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Report of the 2nd Timor-Leste National Aquaculture Forum

8 August 2019, Dili, Timor-Leste

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Report of the 2nd Timor-Leste National Aquaculture Forum

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Photo credits

Front cover, WorldFish

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List of abbreviations

BNCTL	*Banco Nacional de Comércio de Timor-Leste*
COMPAC-TL	Combating Malnutrition and Poverty through Aquaculture in Timor-Leste
CRS	Catholic Relief Services
CTSP	Coral Triangle Support Partnership
DFAT	Department of Foreign Affairs and Trade (Australia)
FAO	Food and Agriculture Organization
GIFT	Genetically improved farmed tilapia
GO	Governmental organization
I/NGO	International/national non-governmental organization
MAF	Ministry of Aquaculture and Fisheries
MDF	Market Development Facility
NADS	National Aquaculture Development Strategy
NDA	National Directorate of Aquaculture (in effect from 2016)
NDFA	National Directorate of Fisheries and Aquaculture
NGO	Non-governmental organization
NORAD	Norwegian Agency for Development Cooperation
PADTL	Partnership for Aquaculture Development in Timor-Leste
PPP	Public-private partnership
SFP	School feeding program
TOMAK	*To'os ba Moris Di'ak* (Farming for Prosperity)
SME	Small- and medium-sized enterprise

Executive summary

The 2nd Timor-Leste National Aquaculture Forum was held on 8 August 2019 in Dili. While the Timor-Leste National Aquaculture Development Strategy (2012–2030) envisions a coordinated approach among all stakeholders to realize success, the forum served as a means of fostering coordination. Attended by 106 participants from diverse government, non-government, private sector organizations and farmer groups, the forum provided a platform to share research and development experiences and identify opportunities to foster partnerships for developing aquaculture in Timor-Leste.

Learnings and progress of aquaculture development initiatives in the recent years were presented at the forum. Various project initiatives conducted by I/NGOs have focused on promoting pond culture of fish among farmers across several municipalities. The Partnership for Aquaculture Development in Timor-Leste (PADTL) project, in particular highlighted a holistic approach and multi-pronged strategy to improve seed and feed provision and grow-out technology for better fish yield while building local capacity for the wider and sustained adoption of tilapia farming. The upgrading and establishment of government and public-private partnership (PPP) hatcheries to produce and disseminate quality tilapia fingerlings mark the beginning of hatchery infrastructure that can be expanded to supply seed among farmers for a growing aquaculture industry. Parallel efforts through other INGO/NGO -initiated projects are reaching out to farmer clusters in several municipalities to learn and adopt fish culture in their farms. Outcomes are promising, with benefits ranging from improved household nutrition to increased farm income. Current farmer practices are still at the small, subsistence scale. Farmers with an intention to intensify further still face issues of limited availability and accessibility to seed and feed, and poor access to markets. Private sector commercial -scale aquaculture targeting import substitution and the export market is still in its infancy, while links and trickle-down benefits to the semi-subsistence sector are not clear.

The forum agreed that to meet the NADS targets of producing enough farmed fish to increase protein intake for the population, aquaculture needs to be scaled up by increasing fish productivity and reducing production costs through continuing R&D efforts. In addition, aquaculture must be scaled out through area expansion, transitioning from subsistence to semi-commercial levels and providing extension services and efficient marketing channels for farm inputs and outputs. It requires the involvement of diverse stakeholders including government, non-government, private sector, research institutions and farmer groups across the aquaculture value chain. It needs functional partnerships involving various stakeholders, with effective leadership to plan, strategize, coordinate and continually evaluate to keep projects on track. It requires enabling policies to support the functioning of the aquaculture value chain from production to marketing. It needs the continual enhancement of technical and management capacity, particularly of the Ministry of Agriculture and Fisheries (MAF) of Timor-Leste, which holds the mandate for implementing and meeting the NADS targets. This forum hopefully provides the impetus for more constructive consultations among diverse stakeholders to bring actual initiatives further along the path of aquaculture development in the country.

1. Background

The Timor-Leste National Aquaculture Development Strategy (NADS) 2012–30, which was developed by the Ministry of Agriculture and Fisheries (MAF) with technical assistance from WorldFish, emphasizes implementation through joint ventures between government, INGOs, NGOs and the private sector to realize its success. Joint ventures require effective partnership and a coordinated approach with open communication among the various parties throughout the implementation process.

As the young aquaculture sector in Timor-Leste continues to develop, it is imperative that communication platforms exist for diverse stakeholders to share experiences, discuss issues and chart out the directions and actions to be taken. The Partnership for Aquaculture Development in Timor-Leste (PADTL) project, a joint effort between MAF and WorldFish that is funded by the Ministry of Foreign Affairs and Trade (MFAT) New Zealand, took the initiative to organize the 1st National Aquaculture Forum in September 2017.[1]

This 2nd National Aquaculture Forum, also organized by the PADTL project as the final activity of phase one, follows from the 1st forum to further explore the way to address the issues and challenges for advancing aquaculture development in sustainable ways that bring livelihood benefits to larger numbers of poor households and nutritional security to the country's consumers. MAF aims to continue playing a key role in organizing national aquaculture fora in the coming years as well. While WorldFish expects funding for the next phase of the PADTL project, it is committed to continue supporting MAF to organize such a forum as an annual event and play a catalytic role in fostering meaningful partnerships among stakeholders.

