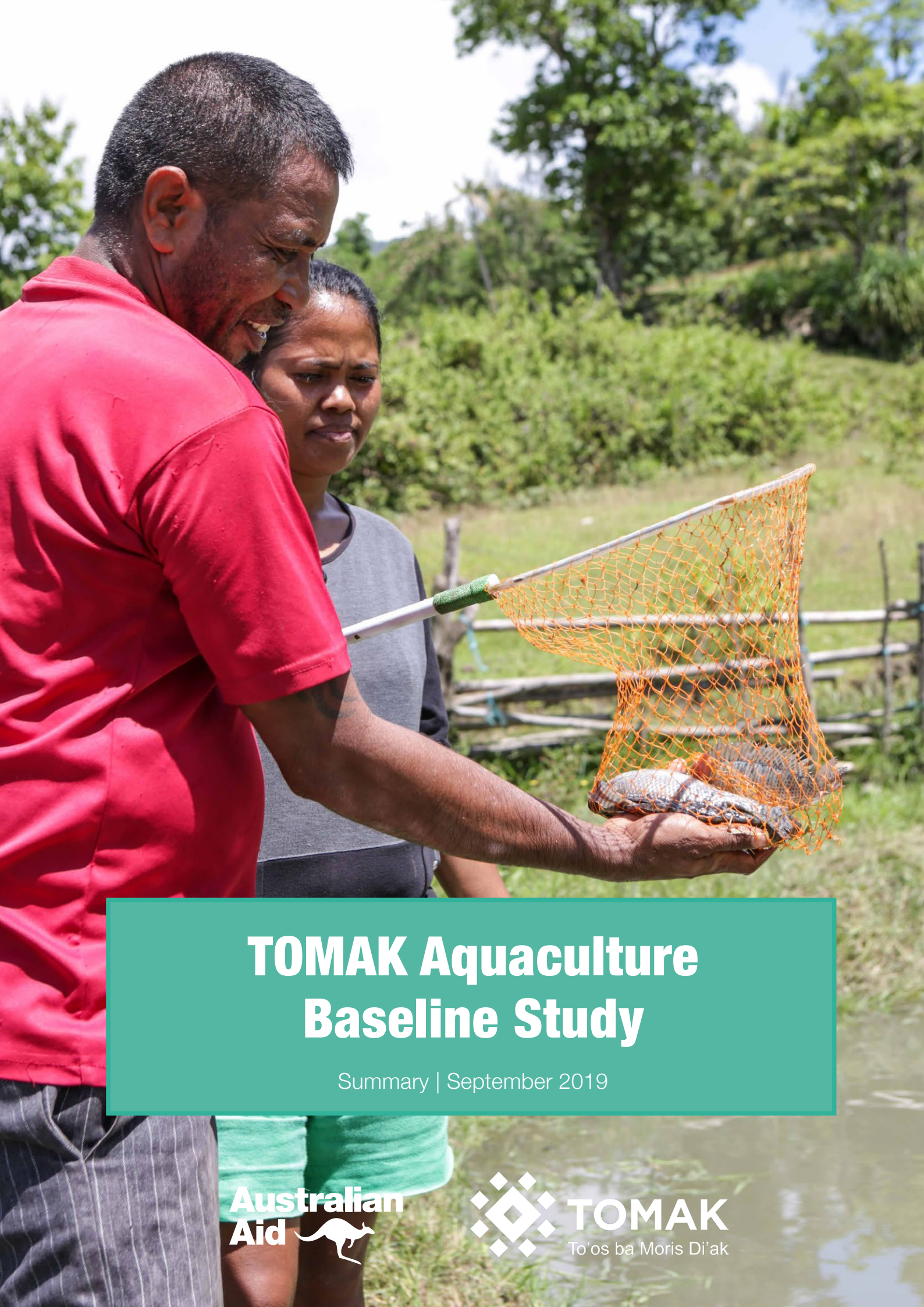

TOMAK Aquaculture Baseline Study

Summary | September 2019

Australian Aid

TOMAK
To'os ba Moris Di'ak

Acknowledgments

Report title: TOMAK Aquaculture Baseline Study

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Abbreviations & acronyms

COMPAC-TL	Combatting Malnutrition through Inland Aquaculture in Timor-Leste (Mercy Corps)
CRS	Catholic Relief Services
DFAT	Australian Government Department of Foreign Affairs and Trade
FFS	Farmer Field School
Freq.	Frequency of responses to a question
HH	Household
IADE	*Instituto de Apoio ao Desenvolvemento Empresarial* (Institute for Business Support)
IYCF	Infant and young child feeding
MAF	Ministry of Agriculture & Fisheries
M&E	Monitoring and evaluation
MRM	Monitoring and results measurement
n	Number of responses to a survey question
NGO	Non-governmental organisation
TOMAK	*To'os Ba Moris Di'ak* (Farming for Prosperity) Program
WRA	Women of reproductive age

Introduction

Despite recent progress, Timor-Leste has one of the highest rates of malnutrition in the world with 46% of children aged 0-59 months suffering chronic malnutrition (stunting).[1] Both Viqueque and Baucau municipalities reflect the national situation with 48% of children under 5 stunted in Viqueque and 53% in Baucau. Protein sources such as meat and fish are rarely consumed in Timor-Leste because they are expensive and in limited supply in rural areas. Timor-Leste's national average per capita meat consumption is estimated at around 1/8th of the global average.[2] Its annual per capita consumption of fish (estimated at 6.1kg) is only a third of the global average (17.3kg/capita/year); lower than the averages for least developed countries (9.8 kg/capita/year); and beneath low-income food-deficit countries (8.8kg/capita/year). In Timor-Leste, *"inland districts* (such as those targeted by TOMAK) *consume approximately one quarter the amount of fish protein of coastal districts."*[3]

Few households in TOMAK's target areas produce or have access to fish, with only 5% of households practising homestead fish production, and 28% of mothers reporting that they consumed no protein source over the previous seven days.[4] Recognising the problem, and the potential for aquaculture development, the Timor-Leste National Aquaculture Development Strategy identifies aquaculture as an important means of improving food and nutrition security in inland areas.[5]

