TOMAK

To’os ba Moris Di’ak

Farming for Prosperity

TOMAK Micro Baseline Study
Red rice / Peanut

October 2018

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Authored by the TOMAK Monitoring and Evaluation Manager and Monitoring and Results Measurement Adviser in May 2018.

Abbreviations & acronyms

ACIAR	Australian Centre for International Agricultural Research
AEW	Agricultural extension worker
CSO	Civil society organisation
FAO	Food and Agriculture Organization of the United Nations
IADE	Institute for Business Support (*Instituto de Apoio ao Desenvolvimento Empresarial*)
KII	Key informant interview
MAF	Ministry of Agriculture and Fisheries
M&E	Monitoring and evaluation
MRM	Monitoring and results measurement
NAIC	Net Atributable Income Change
NGO	Non-government organisation
PPI	Progress Out of Poverty Index
SISCa	Integrated Community Health Services (*Servisu Integradu Saude Comunitaria*)
ToC	Theory of Change

1. Executive Summary

The To'os Ba Moris Di'ak (Farming for Prosperity) Program (TOMAK) is a five (plus five) year agricultural livelihoods program funded by the Australian Government in Timor-Leste[1]. Its goal is to ensure rural households live more prosperous and sustainable lives. TOMAK will achieve this through parallel and linked interventions that aim to:

- Establish a foundation of food security and good nutrition for rural households; and
- Build their capacity to confidently and ably engage in profitable agricultural markets.

Component 2 (Market System Development) promotes the development of commercial agriculture following a market system development approach, focussing on selected higher-potential value chains. SBC approaches are also being applied under this component to promote profit-seeking and self-advancement behaviours.

This baseline survey specifically targeted red rice and peanut producers, but also asked respondents if they had produced 12 other specified crops (a total of 14 crops) in the past year. Four of the 14 specified crops (red onion, red bean, coffee and coconut) were not being produced, and therefore were not included in the baseline report.

The baseline covered 120 survey respondents (60 women and 60 men) over three municipalities (Bobonaro, Viqueque and Baucau), and a total of 8 semi-structured interviews (4 female and 4 male). Data was collected from 26 of February to 22 March 2018.

Key findings from the study include:

- The Progress Out of Poverty index results show respondents are highly likely to be living below the upper international poverty lines.
- Landholdings are small: On average, the land size available to farmers was approximately 0.75 hectares, 98.9% of this land being cultivated. A majority of respondents (62%) reported that they own their land, but do not have any reference number or certification as proof of ownership.
- An average of 0.24 hectares is dedicated to red rice (32% of land) and 0.11 hectares is dedicated to peanut (15% of land).
- Average profit per household for red rice is approximately USD -10 per year, translating to average profit per capita of USD -1.52 per year, demonstrating that the average red rice producer is operating on a loss[2].
- Average profit per household for peanut is approximately USD63 per year, translating to average profit per capita of USD9.24 per year.
- The average yields for red rice and peanut are approximately 1,200kg/hectare and 1,247kg/hectare respectively.
- Overall, little of the income from crop sales is reinvested into the next season of production, with 50% of red rice producers and sellers and 46% of peanut producers and sellers reporting a very small amount of income reinvestment.
- On average, the proportion of peanut and red rice harvest sold is more than half of the harvest (57% and 53%, respectively).
- Regarding production techniques, use of retained seeds was the most common technique for both red rice and peanut producers, with 100% of survey respondents reporting this practice. An overwhelming majority of red rice producers also reported use of flood irrigation and seedling nurseries. Use of other agricultural techniques supporting greater productivity was limited.

[1] With a funding commitment of AUD25 million for the first phase (2016-2021).
[2] This does not take into account the cost of family labour.

- On average, red rice producers reported selling 53% of their crop, consuming 24%, bartering or donating 7%, wasting 4% and using 12% of the harvest for seed. On average, peanut producers reported selling 57% of their crop, consuming 17%, bartering or donating 7%, wasting 5% and using 14% of the harvest for seed.
- The vast majority of respondents (81%) normally sell their products directly to consumers, with less than one quarter of respondents (19%) selling through other people (i.e. aggregators).
- Farmers cited labour and farmhands, tractor rent, and seeds as the most common costs of production, followed by farming equipment (buying or renting, other than tractors) and pesticides.
- The average amount spent on costs for red rice production was USD139 per household, while the average for peanut production was USD70 per household.
- Major constraints to production were reportedly disease management, irrigation, labour and farmhand shortage, and weather conditions. Few farmers felt a lack of technical support or access to inputs was a major constraint. Disease management was the most common production constraint faced by both red rice and peanut producers.
- During the harvest and post-harvest stages, farmers cited storage, access to market, and labour and farmhand shortage as major challenges. Almost one quarter of respondents reported that they did not face any constraints during this time. Storage and access to market were the most common constraints faced by both red rice and peanut producers during this stage.
- Female red rice producers most commonly reported involvement in the production stages of travelling to the farm, planting the seeds, transplanting, harvesting the crop, and selling the produce. Male responses were similar, but men were more likely to report involvement in land preparation and applying pesticides than women were. During red rice production, both women and men reported involvement in travelling to the farm and harvesting the crop 100% of the time.
- Female peanut producers most commonly reported involvement in the production stages of travelling to the farm, planting the seeds, harvesting the crop and selling the produce. Male responses were similar, though men were more likely to report involvement in land preparation and weeding, and were less likely to report selling the produce. During peanut production, both women and men are almost equally involved in transplanting, travelling to the farm, and harvesting the crop.
- A majority of women interviewed reported that they have input into some (38%) or all (37%) farming and production decisions. A majority of men interviewed (72%) reported input into most of these decisions, while only 5% of male respondents reporting input into all of these decisions, much lower than the report from women.
- Both men and women agreed that they have input into at least a few expenditure decisions (0% of respondents reported no input). Less than half of women (40%) reported input into all expenditure decisions, a much higher percentage than men (7%).
- Both men and women largely agreed that women ‘manage’ household cash, although slightly more men perceive this as a shared responsibility.
- Less than one third of respondents reported that they had received support to improve their farming. Of these respondents, about half were men and half were women. The majority of this support came in the form of training and support and was typically received once or twice per year. More than half of those who reported that they had received support reported that this support came from Ministry of Agriculture extension workers (AEWs)
- On average, households produced four specified crops.

This baseline report is structured in the following sections:

- Introduction: Program information and objectives, as well as the objectives of the baseline.

- Methodology: A detailed description of the baseline methodology and approach, sample sizes, preparation and data collection schedule and techniques, data processing and analysis procedures, and limitations of the baseline.
- Findings:
  - Indicator baseline summary: including baseline figures as compared to TOMAK indicators.
  - Demographic information of the respondents: including Progress Out of Poverty Index (PPI) results.
  - Overall findings: including income from sales, sales, and practices across the 10 specified crops.
  - Red rice findings: including income from sales, sales, costs, practices, constraints and workloads.
  - Peanut findings: including income from sales, sales, costs, practices, constraints and workloads.
  - Access and agency findings: including decision-making in household resources and finances, agricultural land and ownership, and support available for farming.
- Conclusions: A summary of the results and outcomes explored in the findings section.
- Recommendations: Recommendations for the TOMAK program based on results found in the baseline study. This section includes recommendations for the following topics:
  - Level of education of head of household
  - Household electronic assets and access to information
  - Crop profitability
  - Income reinvestment
  - Production methods and techniques
  - Costs of production
  - Preparation and growing stage constraints
  - Harvest and post-harvest stage constraints
  - Land ownership
  - The role of women in household decision-making
  - Support for farming

2. Introduction

2.1. Background

The To'os Ba Moris Di'ak (Farming for Prosperity) Program (TOMAK) is a five (plus five) year agricultural livelihoods program funded by the Australian Government in Timor-Leste[3]. Its goal is to ensure rural households live more prosperous and sustainable lives. TOMAK will achieve this through parallel and linked interventions that aim to:

- Establish a foundation of food security and good nutrition for rural households; and
- Build their capacity to confidently and ably engage in profitable agricultural markets.

Component 2 (Market System Development) promotes the development of commercial agriculture following a market system development approach, focussing on selected higher-potential value chains. SBC approaches are also being applied under this component to promote profit-seeking and self-advancement behaviours. Gender is embedded in the planning, implementation and monitoring of activities across the program, promoting gender equality and women's economic empowerment.

The primary target area for Phase 1 comprises 66 inland mid-altitude *suku* (villages) with reasonable agricultural potential, located in Baucau, Viqueque and Bobonaro municipalities. Implementation is based on a systems approach, working with and through a broad range of partners, including Government (across various ministries and administrative levels), NGOs, CSOs and the private sector.