Key outcomes from the forum

- Overview of achievements to date from research and development (R&D) efforts in aquaculture in Timor-Leste
- Identified issues and challenges for bringing aquaculture to scale
- Determined demand for farmed fish to contribute to improving nutrition and food security
- Consensus on the need for functioning partnerships among diverse stakeholders to take on complementary roles across the aquaculture value chain
- Call for future meetings and consultations to coordinate efforts for aquaculture advancement

2. Forum objectives, agenda and participants

The 2nd Timor-Leste National Aquaculture Forum was held on 8 August 2019 in Dili. The forum's objective was to provide a common platform for stakeholders to share their R&D experiences and identify opportunities for fostering partnerships in aquaculture development in Timor-Leste.

The specific objectives of the forum were to:

- discuss the current status and future direction for the aquaculture sector;
- explore prospects for improving access to and the availability of farmed fish for meeting the food and nutrition security needs of the Timorese people; and
- identify opportunities for fostering partnerships between government, INGO, NGO, private sector and development partners for realizing the goals for sustainable aquaculture development.

The forum agenda is included in Appendix 1. The forum was attended by 106 participants representing a diversity of diplomatic, government, non-government, private sector and academic organizations as well as farmer representatives (Figure 1). The participant list is included in Appendix 2.

In delivering his keynote address in the opening session of the forum, H.E. Phillip Hewitt, New Zealand Ambassador to Timor-Leste, commended the PADTL project for its impressive progress in building the technical capacity for farming quality tilapia and establishing a public-private partnership hatchery, marking an important step toward boosting aquaculture production for food security.

Dr. Gareth Johnstone, Director-General of WorldFish, lauded Timor-Leste as a "small country with big lessons". He called for the achievements gained in tilapia farming—through a holistic approach to improve seed, feed and farming practices as part of PADTL's in-country development efforts—to be emulated. He emphasized the importance of combining sustainable aquaculture with resilient coastal fisheries to improve livelihoods and meet the protein needs of the Timor-Leste population.

In his inaugural address, H.E. Joáquim José Gusmão dos Reis Martins, Minister of Agriculture and Fisheries Timor-Leste, expressed that with PADTL's achievement in developing a systematic process and supporting services for tilapia farming, the time has come to take aquaculture to scale in a coordinated manner through strategic partnerships among government and non-government agencies, the private sector and farmer communities.

The opening session ended with a press conference, which involved the launch of the *Better Management Practices for GIFT in Timor-Leste handbook* (Pant et al. 2019) that was jointly produced by WorldFish and MAF. At the launch, H.E. Joáquim José Gusmão expressed that the BMP guidelines, which are available in both Tetum and English, are an important reference to be used in providing training and support to fish farmers, and that will help them achieve the best results from growing the fast-growing Genetically Improved Farmed Tilapia (GIFT) strain.

The presentations and discussions of the ensuing technical sessions are reported thematically in the following sections.

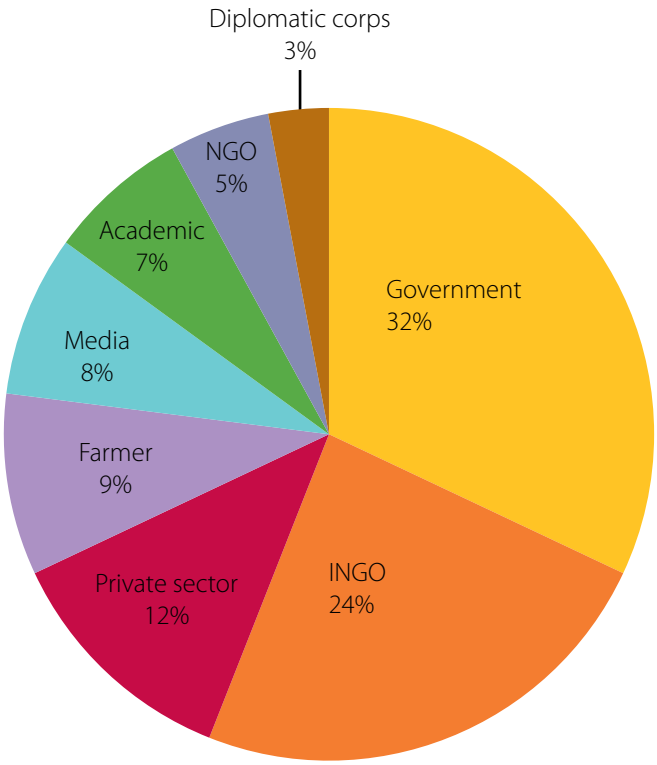

Figure 1. Forum participants by type of organization.

3. Aquaculture development in Timor-Leste to date

3.1. Overview of ongoing projects and initiatives

Presentations in sessions 2 and 3 reported on where aquaculture development is at in Timor-Leste, and the associated issues that provide insights for the way to further develop this sub-sector.

Starting off session 2, themed "Foundations of sustainable aquaculture", Dr. Jharendu Pant of WorldFish provided an overview of past and ongoing initiatives and projects that WorldFish has been involved in during its 10 years working in the country, drawing on financial support from various sources and entering into collaborative efforts, principally with the MAF and also with other INGOs. The journey traced out revealed a logical progression from needs identification and strategy formulation to devising and implementing a suite of interventions that are ground-tested and lay the foundation for further advancing aquaculture development in the country.[2]

Highlighted among the milestones achieved were:

- A scoping mission in 2010, supported through the Coral Triangle Support Partnership (CTSP), identified the need for aquaculture research and development in Timor-Leste (Pant et al. 2011; NDFA 2012) and mapped potential areas for pond aquaculture (Andrew et al. 2011);
- Assistance accorded (2010–2012) to MAF in developing the NADS, with funding support through FAO and the CTSP (NDFA 2013);
- Demonstrated the benefits to resource-poor farming households of integrating fish ponds in improving their diets, through the COMPAC-TL joint project (2014–2016) supported by NORAD and implemented jointly by Mercy Corps, Hivos and WorldFish;
- Supported MAF in developing sustainable aquaculture technologies under the PADTL project (2014–2019) funded by the Ministry of Foreign Affairs and Trade (MFAT) New Zealand.