Aligned to this strategy, an expanded focus on household-level aquaculture has been added to

1 Timor-Leste Demographic and Health Survey, 2016.
2 World Watch Institute,2011, Global Meat Production and Consumption Continue to Rise. At URL: http://www.worldwatch.org/global-meat-production-and-consumption-continue-rise-1
3 NDFA, 2012, Analyses of the Current Situation and Potential for Aquaculture Development in Timor-Leste, National Directorate of Fisheries and Aquaculture (NDFA), Ministry of Agriculture and Fisheries (MAF)
4 CRS, Community Driven Nutrition Improvement Project (CD-NIP) baseline report.
5 FAO, 2012, Analyses of the Current Situation and Potential for Aquaculture Development in Timor-Leste.

TOMAK to increase household-level and local market supply of fish as a source of dietary protein. TOMAK will support key partner CRS to implement a 3-year activity designed to provide a reliable supply of fish at least 50% of the year in five *suku* (villages) in Baucau and Viqueque and to increase household consumption of fish protein. The proposed intervention addresses one of the key practices in TOMAK's Social and Behaviour Change (SBC) Strategy: *'Mothers of children under five prepare meals for the family containing meat, fish, or egg-source foods'*.

The aquaculture project has the following main objectives:

- To provide training for partner staff and MAF extension workers on a nutrition and gender-sensitive aquaculture Farmer Field School (FFS) curriculum.
- To roll-out a nutrition and gender-sensitive FFS curriculum to communities.
- To establish local fish nurseries.
- To construct or rehabilitate 137 fish ponds in 5 suku where CRS is implementing with support from TOMAK. This will be done in partnership with two local organisations:

  - *Through Fraterna*: Reconstruction or rehabilitation of 75 fish ponds in three Viqueque suku (Builale and Ossu de Cima in Ossu subdistrict; and Afaloicai in Uatucarbau).

  - *Through Caritas de Baucau*: Construction of 62 new fish ponds in two Baucau suku (Maluro in Quelicai subdistrict and Uacalain in Baguia).