The baseline report presented here relates to Component 2. Key interventions include implementation of demonstration plots (demplots) and Farmer Field Schools (FFSs) in the red rice and peanut subsectors, designed to promote improved production practices that can result in improved productivity. These interventions are delivered by TOMAK through the Ministry of Agriculture and Fisheries (MAF). The baseline study was undertaken ahead of or at early commencement of demplot and FFS activities, in late 2017.

This micro-baseline specifically focussed on farmer demonstration plot and FFS activities in the red rice and peanut subsectors. The demonstration plot objectives are threefold. Firstly, to demonstrate new technologies and varieties on a small scale before rolling these out to more farmers. Secondly, to promote improved production practices to other farmers by organising farmer field days at key points of one cropping season. Thirdly, to calculate gross margins to determine the level of profitability for farmers.

Individual farmers are selected to host demonstration plots based on recommendations by MAF or by other organisations. Each farmer is supported by their locally-based MAF agricultural extension worker with weekly visits. Prior to demplot establishment, TOMAK technical staff facilitate training (or refresher training) for the AEWs in Good Agricultural Practice (GAP) for the target crop and then supports them in their work with farmers. During the cropping season (3-4 months) other neighbouring farmers are invited to participate in Farmer Field Schools twice or three times, where new technologies will be explained, with a view to attracting interest for activity expansion. Activities will be expanded to more farmers if there is a proven market for the products.

2.2. Objective of baseline

TOMAK is delivering Component 2 both directly and through partners – currently MAF and the Institute for Business Support (IADE) - who work with farmers to address a range of issues relating to agricultural supply and farming business practices.

The key objectives of this baseline study were to:

- Estimate current income earned from agricultural activities, including overall income from crop sales and sales specific to red rice and peanut.
- Review current production practices being applied by farmers for red rice and peanut.
- Assess agricultural support received by farmers for red rice and peanut.
- Assess women's economic empowerment in households

[3] With a funding commitment of AUD25 million for the first phase (2016-2021).

3. Methodology

3.1. Methodology

During the first year of program implementation, TOMAK developed a program-wide Theory of Change (ToC, presented below) and key indicators to direct its work. This encompasses Component 1 (Household Food Security and Nutrition) and Component 2 (Market System Development), with outcome level theories of change also developed. The baseline methodology was developed based on the Component 2 Theory of Change. The logic moves through a number of levels, starting from project interventions delivered through TOMAK partners (including the private sector and government), through to partner and farm level practice changes, leading to impact on farmer incomes.

Specific indicators for each level of change have been developed, leading to the development of tools and a monitoring and results measurement (MRM) plan. At impact level, TOMAK aims to increase economic empowerment for women and men from agriculture-related activities.

The theory of change boxes, indicators and baselines are presented in Section 4. These are taken from the MRM plan and focus at outcome and impact level of change that will be measured. Output level changes will be captured in TOMAK's ongoing monitoring work.

The baseline methodology employed mixed methods, including quantitative farmer surveys, with further qualitative data collected through semi-structured interviews. The baseline data collection was undertaken early in the lifecycle of interventions for red rice and peanut. The baseline draws on existing TOMAK reports and other secondary data to triangulate and support measurement and analysis, including:

- TOMAK's Value Chain Analysis (TOMAK, 2016)
- TOMAK's Aggregator study (TOMAK, 2017)

3.2. Sampling

The population of interest includes farmer households that grow red rice and peanuts in TOMAK's target municipalities of Bobonaro, Baucau and Viqueque.

Surveys

Sampling for the baseline survey involved farmers already participating in peanut and red rice demonstration plot activities, and other farmers in the general area, who were likely to be exposed to the activities to some degree.

Sampling for the baseline survey is shown in Table 1 (includes existing demonstration plot farmers) and equally split between women and men farmers.

Table 1: Survey sample

Crop	Baucau	Bobonaro	Viqueque
Red rice	30	0	30
Peanut	30	30	0

The survey template is provided at Annex 1.

Semi-structured interviews

Semi-structured interviews were conducted with women and men farmers in each municipality for the relevant target crop. Questions explored included how labour is organised on farms, land sharing arrangements, selling arrangements in groups or individually and transporting produce to sell.

Sampling for semi-structured interviews is outlined below in Table 2.

Table 2: Semi-structured interview sample

Crop	Baucau	Bobonaro	Viqueque
Red rice	2 (1 woman and 1 man)	0	2 (1 woman and 1 man)
Peanut	2 (1 woman and 1 man)	2 (1 woman and 1 man)	0

The question guide is provided at Annex 2.

3.3. Preparation and data collection

3.3.1. Preparation

Following the preparation of the draft survey tool, the survey was field tested by the M&E Manager and two enumerators with farmers for language, format and duration using tablets equipped with the Ona software platform. It was further tested during enumerator training. Key informant interviews (KIIs) followed a semi-structured format with guidance questions for the interviewer to draw on.

TOMAK has conducted a recruitment process to collect a pool of enumerators for the MRM to draw on casually as required by data collection needs of the program over time, with 20 enumerators now making up this resource. Enumerators were selected on the basis of existing data collection experience and includes those familiar with more basic levels of data collection, such as structured surveys.

The MRM team recruited four enumerators and ran one day of survey familiarisation ahead of data collection. The team included two women and two men, to allow for gender-sensitive surveys to be conducted.

3.3.2. Data collection

Survey data was collected in the three districts according to the following schedule in Table 3.

Table 3: Data collection schedule

District	Start date	End date
Bobonaro	26 February	1 March
Baucau	6 March	22 March
Viqueque	12 March	14 March

The enumerators travelled in one group, with the M&E Manager supporting data collection and undertaking the semi-structured interviews.

3.4. Data processing and analysis

Following the completion of data collection, data was exported from Ona by a freelance survey adviser into excel, where it was cleaned. Analysis was undertaken by the MRM Adviser and M&E Manager.

KIIs were transcribed from recordings in dot point form. Transcriptions were then analysed thematically by the M&E Manager and MRM Adviser.

Overall analysis was undertaken by the MRM Adviser and M&E Manager against the key indicators. The draft report was reviewed by the TOMAK Team Leader, Market Systems Development team, and M&E House Evaluation Adviser.

3.5. Limitations of the baseline

A number of issues were encountered during the data collection process, outlined below:

- The selection of demonstration plot farmers did not always correspond to the criteria for baseline respondents (growing and selling the crops in question), particularly in the eastern region (Baucau and Viqueque), which affected the sample representation and data collection schedule. Some farmers didn't grow and sell red rice but had been selected for demonstration plots by MAF AEWs and proposed to TOMAK. In response, TOMAK regional offices were asked to reorganise the schedule for data collection in order to achieve the target sample.
- Costs of production reported by farmers may be inflated. The costs of production for both red rice and peanut were significantly higher (i.e. double) the expenditure associated with these crops in TOMAK's Value Chain Analysis. In reality, both amounts are likely to be estimates and the actual costs likely to be between the two. As a result, the profit reported in this baseline for the two crops may be conservative.
- Coordination with community leaders could be improved, especially in the eastern region (Baucau and Viqueque) due to a hierarchical system between the President of Municipality Authority and *suku* (village) leaders which increases the time needed for information to reach farmers. One week's advance notification from TOMAK wasn't sufficient for the President of Municipality Authority to inform the Post Administrator and suku leadership. In the future, TOMAK will give two or more weeks' notice to allow for better coordination. In addition, TOMAK regional offices can follow up with suku leaders to guarantee that information is reaching the farmers.
- Farmers' capacity to understand the questions during the semi-structured interviews was limited and therefore the interviewer needed to use prompting questions to gain more information and insight.
- During interviews, red rice and peanut producers were asked to select the production methods and techniques that they most commonly use for red rice and peanut production. During a subsequent review by the technical team, four production methods and techniques were deemed irrelevant to one or both of the specific crops (i.e. not actually used by farmers), and therefore these methods have been removed from the baseline data. This includes mentions of the use of raised beds across both groups of producers, and mentions of the use of irrigation seedling nurseries, and transplanting during peanut production.

4. Findings

4.1. Indicator baseline summary

The results summary provided below is predominantly drawn from the survey data.