The PADTL project focuses on pond culture of tilapia in Ermera, Baucau and Bobonaro municipalities, where an earlier GIS mapping exercise had identified these areas as having the highest potential for pond aquaculture. Dr. Pant's account of the project highlighted the holistic approach adopted for improved seed and feed provision and grow-out technology for better fish yield while building local capacity for the sustained implementation of these interventions. The two following presentations by Mr. Marcos de J.S.M. of MAF and Mr. Silvino Gomes of WorldFish elaborated on the seed production and technology dissemination aspects of the PADTL project respectively, following the farmer field school (FFS) approach.

Significantly, the PADTL project has laid the foundation for expanding aquaculture through a multi-pronged strategy to tackle the key aspects of the tilapia production chain as depicted in Figure 2.

The impacts of the project are starting to be felt beyond the three target municipalities. The government-run Gleno hatchery has to date disseminated more than 1.5 million monosex GIFT fingerlings to 12 municipalities, as well as provided quality broodfish to a newly -established PPP -model hatchery in Leohito in Bobonaro municipality in the west. The Leohitu hatchery, which was inaugurated on 7 June 2019, is now in full operation and has already started selling monosex fingerlings to local fish farmers and INGOs supporting aquaculture in the eastern municipalities.

Mr. Nicholas Wolf of the Market Development Facility (MDF), Australian Aid's flagship private sector development program, started off session 3 by explaining the public-private partnership (PPP) arrangement with MAF, facilitated by WorldFish, that led to the establishment of the Leohito hatchery. Recognizing seed availability and distribution as a major constraint to aquaculture expansion, MDF has committed to establishing a second PPP hatchery in Baucau in 2019–2020, which will serve the eastern part of the country. He pointed out that PPP hatchery operations are meant to relieve the load from government hatcheries to enable widespread seed distribution, but their viability requires farmers to accept and pay for fingerlings at a nominal cost.

In line with the NADS, there have been a diversity of fish farming initiatives implemented by various parties involved in rural development. Two presentations that followed in session 3 showcased the role of INGOs in providing support to aquaculture development in Timor-Leste.

Mr. David Palasits and Mr. Augusto Fernandes from Catholic Relief Services (CRS) described the pilot aquaculture project that CRS initiated in Baucau and Viqueque in 2018 under the Australia/DFAT -supported *To'os ba Moris Di'ak* (TOMAK) program, or Farming for Prosperity (2016–2021). The project introduced fish ponds to poor farming households, mainly to increase their fish consumption to improve their nutritional status. Training of trainer efforts involving local NGOs, MAF and health workers aimed for knowledge and technology dissemination among farmers. Such interventions aimed to improve farmer skills and productivity levels to move them beyond subsistence production to ensure the sustainability of their aquaculture practices.

In his presentation, Mr. Mateus des Neves of Mercy Corps outlined four past and ongoing projects supporting aquaculture development in Timor-Leste: COMPAC-TL (2014–2016); Fish for School Feeding Program (2018–2019); TOMAK (2016–2021) and *Resilensia Di'ak* (2019–2020). Impact indicators point to the increased uptake of fish farming and fish yields leading to better household incomes, and improved dietary diversity and nutrition among practicing households and schoolchildren. Building on the experiences and insights gained through the projects, interventions found to be effective include the cluster approach, introduced during the COMPAC-TL project,[3] in working with farmers for peer reinforcement and collective actions in inputs procurement, and marketing of farm products.

It is apparent, from the presentations made by the stakeholders that, farmers' aquaculture activities are presently at small-scale, subsistence to semi-subsistence levels. Supported mainly by INGOs/NGOs in collaboration with MAF, these activities are located mainly in Ermera, Bobonaro and Baucau municipalities, which have been identified in NADS as having high aquaculture potential, and also in Viqueque, Aileu and Same.

Private sector initiatives in the aquaculture sector are still early and limited. Two presentations in session 3 described examples of commercial-scale, private sector involvement in aquaculture in Timor-Leste. Mr. Ambrosio Valentim, speaking on