The aquaculture project concept and design were developed after TOMAK's original baseline study was completed. Therefore, this aquaculture project baseline ensures activities and results of the aquaculture components can be evaluated alongside TOMAK's main baseline report over the project lifecycle.

Methodology

The baseline study applied a quantitative methods approach to produce and analyse knowledge, attitudes and practices.

Core methods

Evaluation methods conform to DFAT's Monitoring and Evaluation Principles and were adapted to the uniqueness of the project objectives and context of the beneficiary communities. Core methods employed were:

Document review of project documentation (TOMAK baseline study, CRS MRM plan, Aquaculture Activity Design, Mercy Corps' 2014 Aquaculture baseline survey for the COMPAC-TL Project and the 2016 final project report, and the IADE Agribusiness Training – Tracer Study protocols), plus external reports related to aquaculture and nutrition in Timor-Leste.

Household survey. The household survey of 56 women and 53 men took place from 14 to 18 November 2018. The consultant evaluator collaborated with TOMAK staff to develop an appropriate set of questions drawn primarily from the tool used at TOMAK's main baseline study and indicators in the project MRM plan. The survey used the 'household' as the unit of analysis. Women of reproductive age (WRA) with a child between the ages of 6 and 23 months of age were the primary target respondents. A shorter survey was also conducted with men of working age in the same households, to probe activities that are predominantly performed by men and to uncover gendered differences in knowledge, attitudes and practices.

To be consistent with TOMAK's main baseline survey, the sampling frame ensured probability

proportion to size (of population) via simple random sampling of registered beneficiary households containing a child between the ages of 6 and 23 months of age, calculated for 90% confidence level and 10% margin of error. To achieve this confidence interval for the target population of 150 households registered for aquaculture support, 47 valid responses were required. Thus, the 56 women and 53 men exceeded the minimum sample size.

Limitations

Sample size: While the sample size has been calculated to ensure statistical validity of aggregate results, responses are insufficient to allow for any sub-categorising of respondents (e.g. practices of those already undertaking aquaculture) and maintain the desired confidence levels to claim validity.

Language: The questionnaire was developed in English and translated into Tetun by TOMAK M&E staff. Surveys were conducted in Tetun.

Supervision of data collection: The consultant worked remotely to develop the questionnaire and sampling frame. Training and supervision of data collection was cascaded to TOMAK's M&E Manager in-country. Delegating data collection reduced the supervision and control by the lead evaluator.

Alignment of male & female respondents: Only 59% of households where a WRA was interviewed (freq.=33/56) had a male present to complete the male interview. Therefore, an additional 20 households were visited where only a male was interviewed. Thus, though the WRA and male interviews were supposed to represent male and female knowledge and attitudes in the same sample of households, this is only true for 59% of responses. The baseline cannot claim that differences of results between males and females is primarily related to gender without other confounding factors.

Coverage of target suku: At the time of baseline survey, the project had not yet recruited project participants in one of the targeted suku: Lavateri in Baguia, Baucau. Thus, the sampling frame did not include this project location. The baseline evaluator recommends that Lavateri be subsequently excluded from the end-of-project evaluation survey, to optimise reliability of any longitudinal study.

Respondent criteria: The survey participant list was not accurate in its criteria that required the household to contain children aged 6 – 23 months and could not anticipate whether both a woman and a man would be present to answer the survey on the day of data collection.

Results

Production and consumption of fish for household nutrition

Indicator: Average number of months per year that households report meeting consumption needs from own production

Summary baseline results:

- 80% of WRA consumed no fish in the 24 hours prior to the survey
- 63% of children consumed no fish in the previous 7 days

Application of nutrition-sensitive aquaculture practices

Indicator: Percentage of households reporting use of promoted aquaculture practices

Summary baseline results:

- 48% of targeted households are currently practising aquaculture[6]
- No fish ponds (0%) are reporting as profitable at baseline

Among those practising aquaculture (n=23)[7]:

- 26% achieve 4 or more harvests per year

6 This result is indicative that promotion of aquaculture has already commenced among target households under previous projects (CDNIP and COMPAC-TL).