Table 4: Indicator baseline summary

Outcome 2 - Theory of Change box	Indicator	Baseline figures		
		Red rice	Peanut	Overall[4]
Impact				
Increased economic empowerment for women and men from agriculture-related activities	Proportion of households that report improvements in income from increased agricultural sales (Other factors: seasonality, other program support, external market forces)	Average per HH profit USD -10/year Average per capita profit USD -1.52/year	Average per HH profit USD63/year Average per capita profit USD9.24/year	Average per HH profit USD1,627/year Average per capita profit USD239.04/year
	Proportion of women reporting increased decision-making authority in household resources and finances	40% of women reporting input into all production-related decisions. 97% of women reporting management of income from agricultural sales, and 77% of men reporting women manage the income from agricultural sales. 47% of women reporting input into all household expenditure decisions.	33% of women reporting input into all production-related decisions. 100% of women reporting management of income from agricultural sales, and 97% of men reporting women manage the income from agricultural sales. 33% of women reporting input into all household expenditure decisions.	37% of women reporting input into all production-related decisions. 98% of women reporting management of income from agricultural sales, and 87% of men reporting women manage the income from agricultural sales. 40% of women reporting input into all household expenditure decisions.
	Proportion of women reporting manageable workloads (collected as part of gross margin calculations)	Not measured in this baseline.	Not measured in this baseline.	N/A
	Proportion of women reporting access to productive assets	Qualitative assessment showed land predominantly owned by men and is generally lost by women that marry and move away from the family.		
Farmer level outcome				
Farmers (♀♂) improve farm management, production, productivity and post-harvest management	Improved yield per hectare and reduced post-harvest losses	1,200kg/hectare Average yield for TOMAK farmers = 379kg (average land	1,247kg/hectare Average yield for TOMAK farmers = 192kg (average land size for	(Per crop) Average 5% reported wastage

[4] Across ten specified crops as proxy for 'overall' agricultural revenue

Outcome 2 - Theory of Change box	Indicator	Baseline figures		
		Red rice	Peanut	Overall[4]
		size for red rice production = 0.32 ha) Average 4% harvest wastage	peanut production =0.15 ha) Average 5% harvest wastage	
	Proportion of 'word of mouth' farmers copying and adopting new practices	To be measured through monitoring and endline.	To be measured through monitoring and endline.	To be measured through monitoring and endline.
Farmers (♀♂) produce and sell consistent and sufficient quantity and quality to meet market requirements	Farmers report that they are profiting from engagement with buyers	To be measured through monitoring and endline.	To be measured through monitoring and endline.	To be measured through monitoring and endline.
	Type, volume and value of produce purchased by buyers from farmers (data to be gathered during monitoring)	To be measured through monitoring.	To be measured through monitoring.	To be measured through monitoring.
	Buyers report satisfaction with sourced volume, consistency and quality (data to be gathered during monitoring)	Not measured for this baseline.	Not measured for this baseline.	Not measured for this baseline.

4.2. Demographic information

The Progress Out of Poverty Index (PPI) is a globally applied tool developed by the Grameen Foundation to simply and rapidly assess the likelihood that households are living in poverty. Using this index, the average likelihood of households in TOMAK target areas living in poverty is shown in Table 5, against international poverty lines. These are measured against the upper and lower international poverty lines. The results demonstrate that participants in this baseline assessment are highly likely to be living below the upper international poverty line.

Table 5: Progress Out of Poverty Index results

Poverty line	Average likelihood
$2.50/day Upper International Poverty Line 2005	81.9%
$1.25/day Lower International Poverty line 2005	33.0%

These average results for the Upper International Poverty Line are disaggregated by municipality in Table 6 below.

Table 6: Upper International Poverty Line results

Municipality	Average per municipality
Baucau	89.8%
Bobonaro	89.2%
Viqueque	88.0%

The PPI is used by TOMAK to gain a rapid snapshot of farmers likely to be living in poverty. The Index includes 10 key questions covering household size, land ownership, occupation, household construction materials, and level of education and household assets.

The average household size reported by male and female respondents was 13 members, with 55% of respondents having nine or more family members in their household.

Overall, 44% (52 respondents) of farmers from the three municipalities reported using one or more hectares of land for cultivation of annual crops or fallow, tree crops, pasture, plantation, grassland or garden plots. Only 27% (32 people) reported using more than half a hectare (but less than one hectare) and 27% (33 respondents) reported using less than half a hectare. Three percent reported using less than one third of a hectare for cultivation. Figure 1 below shows land ownership breakdown by the three municipalities.

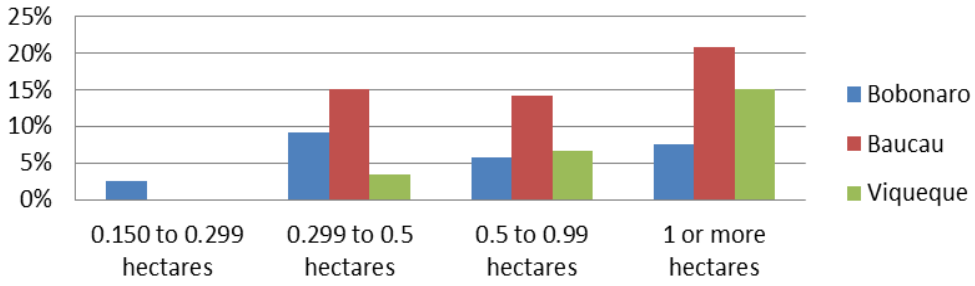

Figure 1: Land size by municipality

Almost all respondents (95%) reported the head of household's main occupation as 'agriculture and animal husbandry (farming), forestry, fishing, or hunting' while the other five percent of respondents reported the main occupation as government employment.

The head of household's level of education was relatively low across the sample. Thirty-three percent of respondents reported the head of the household (usually male) had no education or only up to primary class 1 (mostly from Bobonaro municipality). Twenty-six percent reported that the head of household had completed between primary classes 2 to 5, with 20% reporting studying up to class 6 or pre-secondary class 2. Twenty-two percent reported education to pre-secondary class 3 or higher. Figure 3 below shows the education levels reported for the head of households broken down by municipality.

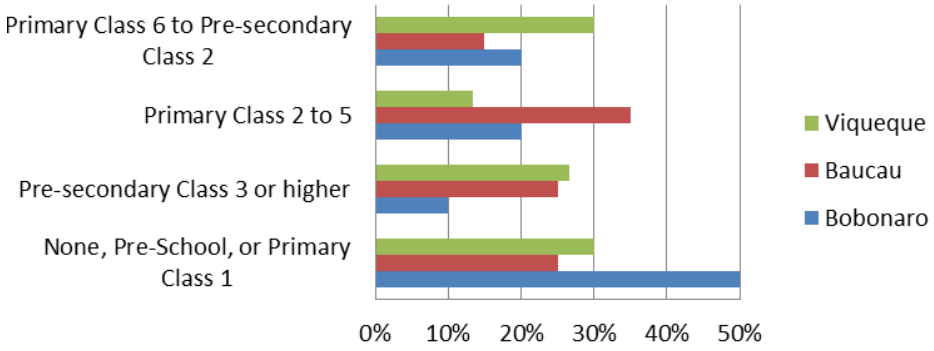

Figure 2: Head of household education level

The majority of household members aged 8 to 17 are currently in school (84%). The remaining sixteen percent of respondents reported household members in this age bracket are not in school.

Overall 66% percent of households reported having no access to electronic assets such as a television, CD player or radio, while 34% reported owning electronic assets. Figure 3 shows households owning electronic asset by municipality.

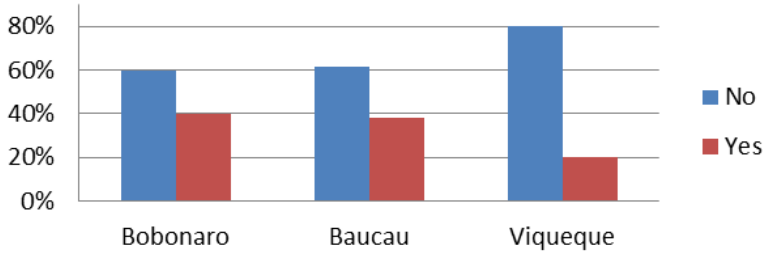

Figure 3: Households owning electronic assets

4.3. Impact

Section 4.3.1 presents the overall findings from the respondents. Sections 4.3.2 and 4.3.3 present findings for the red rice and peanut sub-sectors respectively.

4.3.1. Overall - Income from agricultural sales

4.3.1.1. Income from sales

As discussed in the demographics section, respondents were asked how much land they have available for cultivation. On average, land size available to farmers is 0.75 hectares, similar to estimates in TOMAK's Value Chain Analysis (TOMAK, 2016). Out of 120 households surveyed, farmers reported using all or most of their land for agricultural cultivation, on average reporting 98.9% land utilisation across the 10 specified crops, an unsurprising finding due to the small size of most available farm land.

In a related question, respondents were asked about the proportion of their cultivable land that they use for each of the 10 specified crops. On average, respondents growing red rice are using the most available land for production, with red rice producers reporting an average usage of 32% of land. Land utilisation for the other eight specified crops is, on average, less than one quarter of available land for cultivation, as shown in Figure 4 below.