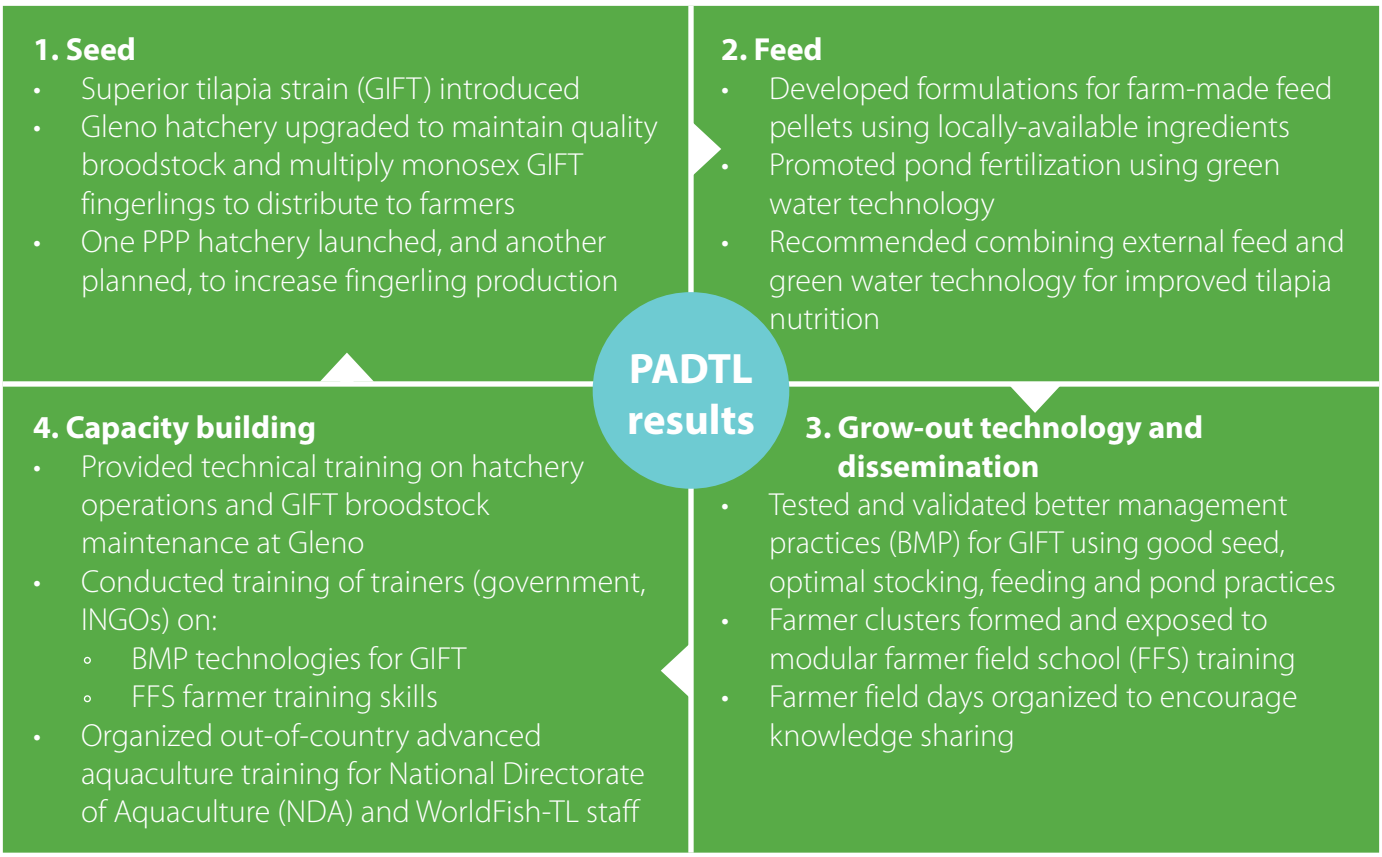

Figure 2. Holistic approach of the PADTL project and main achievements.

behalf of the General Manager of Long Ping, Mr. Fang Yuan Xiang, described an ambitious plan for establishing a state-of-the-art mariculture industry in Timor-Leste. Presently at the preliminary survey stage, the commercial initiative would include elements of land-based, inshore and offshore culture of shrimp, crab and fish. Capitalizing on the favorable climate and pristine marine waters of the country, the company envisages that benefits would accrue from China's private investment into the aquaculture industry by providing local employment and increasing foreign earnings.

Ms. Zenilda Gusmao of Mariscos Timor Lda of the CEMILL Groups presented on the company's foray in 2015 into commercial farming of the Pacific whiteleg shrimp (*Litopenaeus vannamei*) with eight ponds in a two hectare plot in the mangrove area at Metinaru just east of Dili capital. The company sees further expansion as providing benefits in terms of import substitution and export earnings. At the same time, the company recognizes the existing constraints of importing fry and feedstock for lack of local supplies, and poor market access and high capital outlay.

Following these two presentations, participants raised questions about the economic and environmental sustainability of such commercial ventures with high capital investment as well as the direct benefits toward improving food and nutrition security and the incomes of the people of Timor-Leste. Identification of suitable agro-ecological zones through GIS modelling was deemed necessary to ensure that coastal aquaculture development endeavors in Timor-Leste are economically viable, socially acceptable and environmentally benign.

3.2. Emerging issues related to production of farmed fish

Three presentations that wound up session 3 were made by farmer representatives who have been participating in the PADTL project in Bobonaro, Ermera and Baucau municipalities. While acknowledging the benefits they got from participating in the project, the farmers also highlighted a number of issues and challenges they face. Many of these issues align with those raised by the earlier presenters from the project implementors' perspectives, and are summarized in section 3.2.1 and 3.2.2.

3.2.1. Aquaculture inputs: availability, accessibility and practices

- Despite the early efforts at producing quality seed in the form of monosex GIFT fingerlings, there is still a general shortfall in the availability of seed for the aquaculture industry to support large numbers of small-scale farms on the one hand, and the fledgling commercialized mariculture industry on the other. Inquiries about how soon the second PPP hatchery in Baucau would be operational underscore expectations for improved access to fingerlings in the eastern part of the country.
- While farm-made feed pellets formulated with local ingredients provide practical alternatives to costly imported feed, fish farmers report that they encounter a shortage of the raw ingredients and that village restrictions deny them the use of certain plant ingredients.
- In some instances, farmers have yet to accept and adopt green water technology as a means for complementing farm-made pellet feeding for better nutrition of the fish.
- Promoting aquaculture to rural farming households must be done in a gender-sensitive manner, for example, by considering demands on the household workload.
- Farmer participants at the forum raised the need for labor- and time-saving measures for digging bigger ponds and making feed pellets on-farm, indicating the scope for some level of mechanization, either through collective management or through SME providers.

3.2.2. Building and enhancing skills

- Reports on the various pilot aquaculture projects indicate the importance of building and enhancing skills in fish farming through group learning in practical and interactive ways such as using the farmer field school approach with farmer clusters, and through knowledge exchange during farmer field days.
- Technical information about grow-out technologies (e.g., BMP guidelines) needs to be packaged into manageable modules and tailored to farmers' knowledge levels, including being expressed in simple language with culturally-meaningful symbolism and graphics.
- More widespread dissemination of grow-out technologies to farmers requires increased extension resources and skills within

government and INGO/NGO agencies working in a complementary manner, with the former providing oversight and coordination.