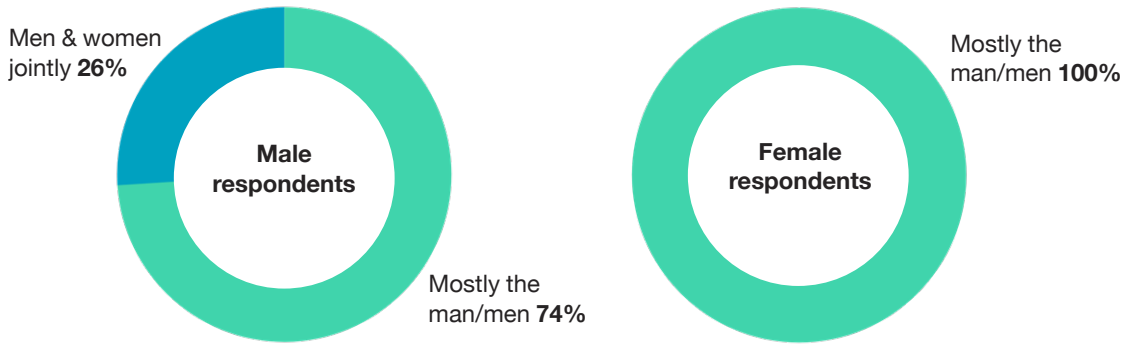
7 As results from both the men's and women's survey suggest that from those already practising aquaculture, men are primarily responsible for all pond management tasks, the following data is taken from the men's survey. Women's responses were more likely to identify men as undertaking certain tasks, (e.g. adding lime to the pond) when men themselves reported that no one was doing this.

- Only 8.7% fertilise their pond
- None (0%) add lime to their pond
- 9% sell any of their fish

Aquaculture practices and gendered roles

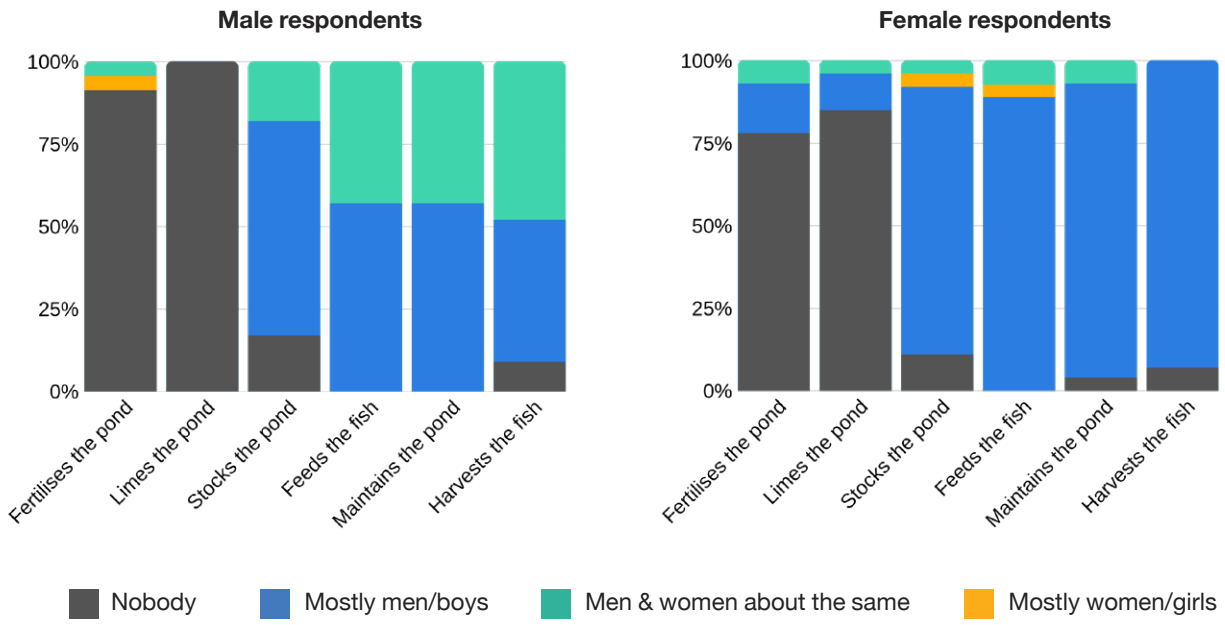
Aquaculture is currently a male-dominated activity. According to men surveyed, three quarters of ponds (74%) are owned by men, with the remaining quarter (26%) considered to be jointly owned by men and women of the household. Yet, no women from those households reported jointly owning the pond (100% of women respondents claimed the pond was owned by a man/her husband).