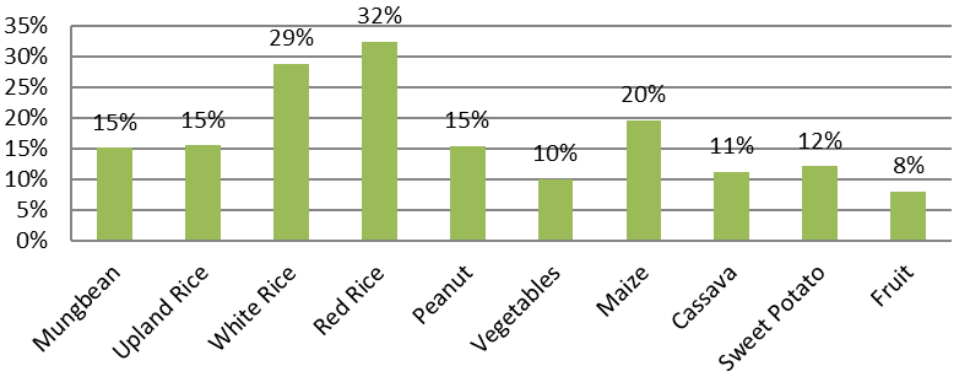

Figure 4: Average proportion of land utilisation, by crop

Estimated yields, based on historical data for Timor-Leste from FAO, MAF, and ACIAR are shown in Table 7.

Table 7: Yields per crop, per hectare

Crop	Average kg / ha
Mung bean	1,069
Upland rice	1,560
Lowland rice	3,120
Red rice	1,200
Peanut	1,247
Vegetables	4,081
Maize	2,200
Cassava	4,071
Sweet potato	2,609
Fruit	10,165

Figure 5 below shows the crops that are grown and sold by respondents. Maize was the most commonly grown crop across the sample, with 99 respondents (83%) growing maize, but just over half (53%) of maize producers reported also selling the crop. Vegetables (62% of respondents), cassava (61% of respondents) and white rice (60% of respondents) were the next most commonly grown crops.

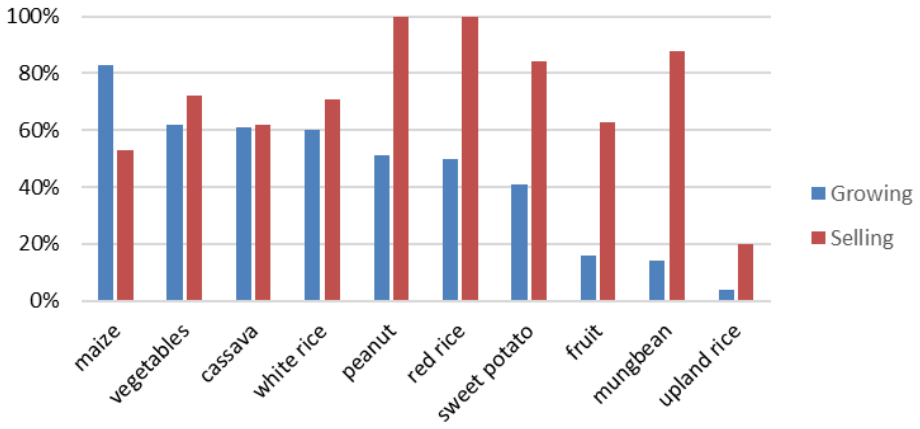

Figure 5: Percentage of respondents growing and selling specific crops

All of the red rice and peanut producers interviewed reported selling their red rice and peanut crops. Forty-one percent of the respondents interviewed reported also growing sweet potato (49 respondents), with a large majority (84%) of these sweet potato producers reporting the crop as sold. All other crops mentioned were reported by less than one quarter of the respondents. See Table 8 for more detailed information on the percentage of respondents growing and percentage of growers selling each of the 10 specific crops.

Table 8: Percentage of respondents growing and percentage of growers selling specific crops

Crop	% of respondents growing	% of growers selling
Mung bean	14%	88%
Upland rice	4%	20%
White rice	60%	71%
Red rice	50%	100%
Peanut	51%	100%
Vegetables	62%	72%
Maize	83%	53%
Cassava	61%	71%
Sweet potato	41%	84%
Fruit	16%	63%

Revenue derived from crop production was calculated using household survey data and historical FAO data, taking into account average planted areas, estimated yields (FAO data), the amounts being sold, and prices received. Note that this does not represent total household income, but just that portion derived from cropping activity.

From the ten crops mentioned by farmers as being grown and sold, average income per household from crops sales was estimated at USD1,627 per year. This translates to average per capita profit of USD239.04 per year.

Net Attributable Income Change (NAIC)
Net attributable change in income refers to those changes that can be linked to program inputs, discounting any other factors that may have contributed to income change. To calculate this, TOMAK uses a combination of primary and secondary data. The calculations work from the size of land used to grow specified crops, average yields using historical FAO data, average sales prices reported by farmers less estimated production costs. The resulting revenue estimates will be compared with a 'comparison' group at endline that has not been involved with TOMAK interventions, to provide a counterfactual and a closer estimate of actual income change that may be attributable to TOMAK.

Income from red rice production and sales contributes more than one quarter (27%) of the overall average income per household, while 15% of the income is attributed to peanut production and sales. For average per capita income, income from red rice sales makes up 14% of income, while income from peanut sales contributes only half of that of red rice, at 7%. See Figure 6 below for details on the proportion of overall household and per capita income for the two specific crops.

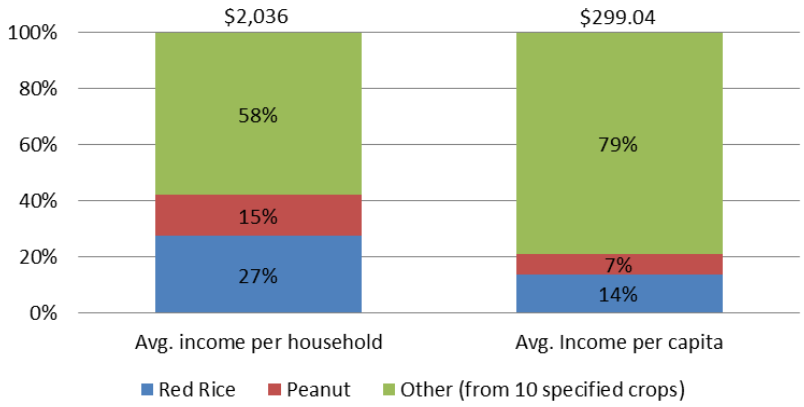

Figure 6: Proportion of average income for red rice and peanut sales

Respondents were asked to rank the crops that they produce and sell in order of first, second and third top income earner for their household. The large majority (87%) of red rice producers and sellers ranked red rice as the top agricultural earner for their household. Thirty-nine percent (39%) of peanut producers who also sell peanuts reported peanut as the top agricultural income earner for their household, while 30% of sweet potato producers and sellers (40 producers in total) ranked sweet potato as the top agricultural earner for their household. Very few vegetable producers and sellers (21%), white rice producers and sellers (20%) and maize producers and sellers (17%) reported their crop as the top income earner. Figure 7 below shows the percentage of producers reporting which crop is the top agricultural income earner for their household for seven of the ten specified crops covered in this baseline.

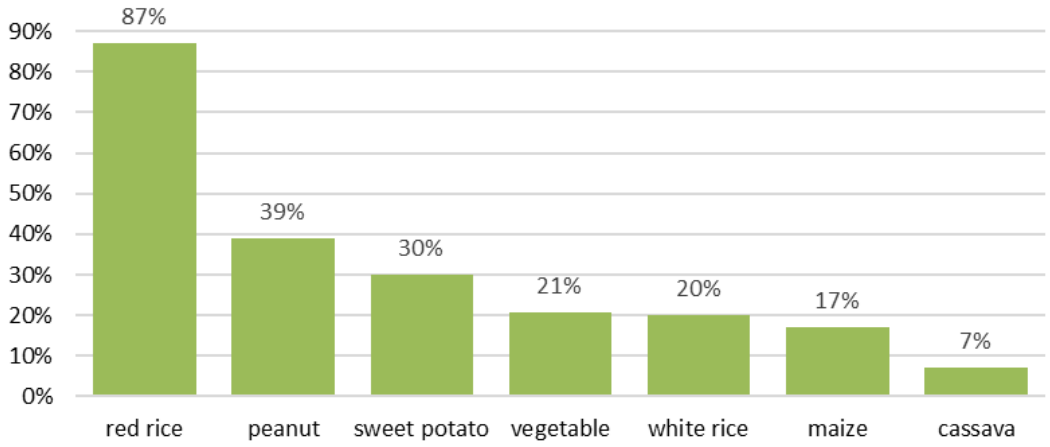

Figure 7: Percentage of producers reporting their crop as a top agricultural income earner

It is important to note that because this baseline specifically targeted red rice and peanut producers, there is a bias towards these two crops in the top income earner results.