3.3. Emerging issues related to demand, marketing and distribution of farmed fish

The panel discussion in session 4 focused on the demand, marketing and distribution aspects of bringing farmed fish affordably to the people of Timor-Leste to achieve the NADS target of per capita fish consumption of 15 kg per year by 2030.

3.3.1. Fish demand

As expressed by several speakers at the forum, the demand for fish is high, given the large protein gap in the nutrition of the Timorese population at large. Schoolchildren, who are at a crucial stage of their growth, are important and obvious targets for improving fish consumption through the nationwide school feeding program (SFP) at elementary to middle school levels. Mr. Celestina Ximenes from the Ministry of Education explained that school lunches are provided at a budget of USD 0.25/day. Presently, fish does not appear on the lunch menu for many remote and rural schools. There is also concern about food safety where fish that is provided is not fresh or tainted.

Mr. Marcos da C. Belo from the Ministry of Health explained that an important role of its Nutrition Department is to increase public awareness of the nutritional and health value of different food types including fish. The department disseminates guidelines on meal composition and nutritional standards. The guideline for fish consumption is a minimum of 150 g per meal, taken 2–3 times per week. However, fish consumption by the population at large generally falls short, partly because of the limited availability and affordability of fish and partly due to a lack of awareness about its nutritional value.

An indicative demand for providing fish to the school feeding program may be estimated based on the meal budget per child (USD 0.25/meal; assuming 30 percent of the budget per week is allocated for fish), prevailing fish price (at USD 4/kg) and school enrolment in the country. It is estimated that about 1600 metric tons of fish is required to provide a nominal 50 g of fish per meal, two meals per week, to each child at elementary and middle school levels throughout the country. A reduction in fish price would enable consumption per child to increase, thus increasing the demand volume. Besides schools, the inclusion of fish in the menu in hospitals provides another key opportunity to impact on nutrition outcomes.

3.3.2. Supply, marketing and distribution issues

According to Mr. Pascual Surimali from Lita Supermarket, the store sells mainly imported fish. About 8 metric tons of frozen fish are imported monthly, mainly from China. Achieving import substitution would require a substantial increase in local fish production to provide the quantities that can be viably marketed, including through the supermarket chain. Issues relating to marketing and distribution of farmed fish then become increasingly important:

- Poor transportation links to the rural areas was commonly cited by forum speakers and participants as a major constraint for both access to farm inputs and the sale of farmed fish beyond the immediate vicinities of the ponds.
- Marketing live produce from numerous and dispersed fish farms operating at a semi-commercial scale requires marketing arrangements that can effectively link the small producers to the demand centres for prompt and efficient delivery.
- Potential market destinations such as schools, restaurants and supermarkets expect consistent and assured quantity and quality of fish to be supplied, which require quality control and collective arrangements among fish farmers to deliver the required quantities at the supply end.
- Delivery of fresh fish to consumers requires cold storage facilities, which are presently lacking.
- Commercial farms targeting the local and export markets for mariculture products are constrained by poor infrastructure and a lack of license certification for exporting their products, respectively.

4. Taking aquaculture to scale

In his presentation in session 2, Dr. Jharendu Pant from WorldFish identified the main strategies for taking aquaculture to scale to benefit more farmers over larger areas, using the case of tilapia. Broadly, he said, two main aspects of scaling need to be considered.

4.1. Scaling up aquaculture

It is necessary to increase aquaculture productivity to reduce production costs. Further R&D is needed to refine grow-out technologies to:

- shorten the culture period to increase annual production, for example achieving two production cycles of GIFT per year by reducing the growth period from around 11 to six months; and
- increase nutrition efficiency to optimize use of farm inputs.

It was pointed out by forum participants that efforts at further intensification to improve fish productivity should not compromise environmental sustainability and must be accompanied with building monitoring and management skills to deal with fish disease and water quality issues. The continued involvement of R&D institutions is necessary, as well as building skills within government organizations (GOs) and NGOs to provide technical and extension support to farmers.

4.2. Scaling out aquaculture

It is necessary to expand the aquaculture industry through area expansion by increasing numbers of entrant farmers as well as encouraging the transition from the subsistence, extensive scale of pond operation to the semi-intensive, small- and medium-sized enterprise (SME) scale.

Forum participants commented that the outcomes and impacts of scaling out need to be monitored and evaluated against baseline data on production; the costs and benefits of fish farming at different scales; fish consumption patterns; and demographic and socio-economic structures and their nutritional status.

4.3. Meeting the targets of the National Aquaculture Development Strategy

While the targets in the NADS (2012–2030) for producing 12,000 metric tons/year of farmed fish involving 40,000 households may not be achievable by 2030, the deliberations at the forum suggest cautious optimism for the future of aquaculture development in Timor-Leste. The forum participants recognized the diverse stakeholders and multiple actors operating at multiple levels of the aquaculture value chain. Practically, all of the issues raised by forum participants about production, access to quality extension services and the improvement of post-harvest handling and marketing of fish products need to be effectively addressed to accomplish the NADS targets.

Mr. Adrianu Dani Fernandes du Karmu from the NDA reiterated MAF's overall role and commitment to increase production and supply of farmed fish. However, given limited government resources to service an anticipated increase in fish farmers throughout the country, MAF needs to work closely with all relevant stakeholders with complementary roles.