Figure 1: Who owns the pond?



Among households already fish-farming, responses from men and from women were surprisingly divergent in relation to some reported practices. Overall, we see that for all pond management tasks, men are usually responsible, and a minority of households share responsibility. Almost no households reported a woman having primary responsibility for any specific task. This is surprising given the high proportion of households in the sample that are female-headed (36%).

Figure 2: Who does these aquaculture practices?

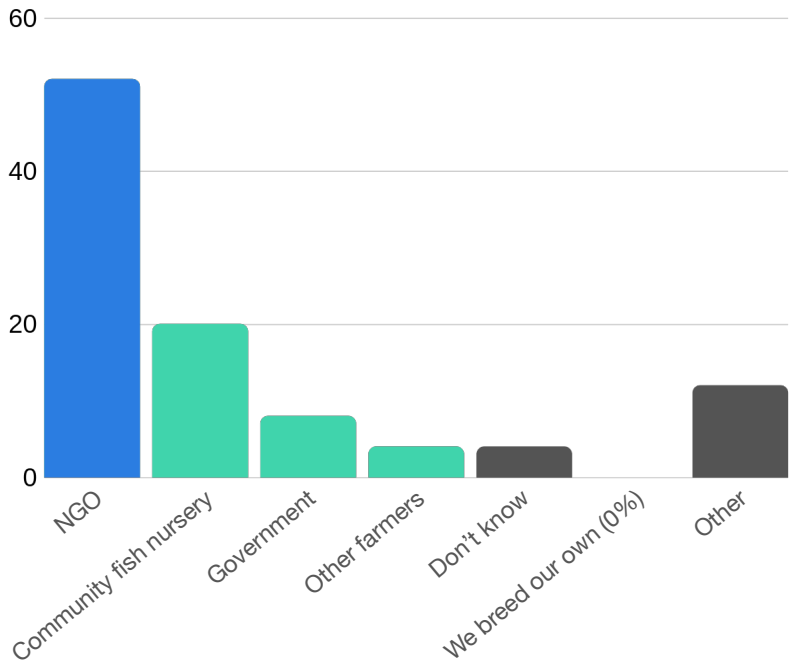


The very small number of households fertilising their pond and the absence of households adding lime to their ponds are sub-optimal results for productive and sustainable aquaculture.

Pond management practices

From the graph below, it is apparent that NGOs are the primary source of fingerlings for households currently practising aquaculture, providing over half of all households' stock (52%). No households currently breed their own.

Figure 3: Main source of fingerlings



Knowledge of nutrition-sensitive aquaculture practices

Indicator: Percentage of men and women with knowledge about promoted aquaculture production practices, disaggregated by sex.

Summary baseline results:

- 39% of women stated someone in their household had previously been trained on aquaculture

Within those households where someone had been trained:

- 36% contained a woman who had been trained in aquaculture
- 91% contained a man who had been trained in aquaculture

Across the entire sample (of female respondents' households):

- 14% of households contained women who had been trained in aquaculture
- 36% of households contained men who had been trained in aquaculture

In households where *someone* had been trained, women could recall lessons on the following topics:

- Pond construction: 23% of women
- Pond stocking management: 5% of women
- Fish feeding systems: 55% of women
- Harvesting and post-harvest handling: 18% of women

In households where *someone* had been trained, men could recall lessons on the following topics:

- Pond construction: 93% of men

- Pond stocking management: 33% of men
- Fish feeding systems: 87% of men
- Harvesting and post-harvest handling: 67% of men

In general, the baseline found that men in households where someone was trained had better recall of training content than women. Almost half of all women did not know what any of the training content was. For the rest of the interviewed women, only fish feeding was frequently cited. Almost certainly, the differences here are a result of past trainings focussing on training men, with far fewer women trained. This result also implies that when one household member is trained, the lessons are not well transmitted to other members of the household. The interview did not prompt interviewees about each topic. The respondent had to name whatever topics they could remember.