Women are the primary sellers of produce, according to semi-structured interviews conducted across red rice and peanut crop types. Sales of produce was reportedly conducted individually rather than in groups. In some instances, buyers came directly to farms to purchase produce. Women respondents reported selling as being heavy and onerous, with their families sometimes being involved in transporting produce to market. However, it seems women are generally responsible for the process of selling. One female respondent reported "*in Manatuto and Dili, sometimes we sleep in the market, because our families live far away. It doesn't feel secure because women are sleeping in the markets alone.*" (Female respondent, Baucau). Women also reported being responsible for household savings and repayment of credit.

Respondents were asked to select how much of their income from overall crop production and sales (including all crop types) is reinvested into the next season of production. Response options were presented on a sliding scale.

4.3.1.2. Sales and practices

Overall, 48% of respondents reported that they reinvest a very small portion of their income from crop production into the next production season. Ten percent (10%) of the respondents reported that they reinvest half, while 30% reinvest a small portion. None of the respondents reported that they reinvest most of their income from crop production, and therefore "Most" has not been included in Figure 8 below. Based on these results, the majority of respondents (78%) reinvest less than half of their agricultural production income, and 12% do not reinvest any of this revenue at all.

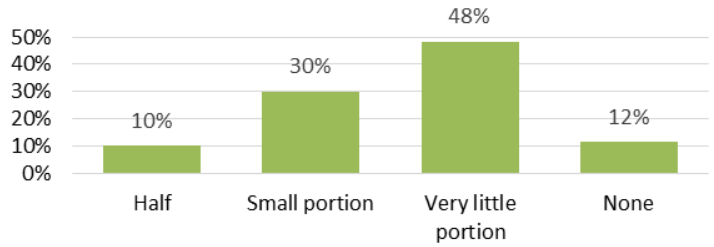

Figure 8: Overall amount of income reinvested into production

Respondents who reported that they grow and sell the ten specified crops were asked what proportion of the total harvest is typically sold. Overall, peanuts and red rice had the highest average of proportion of harvest sold, at more than half of harvest sold (57% and 53%, respectively). On average, respondents who grow and sell mung bean reported selling 45% of their harvest, while producers and sellers of white rice and maize reported selling 42% of their harvest. Overall, the average proportion of total harvest sold is more than one quarter of the harvest for each of the ten specified crops, as shown in Figure 9 below.

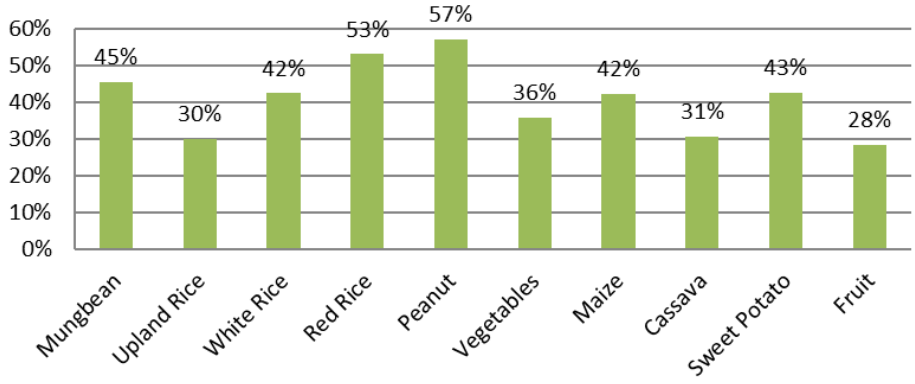

Figure 9: Average proportion of harvest sold, by crop

Figure 10 below shows the most commonly selected planting month for each of the ten specified crops. There were a total of 598 months selected across all ten crops, with 27% (32 respondents) selecting multiple growing months for a single crop. Overall, November was the most common planting month for cassava (selected 45 times), fruit (selected 14 times), maize (selected 69 times), sweet potato (selected 26 times), and vegetables (selected 33 times). Peanut and upland rice were most commonly planted in December, selected 25 and 4 times, respectively. Producers of white rice and mung bean most often selected February as their planting month (22 times and 7 times, respectively). Red rice was most commonly planted in April, with 16 producers selecting April. A breakdown of planting months for red rice and peanut by municipality can be found in the following crop specific sections.

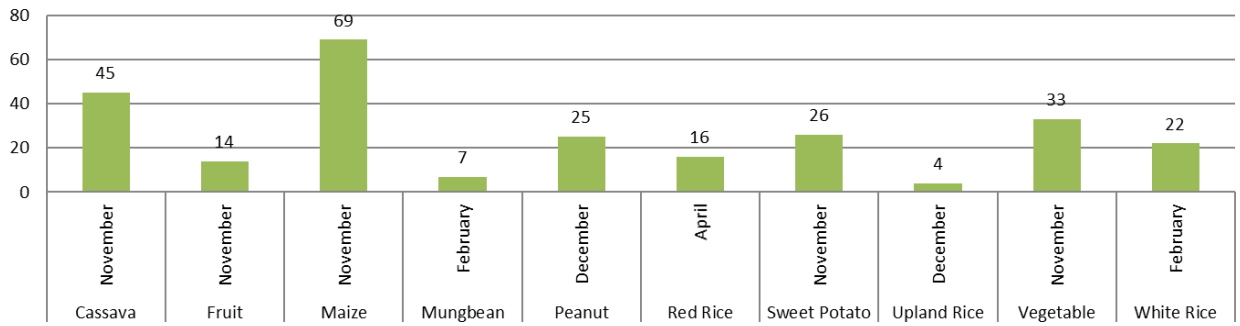

Figure 10: Most common planting month, by crop

4.3.2. Red rice

4.3.2.1. Income from sales

Of 60 red rice producing households surveyed, the average land area dedicated to the cultivation of red rice was 0.24 hectares (an average of 32% of the total land available to farmers). Average yield per hectare was estimated at 1,200kg based on historical FAO data.

Prices per kilo are estimated at USD0.60. This figure was derived from farm gate price information collected by the TOMAK team and further data collected in TOMAK's Market Systems and Value Chain study (TOMAK, 2016).

TOMAK's Aggregator study reports an average quantity of 1.1 tonnes of red rice being purchased by large traders from farmers per purchase, and 75kg of red rice purchased by small market traders from farmers per purchase.

From the 60 households reporting production of red rice, the average household profit from red rice crop sales is USD -10/year when reduced by costs of production[5], translating to per capita USD -1.52/year, demonstrating that on average, the costs associated with production are much higher than the revenue generated by red rice production, making red rice an unprofitable crop for farmers.

Almost all red rice producers (98%) ranked red rice as one of the top 3 agricultural income earners for their household. Most of these respondents (87%) ranked red rice as the biggest earner for their household. Ten percent (10%) of the producers ranked red rice as the second top income earner, and only 1% ranked red rice as the third. Figure 11 below shows these percentages in more detail. Again, it is important to highlight the potential bias of respondents towards red rice as the top agricultural income earner for the household, as the baseline specifically targeted red rice producers and sellers.

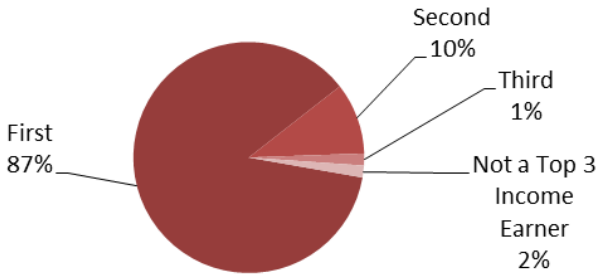

Figure 11: Red rice as a top 3 agricultural income earner

Red rice producers were asked to estimate the use of their red rice harvests against particular categories. A more detailed summary is shown in Figure 12 below. Of those growing red rice, farmers reported selling, on average, 53% of their crop, consuming 24%, bartering or donating 7%, wasting 4% and retaining 12% of the harvest for seeds.

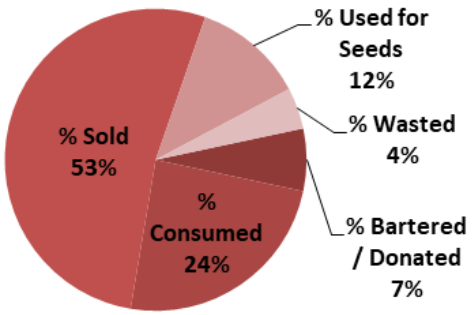

Figure 12: Usage of red rice harvest

[5] This does not take into account the cost of family labour.

4.3.2.2. Sales, costs, practices and constraints

Half of red rice producers interviewed reported that they reinvest a very small portion of their crop production income into the next season of crop production. Only 15% reported that they reinvest half of this income, while 27% reported reinvesting a small portion. Eight percent (8%) of red rice producers do not reinvest any of this income into crop production for the next season. These results demonstrate that the majority of red rice producers do reinvest at least a very little portion of income into the next production season (92%).

