countries. The project would collaborate with FAO, the Government of Timor-Leste and the New Zealand Aid Programme in producing joint publications on nutrition-sensitive fish agri-food systems for small island developing states, for wider sharing and dissemination through participation in regional and international fora.



Tilapia in a cooling box ready for marketing.

Note

- ¹ While the single fish retailer interviewed in Batugade reported selling marine fish, which is in high demand, the retailer in Laubono sold only a limited quantity-25 kg of frozen fish per week, imported from China. Laubono villagers are able to catch river fish only during the dry season.

References

- Andersen AB, Pant J and Thilsted SH. 2013. Food and nutrition security in Timor-Leste. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report AAS-2013-29. <https://hdl.handle.net/20.500.12348/906>
- Edwards P and Pant J. 2016. COMPAC-TL: Combating malnutrition and poverty through aquaculture in Timor-Leste. Synthesis Report. October 2016.
- [GDS] General Directorate of Statistics. 2016. Poverty in Timor-Leste 2014. 68 pp.
- [GDS] General Directorate of Statistics, [MoF] Ministry of Finance and ICF. 2018. Timor-Leste Demographic and Health Survey 2016. Timor-Leste and Rockville Maryland ISA: GDS and ICF.
- [MoH] Ministry of Health Timor-Leste. 2014. Timor-Leste National Nutrition Strategy 2014–2019. 76 pp.
- [NDFA] National Directorate of Fisheries and Aquaculture, Ministry of Agriculture and Fisheries Timor-Leste. 2013. Timor-Leste National Aquaculture Development Strategy 2012–2030. <https://hdl.handle.net/20.500.12348/861>
- Pant J, Teoh SJ, Gomes S and Pereira M. 2019a. Setting the foundation for sustainable aquaculture in Timor-Leste: Ten years (2010–2019) and beyond. Presentation made at the 2nd Timor-Leste National Aquaculture Forum. <https://hdl.handle.net/20.500.12348/3855>
- Pant J, Teoh SJ, Gomes S, Pereira M and Kam SP. 2019b. Report of the 2nd Timor-Leste National Aquaculture Forum. Penang, Malaysia: WorldFish. Program Report: 2019-20. <https://hdl.handle.net/20.500.12348/4110>
- Pant J, Teoh SJ, Gomes S, Mohan CV, Dani A, De Jesus LS, Shrestha MK and Pereira M. 2019c. Better management practices for genetically improved farmed tilapia (GIFT) in Timor-Leste. Penang, Malaysia: CGIAR Research Program on Fish Agri-Food Systems. Manual: FISH-2019-04. <https://hdl.handle.net/20.500.12348/3742>
- Pant J, Teoh SJ, Gomes S, Pereira M and De Jesus LS. 2019d. Partnership for Aquaculture Development in Timor-Leste (PADTL) Progress Report July 2018–August 2019. <https://hdl.handle.net/20.500.12348/3867>
- Pant J, Teoh SJ, Gomes S, Pereira M., Kam SP. 2020. Partnership for Aquaculture Development in Timor-Leste (PADTL): Looking back, looking forward. Project brief. <https://hdl.handle.net/20.500.12348/4185>
- Provo A, Atwood S, Sullivan EB and Mbuya N. 2017. Malnutrition in Timor-Leste: A review of the burden, drivers and potential response. The World Bank Working Paper Report No. 114087. 176 pp.
- [RDTL] Republica Democrática de Timor-Leste. 2011. Timor-Leste Strategic Development Plan 2011–2030. 231 pp.
- Thilsted SH, Thorne-Lyman A, Subasinghe R, Webb P, Bogard JR, Phillips MJ and Allison EH. 2016. Sustaining healthy diets: the role of capture fisheries and aquaculture for improving nutrition in the post-2015 era. *Food Policy* 61:126–131. <https://hdl.handle.net/20.500.12348/80>
- [UNDP] United Nations Development Program. 2018. Human Development Indices and Indicators 2018 Statistical Update. 112 pp.
- [WFP] World Food Programme. 2018. Symposium report on social and behavior change communication for better nutrition and health in Timor-Leste. 12–13 December 2018. Ministry of Health, Dili, Timor-Leste.

About WorldFish

WorldFish is an international, not-for-profit research organization that works to reduce hunger and poverty by improving fisheries and aquaculture. It collaborates with numerous international, regional and national partners to deliver transformational impacts to millions of people who depend on fish for food, nutrition and income in the developing world. Headquartered in Penang, Malaysia and with regional offices across Africa, Asia and the Pacific, WorldFish is a member of CGIAR, the world's largest global partnership on agriculture research and innovation for a food secure future.