Table 1: Contents of lessons women could recall

Type of training	Pond design construction	Pond stocking	Fish feeding systems	Harvesting post-harvest handling marketing	Can't remember	Other
Number who could cite training type	5	1	12	4	10	0
As % of HHs that received training (n=22)	23%	5%	55%	18%	45%	0%
As % of the entire sample (n=56)	9%	2%	21%	7%	18%	0%

NB: Respondents could give more than one answer to this question

Table 2: Contents of lessons men could recall

Type of training	Pond design construction	Pond stocking	Fish feeding systems	Harvesting post-harvest handling marketing	Can't remember	Other
Number who could cite training type	14	5	13	10	0	0
As % of HHs that received training (n=22)	93%	33%	87%	67%	0%	0%
As % of the entire sample (n=56)	26%	9%	25%	19%	0%	0%

NB: Respondents could give more than one answer to this question

WRA knowledge about optimal maternal nutrition and IYCF practices

Indicator: Percentage of WRA with knowledge about optimal maternal nutrition and IYCF practices

Summary baseline results:

- 45% of women and 58% of men can correctly cite two or more nutrients contained in fish meat. The difference between men and women is not statistically significant ($p=0.15$).
- 30% of women and 66% of men could cite three or more health benefits from eating fish. The difference between men's knowledge and women's is statistically significant ($p<0.000$).
- 98% of women and men are aware that an infant below 6 months should not be fed fish
- 57% of WRA and 38% of male respondents thought fish could be introduced between the ages of 6 and 9 months
- 2% of WRA thought fish could be first introduced at 10 or 11 months
- 39% of WRA and 55% of men incorrectly believe a child needs to be 12 months or older before being allowed to eat fish. This result suggests that up to half of all 6 to 11-month-old children are not benefitting from fish in their diet.

Attitudes towards optimal maternal nutrition and IYCF practices

Summary baseline results:

- 64% of WRA said their mother-in-law probably or definitely would not support her eating fish if she became pregnant
- 45% of WRA said their mother-in-law probably or definitely would not support her to feed fish to a young child
- 26% of WRA said their husband probably or definitely would not support her to feed fish to a young child
- Informants suggested that mothers-in-law have high influence over mothers of young children
- 20% of women were living with their mother-in-law

Barriers to consuming more fish

Summary baseline results:

Constrained access to fish is the biggest barrier preventing greater consumption for respondents' families (reported by 68% of WRA respondents, and 83% of men). The next most common reason for women and men was the affordability of buying fish.

Conclusions & recommendations

Theme	Conclusion	Recommendation
Aquaculture for nutrition	In target communities, only 41% can access fish in their local community, and less than half of all children and adults consumed fish over a seven-day period. Access to fish was cited by respondents as the greatest barrier to being able to consume more fish. Affordability was cited as the second greatest barrier to being able to consume more fish.	**Targeting household aquaculture for introduction and expansion under TOMAK is an appropriate initiative**. Protein deficiency is a health problem in Baucau and Viqueque that increasing fish consumption would address. The small size of the implementation area and select number of household beneficiaries, provides an opportunity for adaptive programming based on need (e.g. see recommendation below to integrate household decision making topics into training content).

Theme	Conclusion	Recommendation
Technical aquaculture practices	Aquaculture has already been introduced to project target areas by NGOs (CRS, Fraterna). However, adoption of aquaculture is relatively recent in targeted areas and fish pond management practices are sub-optimal. Consequently, harvests of fish are infrequent and generate insufficient quantities for gifting or sale to other households. Practitioners are still heavily dependent on NGOs to stock their ponds. These deficiencies suggest that aquaculture will not be a sustainable form of agriculture and nutrition without a new project to consolidate and expand the practice in these communities.	**Engage relevant government counterparts at all levels.** Closely involve MAF and MoH from national to village level in the design, implementation, and monitoring of this small-scale aquaculture activity.
		Design and budget for follow-up support. Given the low knowledge retention observed in relation to past aquaculture trainings, TOMAK, CRS and partners should plan for periodic follow-up support to participants between formal group-training events. Such support could also take place at each participant's own fish pond, to ensure questions and solutions are directly practical to their needs. This follow-up support could be formal visits by project facilitators each month; and/or informal visits by peer coaches; and/or farmer-field school-style group peer-to-peer hosting and visiting at each other's ponds.
		Decentralise sources of fingerling stocks. At baseline, more than half of all households that already practise aquaculture are reliant on NGOs for obtaining fingerlings. Given the finite lifecycles of NGO projects, restocking may cease when NGO projects end. CRS should place a focus on diversifying sustainable sources of fingerlings to ensure long-term viability of the aquaculture project outcomes. This may include creating or expanding profitable local breeding ponds and formalising links between MAF hatcheries and aquaculture farmers.