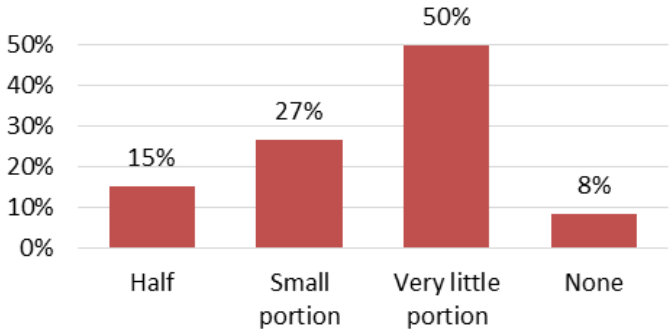

Figure 13: Amount of income reinvested in red rice production

In Baucau municipality, red rice producers reported that the most common planting months are February (39% of Baucau producers) and March (34% of Baucau producers). In Viqueque, planting months are slightly later, with 47% of Viqueque producers selecting April, and 38% selecting May. There were no red rice producers interviewed in Bobonaro.

Seventy-five percent (75%) of red rice producers report normally selling directly to consumers, with 25% reportedly selling through other people. Sales by location presents an interesting picture with 30% of producers reportedly selling from home, 28% at the district market, 20% to sub-district markets and 22% to suku markets, as shown in Figure 14 below.

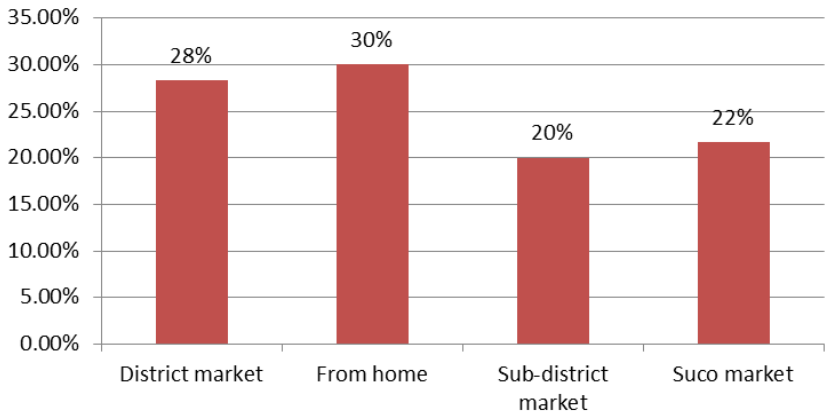

Figure 14: Red rice sales locations

Of 60 red rice producers, the majority of respondents reported labour and farmhands (82%) and tractor rental (87%) as a cost incurred during red rice production, followed by seeds (42%) and pesticides (35%). Semi-structured interview responses supported this with respondents reporting key costs as machinery / tractor rental and petrol, labour payments as well as transport of harvest and providing food to labourers. The renting and buying of relevant farming equipment had the lowest frequency of selection, at 32% of red rice producers surveyed.

Red rice producers selected costs incurred a total of 166 times, with 90% of the respondents (54 red rice producers) selecting multiple types of costs.

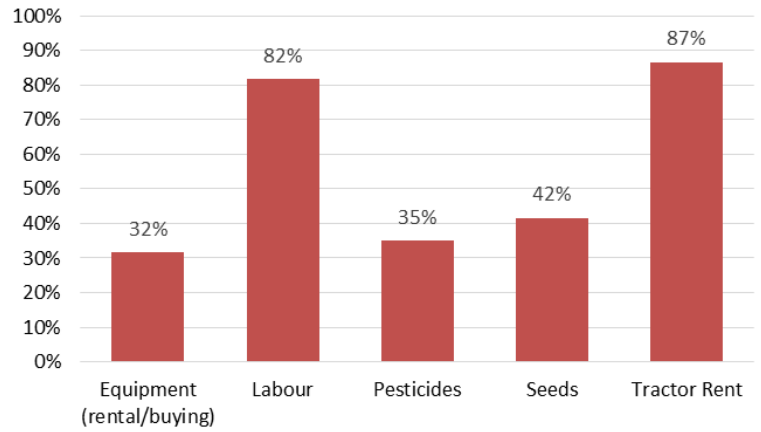

Figure 15: Type of costs incurred during red rice production

When asked how much the household generally spends on the costs incurred during red rice production each year more than half (56%) of red rice producers reported that they typically spend between USD100 and USD200 annually on the costs discussed above. Some respondents reported a cost of over USD200 each year (20%) or between USD50 and USD100 per year (15%). Very few respondents reported that they spend between USD10 and USD30 annually (2%) or between USD30 and USD50 annually (7%). There were no respondents who spent less than USD10 per year on these costs. Based on these results, the average amount spent on costs incurred for red rice production was USD139 per household (USD408.34 per ha). This is significantly different to the TOMAK Value Chain Analysis costs of production, estimated at USD175 per ha for tractor hire and threshing, suggesting that profits calculated here may be conservative. See Figure 16 below for a complete breakdown of amount spent annually on costs associated with red rice production.

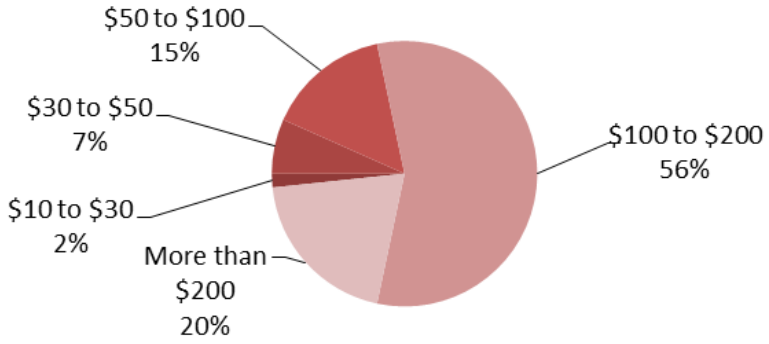

Figure 16: Amount spent on costs during red rice production

Red rice producers were also asked to select the production methods and techniques that use during the production of red rice. Overall, 100% of red rice producers reported using more than one technique or method during production. Forty-three percent (43%) of red rice producers selected four production techniques and methods, while 40% selected three. Figure 17 below shows the percentages of red rice producers selecting multiple production techniques and methods.

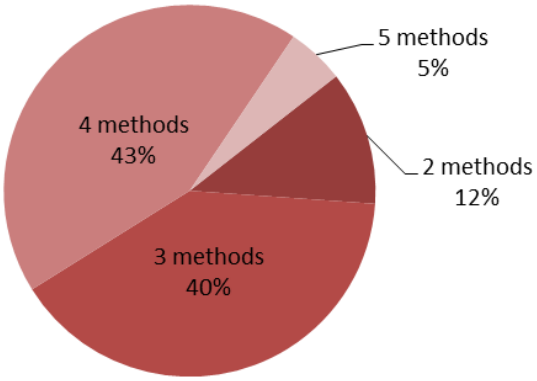

Figure 17: Percentage of red rice producers selecting multiple production methods

One hundred percent (100%) of red rice producers reported using retained seeds, and almost all reported using seedling nurseries (95%) and flood irrigation (93%) during red rice production. The use of inorganic pesticides was reported by about one quarter (28%) of the respondents. Mention of other practices was extremely limited.

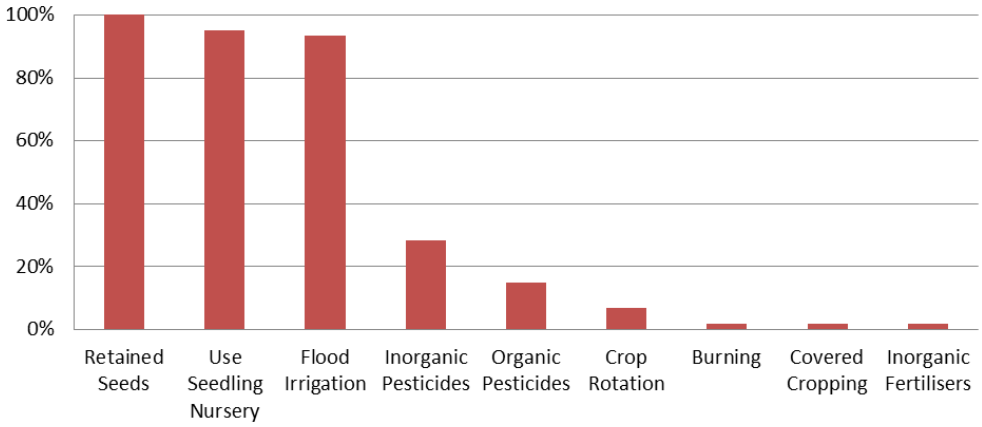

Figure 18: Percentage of red rice producers using most common production methods

Respondents were asked to report on the constraints they face during the preparation and growing seasons of red rice production. 78% of respondents (47 red rice producers) selected multiple constraints.