In the case of production, achieving the target of 12,000 metric tons/year of farmed fish would entail expanding the total pond area to about 1000 hectares, providing 70 million fingerlings/year and over 12,000 metric tons of feed/year. It requires 12-14 hatcheries with an annual production capacity of around 5 million fingerlings per hatchery to meet the projected fingerling production target. It is, therefore, necessary for MAF to engage with the private sector to set up PPP hatcheries to produce fingerlings at such high volumes, enabling the government hatcheries to focus on maintaining good quality broodstock. Likewise, the projected demand of 12,000 metric tons of feed/year would necessitate feed production to be commercialized, giving opportunities for SMEs to be set up to provide locally-formulated feed to farmers. With the prospect of farmers having to pay for inputs, it is then an imperative for continued R&D efforts to improve pond productivity for maximizing income.

4.4. Creating the enabling environment

The panel and open discussions of session 5 focused on identifying the main interventions needed to create an enabling environment for aquaculture to further develop in the country.

4.4.1. Continuing R&D for aquaculture

Encouraged by the achievements of the PADTL project, Ms. Gabrielle Isaak, Deputy Chief of Mission at the Embassy of New Zealand in Dili, Timor-Leste, pledged continued support for furthering the R&D efforts for aquaculture development in Timor-Leste, while stressing the need for the private sector to support access to capital and markets and for the government to formulate appropriate policies. She emphasized the importance of communication and coordination to ensure that industry players complement rather than duplicate efforts and investments.

Ms. Paula Lopes da Cruz, Assistant FAO Representative, Timor-Leste, highlighted the importance of proper planning to provide a comprehensive framework for implementing aquaculture development strategies as well as the need to keep track of progress based on a common results framework. She called for progress on supporting farmers to transition from subsistence- to commercial -scale production. Post-project continuity in the adoption of sound aquaculture practices, she said, is a good indicator of lasting R&D impact.

Having been involved in several externally -funded projects, Mr. Tate Munro of Mercy Corps pointed out that the long funding chain from donor to the farmer beneficiary is an impediment to prompt and smooth project implementation.

4.4.2. Financing

Ms. Celestina Ximenes from Banco Nacional de Comércio de Timor-Leste (BNCTL) expressed the bank's willingness to extend cooperation for access to bank loans while stressing the need for building farmers' capacity in financial management beyond farming know-how. She also spoke of the need to simplify the long bureaucratic procedure to make the financing process more farmer friendly.

4.4.3. Policies

Addressing several of the wide-ranging issues identified at the forum will require policy adjustments to foster an enabling environment for aquaculture development in the country. However, there was insufficient time for a more in-depth discussion on the policy aspects. Policy needs raised at the forum relate to export certification of local fish products, certification of local fish feed and simplifying procedures for accessing finance and administration of project funds.

4.4.4. Platforms and leadership for coordination of complementary partnerships

Many forum participants expressed the importance and need for better cooperation, communication and coordination among the diverse parties to ensure that their various projects and efforts complement each other for greater impact across the aquaculture chain. It was pointed out that highly functioning partnerships require strong and committed leadership to provide coordination and a communication platform, and successfully seek business opportunities to benefit farmers. There appeared to be differences in opinion on if the leadership is better led by government—with MAF having the mandate for aquaculture development in the country—or facilitated by government and led by the private sector.

Mr. Cesar da Cruz, Secretary-General of MAF, ended session five by pointing out that the strategy for aquaculture development for Timor-Leste is already in place. For implementation, it is imperative that the various stakeholders work together to realize the goals for sustainable aquaculture development in the country. He emphasized the need for policies to be put in place and investment into transportation infrastructure to ensure that rural people have access to fish for their nutrition security.

5. Conclusion

To put the present state of aquaculture development in perspective, the reported initiatives, projects and development activities are mapped against the stated outputs and outcomes of the NADS action plan in Table 1. The forum presentations and discussions also provide insights on the way forward for further realization of the NADS core outcomes, and possible next interventions in the near term are included in the table.

	Intended outcomes and actions of the NADS	Main accomplishments	Next steps
1	Suitable agro-ecological zones for aquaculture development identified	• Country-wide mapping done for freshwater aquaculture; high correspondence between areas mapped as suitable and on-going project locations.	• Coastal aquaculture and mariculture suitability mapping. • Further updating and refining of freshwater aquaculture suitability maps.
2	Viable aquaculture technologies developed and disseminated	• Suite of technologies developed and tested on-farm for improved tilapia strain, which packaged as BMPs.	• Tilapia farming using BMPs ready for scaling out to more farmers in more areas. • Refine grow-out technologies to improve fish productivity. • Diversify fish species (e.g. milkfish, common carp).
3	Institutional capacity of the National Directorate of Fisheries and Aquaculture (NDFA) strengthened	• Gleno hatchery upgraded and capacity enhanced for maintaining and producing quality tilapia seed. • Technical training (in-country and abroad) provided on dissemination of grow-out technologies.	• Further develop PPP hatcheries to meet increased fingerling demand. • Continue training more staff, and cover more technical and farm management aspects.
4	Sustainable input supply systems established	• Farm-made feed pellets formulated with local ingredients, and green water technologies farm tested and validated.	• Mechanize feed pellet making to relieve farm labor. • Develop more varied formulations. • Explore possibility of SME-based feed pellet production on commercial basis.
5	Aquaculture producers connected to markets	• Small number of aquaculture farmers connected to local markets.	• Explore strategies and actions for developing the market chain for small producers.
6	Household food and nutrition security improved by aquaculture	• Food and nutrition security improved among early adopters of aquaculture integrated into farming systems evidenced by PADTL project monitoring data.	• Scale out for more widespread impact.
7	Effective partnerships between government agencies, NGOs, communities, the private sector and donors created	• Donor-funded collaborative projects between MAF and INGO/NGOs working with farmer groups. • First PPP hatchery established and operating.	• Create platforms to strengthen partnerships beyond a project basis. • Clarify leadership and partner roles to ensure complementarity. • Establish more PPP hatcheries to improve seed provision and access. • Establish more PPP ventures in feed production and dissemination, post-harvest handling and marketing.
8	Aquaculture farmer groups and representative institutions empowered	• Farmer clusters initiated within projects.	• Strengthen cluster capacity to subsist beyond projects and down the value chain into marketing of farm products.
9	Favorable policies in place for environmentally-responsible aquaculture development	• Development of aquaculture legislation by MAF started.	• Clearly identify enabling policies and develop a comprehensive policy framework.