Theme	Conclusion	Recommendation
Women's involvement in aquaculture	While women in the project area are primarily responsible for food preparation for their households, aquaculture is a male-dominated activity. 100% of female respondents stated that men were the owners of fish ponds and the majority of male and female respondents said that men lead all aspects of pond management including making decisions around how many fish to consume and how many to sell. Past projects have reinforced this gender division by training over twice as many men than women. TOMAK and CRS have an opportunity to balance this past trend by increasing the proportion of women who participate in training and ongoing support. Almost half (45%) of all women were not aware of what was taught in the past. Half could remember lessons about fish feeding practices, and only a minority could recall lessons on other topics. *This suggests training of one member per household does not result in information being well transmitted to other members.*	**Increase female participation in aquaculture.** Ideally, women AND men in participating households should both benefit from direct training from the project. However, to achieve this, the project will need to identify and address gendered barriers that may prevent women from attending training. For example, barriers may include cultural expectations that prioritise men's public participation; or gender obligations for women to look after the children; or gendered time constraints of women already being over-committed in their daily task responsibilities. While women may not be involved in all pond management activities, there are some practices that may more acceptable for women to be involved in versus others (e.g. feeding fish vs. pond construction).
		Explore options for integrating household decision-making topics into aquaculture training sessions for couples. Training sessions should highlight and reinforce essential technical aquaculture practices that ensure a healthy pond. Future training approaches could include take-home reminder materials of essential technical and nutrition practices. These key practices should also be reinforced during follow-up visits.
		Explore opportunities to raise the visibility, status, and leadership of women in aquaculture. This could include drawing out aspects of women's leadership and specific challenges for women in aquaculture, supporting collective action of female aquaculture farmers and linking with MAF female extension workers and technical aquaculture staff.

Theme	Conclusion	Recommendation
Knowledge and attitudes towards fish consumption	Knowledge among respondents is low around why fish is a healthy dietary addition. Only a third of women could cite three or more health benefits from eating fish. Men had higher awareness of health benefits of fish, perhaps due to the higher proportion of men who have received training on aquaculture in the past. The majority of respondents (both men and women) believe that at around one year of age is when children can start consuming fish. This is contrary to the MoH recommendation of starting fish consumption at six months. The survey also confirmed that elder women can be a barrier to promoting fish consumption during pregnancy and for children starting at 6 months of age, with almost half of all WRA perceiving that their mother-in-law would not support her feeding fish to a young child, and 64% said her mother-in-law would not support the WRA eating fish herself. A quarter of all WRA also perceived that their husbands would not support feeding fish to their young child.	**Fish consumption should be promoted through a coordinated approach.** Project implementers, MAF, and MoH all have a role to play in promoting fish consumption and its health benefits to parents and grandmothers for children starting at six months of age. MAF aquaculture staff and agriculture extension workers, along with suku-level health providers should all promote and reinforce the same consumption practices and nutrition benefits of eating fish during pregnancy and for babies starting at six months of age.
		Explore ways to involve mothers in law and grandmothers. Articulate the benefits of fish consumption for pregnant women and babies starting at six months of age in ways that resonate with grandmothers (e.g. fish consumption supports brain development, healthy bodies, and helps children do well in school). CRS and partners are working to improve demand for nutritious foods and year-round access through various activities in addition to aquaculture. There is an opportunity to encourage participation of grandmothers in these other activities, such as Family Nutrition Groups.

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