The majority of red rice producers interviewed reported disease management (77%) and irrigation (57%) as major constraints faced, while half of the respondents listed labour and farmhand shortage as a major constraint during this time. Other constraints reported were weather conditions (37%) and 13% of respondents reported a lack of technical support from the Ministry of Agriculture and Fisheries (MAF AEWs). Only 2% of red rice producers (1 person) reported that they did not face any constraints during preparation and growing time. None of the respondents reported that they lack access to inputs, likely because these are not frequently used.

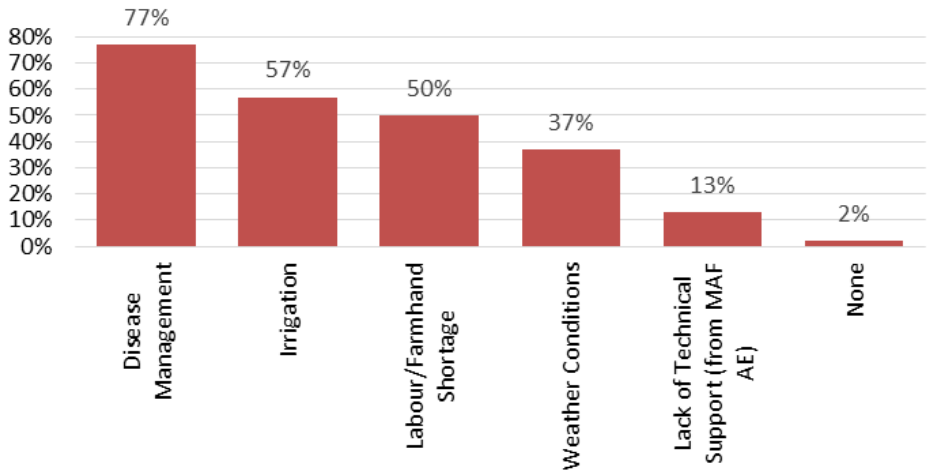

Figure 19: Red rice preparation and growing constraints

In a related question, respondents were asked to report on the constraints they face during harvest and post-harvest seasons of red rice production. Thirty-eight percent of respondents (23 red rice producers) selected multiple constraints.

There was no clear majority of constraints faced after the growing season for red rice producers. Less than half of red rice producers reported access to markets (43%), storage (42%), and lack of sufficient labour and/or farmhands (40%) as major constraints faced. Eighteen percent (18%) of red rice producers reported that they do not face any constraints during this time. Processing was not mentioned as a constraint by any of the red rice producers, and therefore was not included in Figure 20 below.

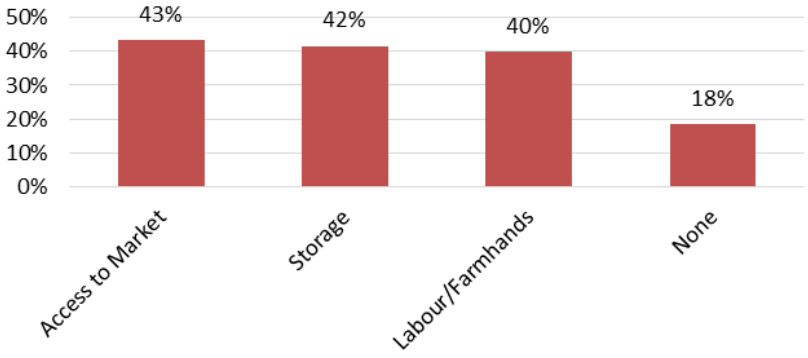

Figure 20: Red rice harvest and post-harvest constraints

4.3.2.3. Workloads

Red rice producers were asked to report on who in their family or household is involved in the activities undertaken during each stage of farming and production. Most respondents selected multiple responses for each activity.

Figure 21 below shows the percentage of men (total of 30 respondents) and women (total of 30 respondents) who selected the “Me” option for each stage of red rice production. A majority of female respondents self-reported involvement in the production stages of land preparation (60%), planting of seeds (97%), transplanting (100%), weeding (90%), harvesting the crop (100%), travelling to the farm (97%), and selling the produce (97%). For male respondents, self-reports show the highest involvement of men in the production stages of land preparation (100%), planting of seeds (90%), transplanting (97%), applying pesticides (50%), weeding (93%), harvesting the crop (100%), travelling to the farm (100%) and selling the produce (50%). Based on survey

results, women and men are almost equally involved in transplanting, travelling to the farm, and harvesting the crop.

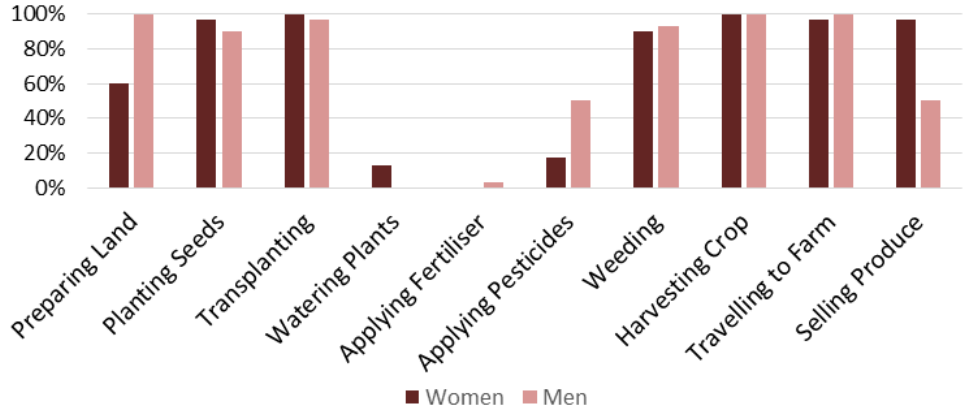

Figure 21: Percentage of women and men self-reporting input into red rice production

According to red rice producing respondents, children of the family (girls and boys) are also reported to be involved in many of the production stages of red rice, but most often in planting seeds (47%), weeding (48%), harvesting the crop (63%), and travelling to the farm (68%). Other family members are typically involved in planting the seeds (78%), weeding (65%), harvesting of the crop (92%), and travelling to the farm (50%).
Many respondents reported that their household does not water the crop (83%), apply fertilisers (98%) or apply pesticides (47%), meaning these respondents selected "does not apply/do not do this activity."
Semi-structured interviews were conducted with two women and two men regarding red rice production and selling practices and responsibilities. Women respondents and one man reported forming local groups (particularly where farms were near each other) including neighbours and extended family members to undertake farming work, usually for land preparation and planting and for the harvest period. One male respondent reported only working within the family, as extension workers had not facilitated groups in their area. Maintenance of farm land ahead of harvest was undertaken by women and men in households and responsibilities throughout the production process seemed to be separated between the genders. For example, "*…women plant, clean weeds and cut the rice, men group together and tie the harvest"* (male respondent, Viqueque) and "*cleaning weeds – its men that do this… (and) apply fertiliser…women cut the rice and men tie it together"* (female respondent, Baucau).

4.3.3. Peanut

4.3.3.1. Income from sales

Of 61 peanut producing households surveyed, the average land area dedicated to the cultivation of peanut was 0.11 hectares (an average of 15% of the total land available to farmers). Average yield per hectare was estimated at 1,247kg based on historical FAO data.

Prices per kilo are estimated at USD1.25. This figure was derived from farm gate price information collected by the TOMAK team and further data collected in TOMAK's Market System and Value Chains study.

TOMAK's Aggregator study reports an average quantity of 27.5kg of peanut is purchased by aggregators from farmers per purchase, who are buying from approximately 52 farmers each per year.

From the 60 households reporting production of peanut, the average household revenue from peanut crop sales is estimated at USD133/year (USD63/year when reduced by costs of production, translating to per capita USD4.74/year). These results demonstrate that per household and per capita peanut revenues are almost half that of red rice producers.

Almost all peanut producers (95%) ranked peanut as one of the top 3 agricultural income earners for their household, with 39% reporting peanut as the number one agricultural income earner for the household, and 43% reporting peanut as the second top earner. Figure 22 below shows these percentages in more detail.

Again, it is important to highlight the potential bias of respondents towards peanut crops as one of the top agricultural income earners for the household, as the baseline targeted peanut producers and sellers.

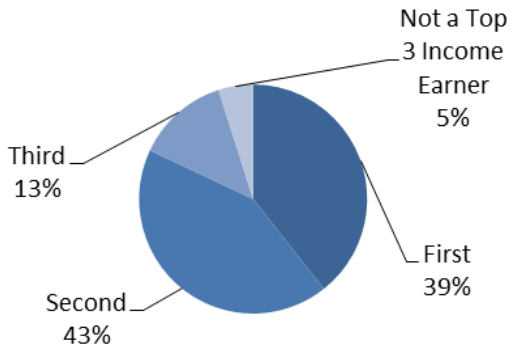

Figure 22: Peanut as a top 3 agricultural income earner

Peanut producers were asked to estimate the use of their peanut harvests against particular categories. A more detailed summary is shown in Figure 23 below. Of those growing peanuts, farmers reported selling, on average, 57% of their crop, consuming 17%, bartering or donating 7%, wasting 5% and retaining 14% of the harvest for seeds.