Table 1. The NADS report card at a glance.

Notes

[1] Unpublished report of the 1st National Aquaculture Forum

[2] http://blog.worldfishcenter.org/2019/08/pathway-to-prosperity-aquaculture-in-timor-leste-set-to-grow-after-10-years-of-development/

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Appendix 1. Forum agenda

Partnership for Aquaculture Development in Timor-Leste (PADTL)

2nd Timor-Leste National Aquaculture Forum

Date: 8 August 2019

Venue: Maubara Room, Level 5, Timor Plaza, Dili, Timor-Leste

Objective: To provide a common platform for stakeholders to share their research and development experiences and identify opportunities for fostering partnerships in aquaculture development in Timor-Leste.

Agenda

Session 1: Opening session			
Time	**Activity**	**Speaker**	**Organization**
8:00	Registration		
8:30	Welcome and forum objectives	**Mr. Mario Pereira** *Country Representative*	WorldFish, Timor-Leste
8:35	**Inaugural address**	**H.E. Joáquim José Gusmão dos Reis Martins** *Minister of Agriculture and Fisheries*	Ministry of Agriculture and Fisheries (MAF), Timor-Leste
8:50	**Keynote address** New Zealand: Timor-Leste Partnership for Aquaculture Development	**H.E. Philip Hewitt** *New Zealand Ambassador to Timor-Leste*	Embassy of New Zealand, Timor-Leste
09:05	**Special address** Timor-Leste: A small island with big lessons for a sustainable food system transformation with fish	**Dr. Gareth Johnstone** *Director General*	WorldFish, Malaysia
09:20	*Coffee break*		

Session 2: Foundations of sustainable aquaculture (Presentations) ***Chair: Mr. Acacio Guterres***			
Time	**Topic**	**Speaker**	**Organization**
9:40	Setting the foundation for sustainable aquaculture in Timor-Leste: Ten years (2010–19) and beyond	**Dr. Jharendu Pant** *Senior Scientist*	WorldFish, Malaysia
10:00	GIFT for Timor-Leste: Seed production and dissemination	**Mr. Marcos de J.S.M.** *Manager of Gleno Hatchery*	MAF, Timor-Leste
10:20	Schooling farmers for aquaculture: Farmer field school approach	**Mr. Silvino Gomes** *Project Coordinator*	WorldFish, Timor-Leste

Session 3: Experiences in scaling aquaculture: Issues and opportunities (Presentations) ***Chair: Dr. Jose Lucas da Silva***			
Time	**Topic**	**Speaker**	**Organization**
NGO support to aquaculture development in Timor-Leste			
10:40	Promoting public-private partnership in tilapia hatchery development	**Mr. Nicholas Wolf** *Country Director*	Market Development Facility (MDF), Timor-Leste
10:55	Programa CRS – TOMAK Aquakultura	**Mr. David Palasits** *Country Manager* **Mr. Augusto Fernandes**	Catholic Relief Services (CRS), Timor-Leste
11:10	Mercy Corps: Aquaculture programming in Timor-Leste	**Mr. Mateus das Neves** *Senior Aquaculture Technical Officer*	Mercy Corps, Timor-Leste
Case example(s) of private sector involvement in aquaculture			
11:25	Promising future of fish and shrimp culture in Timor-Leste	**Mr. Fang Yuan Xiang** *General Manager* **Mr. Ambrosio Valentim**	Long Ping Agricultural Development Lda, Timor-Leste Debao Fishery Development Lda, Timor-Leste
11:40	Healthy, local and fresh prawns	**Ms. Zenilda Gusmao** *Diretora Compania*	Compania Mariscos (CEMILL Groups), Timor-Leste
Farmers' experience with GIFT			
11:55	Farmer from Bobonaro	**Ms. Juvita ana Gloria**	Farmer representative
12:05	Farmer from Ermera	**Mr. Robyati**	Farmer representative
12:15	Farmer from Baucau	**Mr. Anacleto Freitas Belo**	Farmer representative
12:25	*Lunch*		

Session 4: Meeting fish demand: Aquaculture prospect for Timor-Leste (Panel discussion) ***Facilitator: Dr Jose Lucas da Silva***			
Time	**Topic**	**Panelists**	**Organization**
13:30	Nutrition needs and demand for fish: Bringing farmed fish within the reach of consumers	**Mrs. Celestina Ximenes** **Mr. Marcos da C. Belo** **Mr. Adrianu Dani Fernandes du Karmu** **Mr. Pascual Surimali**	Nutrition Department, Ministry of Health School Lunch Program, Ministry of Education Hatchery Department, Ministry of Agriculture and Fisheries Lita Supermarket

Session 5: Creating the enabling environment for fostering partnerships (Panel discussion) ***Facilitator: Dr Jharendu Pant***			
Time	**Topic**	**Panelists**	**Organization**
14:30	Future directions: Partnerships, financing, infrastructure support, policies and governance	**Ms. Gabrielle Isaak** *Deputy Head of Mission* **Mr. Cesar da Cruz** *Secretary General* **Ms. Paula Lopes Da Cruz** *Assistant FAO Representative (Programme)*	Embassy of New Zealand MAF Timor-Leste FAO, Timor-Leste
15:30	*Coffee break*		
Session 6: Closing session			
Time	**Topic**	**Speaker**	**Organization**
16:00	Summing up	**Dr. Kam Suan Pheng and Dr. Jose Lucas**	Aquaculture Forum Rapporteurs
16:30	Vote of thanks	**Mr. Acacio Guterres** *Director General, Fisheries*	MAF, Timor-Leste
16:40	Closing remarks	**H.E. Joáquim José Gusmão dos Reis Martins** *Minister of Agriculture and Fisheries*	MAF, Timor-Leste

Appendix 2. List of participants

	Name	Organization
1	Philip Hewitt	Embassy of New Zealand
2	Gabriella Isack	Embassy of New Zealand
3	Abrani Manuel	Embassy of New Zealand
4	Joaquim Jose Gusmao dos Reis Martins	MAF
5	Cesar da Cruz	MAF
6	Acacio Guterres	MAF
7	Adrianu Dani Fernandes du Karmu	MAF
8	Marco Do J.S. Martins	MAF
9	A. Manuel	MAF
10	Abilio Gomes	MAF
11	Anselmo A. De Araujo	MAF
12	Augusto da Silva	MAF
13	Domingos Santos Martins	MAF
14	Estevao da Silva	MAF
15	Adriano Leite	MAF
16	Fidelino Marques	MAF
17	Joni Freitas	MAF
18	Julio Purificacao	MAF
19	Justino dos Santos Silva	MAF
20	Manuel Freitas	MAF
21	Marcelo da Silva	MAF
22	Mario Cardoso	MAF
23	Martinho I.	MAF
24	Orlando H. Khalis	MAF
25	Pedro Rodrigues	MAF
26	Valdemar Guimaraes	MAF
27	Domingos Ximenes	MAF
28	Hrmenegildo Cortereal	MAF
29	Lino Alves	MAF
30	Joan Jinho da Costa Martins	MAF
31	Angela	MAF
32	A. J. Pereira	DGPU-MAF
33	Maria S.T.	DNIP

34	Celestina Ximenes	MDS (MoH)
35	Angela M.GF.M.	MDS (MoH)
36	D. Ribeiro Sarmento	Trade Investment Tls
37	Silveiro Freitas	Trade Investment Tls
38	Gareth Johnstone	WorldFish (Malaysia)
39	Jharendu Pant	WorldFish (Malaysia)
40	Mario Pereira	WorldFish (Timor-Leste)
41	Silvino Gomes	WorldFish (Timor-Leste)
42	Teoh Shwu Jiau	WorldFish (Malaysia)
43	Tomas D.	WorldFish (Timor-Leste)
44	Lucas de Jesus Soares	WorldFish (Timor-Leste)
45	Natalina Pires	WorldFish (Timor-Leste)
46	Agustinha Duarte	WorldFish (Timor-Leste)
47	Mario Gomes	WorldFish (Timor-Leste)
48	Joctan Lopes	WorldFish (Timor-Leste)
49	Inacia Tema	WorldFish (Timor-Leste)
50	Abilio de Deus	WorldFish (Timor-Leste)
51	Samuel Worang	WorldFish (Timor-Leste)
52	Paula L. Da Cruz	FAO
53	David Palasits	CRS
54	Augusto Fernandes	CRS
55	Margaret M.	Mercy Corps
56	Mateus Das Neves	Mercy Corps
57	Tate M.	Mercy Corps
58	Jose Barros	TOMAK
59	Sarah M.	TOMAK
60	Reinaldo A.	CASA L
61	Bendito M. A.	Mercy Corps
62	Venancio de Jesus	NGO Fraterna
63	Jorge Alves	TASK FORCE Veteran
64	Vasco Da Gama	TASK FORCE Veteran
65	Leoniza C. Xmenes	W. Four SP
66	Anacleto Belo Freitas	Farmer from Bacau
67	Jose Anacleto L.C.P. Freitas	Farmer from Bacau
68	Arlindo M. De Sousa	Farmer from Bacau
69	Thomas da Silva	Farmer from Bacau
70	Izac Das Dores	Farmer from Batugade

71	Juvita ana Gloria	Farmer from Bobonaro
72	Roberto bau Maria	Farmer from Bobonaro
73	Francisco de Sousa	Group Bonu
74	Boaventura Freitas	Group Bonu
75	Lino da Costa	Farmer from Fatuquero
76	Jose Lucas Da Silva	PCM/UNTL
77	Nelvia Guterres	PCM/UNTL
78	Zeconio Fidel dos Santos	PCM/UNTL
79	Alzira de Jesus dos Santos	UNTL
80	Abilio De F.	UNITAL
81	Mateus S.	UNITAL
82	Catherine Kim	UQ
83	Marcelino G.	CEMILL/MT
84	Manuel Pereira	Dili Mart
85	Jose Marques	Empreza Diak
86	Lucas C. S.	ENDEQ
87	Joao Da Silva	We Lekung PPP
88	Nilton Aniceto Lemos	Loja Agricultura
89	Nicholas Wolf	MDF
90	Maria da Costa	MDF
91	Fang Yuang Xiang	Long Ping
92	Ambrosio Valente	Long Ping
93	Zenilda Gusmao	Mariscos Ltda
94	Benny	Mariscos Ltda
95	Ezaquel Freitas	RTTL-EP
96	Jeronimo M.	RTTL-EP
97	Duarte Salvador	Delima FM
98	Benigno H. deJ. Guteres	Delima FM
99	Jacinto Fernandes	Videographer
100	Salvador Natalinode Jesus	Photographer
101	Augusto Da Costa	STL
102	Santino De J.	STL
103	Acacio Pinto	Timor Post
104	Anabdar Grapta	Dalberg Advisory
105	Gagondeep Nonda	Dalberg Advisory
106	Esha Res	Dalberg Advisory

WorldFish

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.

For more information, please visit www.worldfishcenter.org