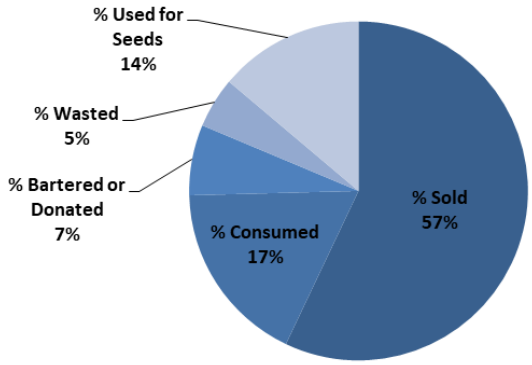

Figure 23: Usage of peanut harvest

4.3.3.2. Sales, costs, practices and constraints

The majority of peanut producers (85%) interviewed reported that they reinvest at least a very little portion of their crop production income in next season's production. Only 5% of these 61 respondents reported a reinvestment of half of this income, and 34% reported a reinvestment of a small portion. The most common amount of reinvestment for peanut producers was a very little portion (46%), similar to the results from red rice producers. Fifteen percent (15%) of peanut producers reported that they did not reinvest any of their crop production income.

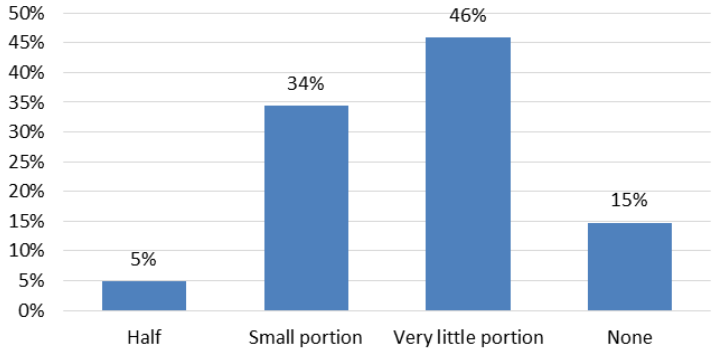

Figure 24: Amount of income reinvested in peanut production

In Baucau, peanut producers reported that the most common planting month is December (50% of Baucau producers). In Bobonaro, the most common planting month is January (40% of Bobonaro producers). There was only one peanut producer interviewed in Viqueque, who selected March as their planting month.

Eighty-seven percent (87%) of peanut producers report normally selling directly to consumers, with 13% reportedly selling through other people. The highest proportion of peanut producers reported selling through district markets (48%), with 18% selling through sub-district markets, 16% selling through suku markets, 15% selling from home, and 3% selling in a market located in another district.

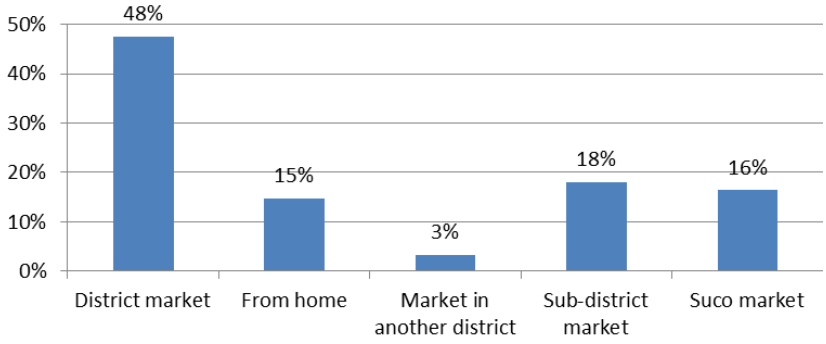

Figure 25: Peanut sales locations

Of 61 peanut producers, the majority of respondents reported seeds (72%), and labour or farmhands (61%) as a cost incurred during peanut production. Tractor rental (43%) and the renting and buying of relevant farming equipment (23%) were other common costs reported by peanut producers. Very few respondents reported manure (5%) as a cost incurred, and only one respondent reported that they did not incur any costs during the production of peanuts, as shown in Figure 26 below.

Peanut producers selected a type of cost incurred a total of 133 times, with 74% of the respondents (45 peanut producers) selecting multiple costs. When compared to costs incurred by red rice producers, this demonstrates that red rice producers in Timor-Leste incur slightly more types of costs during production than peanut producers. The majority of both red rice and peanut producers reported labour and farmhands as a cost incurred during production.

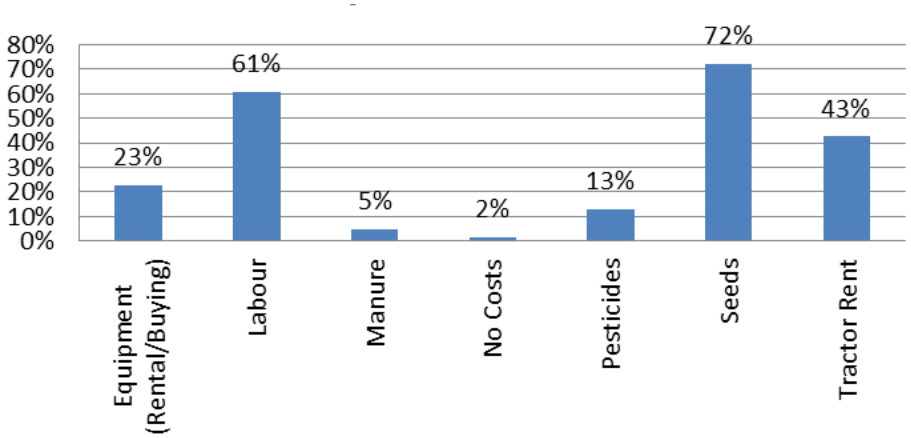

Figure 26: Type of cost incurred during peanut production

Thirty-nine percent (39%) of peanut producers reported spending between USD50 and USD100 each year on costs incurred, and 20% of producers reported either between USD100 and USD200 or between USD30 to USD50. The remaining 21% of respondents reported that they spend somewhere between USD0 and USD30 each year. Based on these results, the average amount spent on costs incurred for peanut production was USD70 per household or USD455.02 per ha. Again, this contrasts significantly with TOMAK's Value Chain Analysis for peanut which shows expenditure per hectare at USD223 for seed and tractor hire, suggesting that

the profits calculated here may be conservative. See Figure 27 below for a complete breakdown of amount spent annually on costs associated with peanut production.

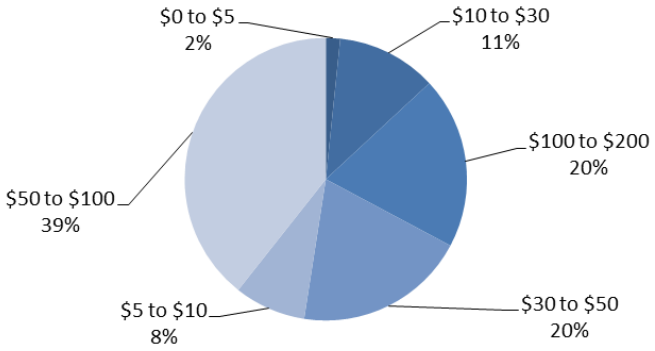

Figure 27: Amount spent on costs during peanut production

Peanut producers were asked to select the production methods and techniques that they are using during the production of peanut. Ninety percent (90%) of respondents selected more than one technique or method. Fifty-two percent (52%) of peanut producers selected two production techniques and methods, while 25% selected three. Figure 28 below shows the percentages of peanut producers selecting multiple production techniques and methods.

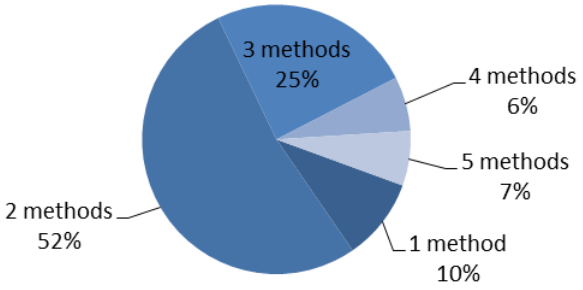

Figure 28: Percentage of peanut producers selecting multiple production methods

One hundred percent of peanut producers reported using retained seeds, and more than half (61%) reported burning their fields. About one third of peanut producers reported leaving crop residue on the surface or incorporating it into soil (36%). Less than one quarter of the respondents reported crop rotation as a regular practice (21%). Mention of other practices was extremely limited.

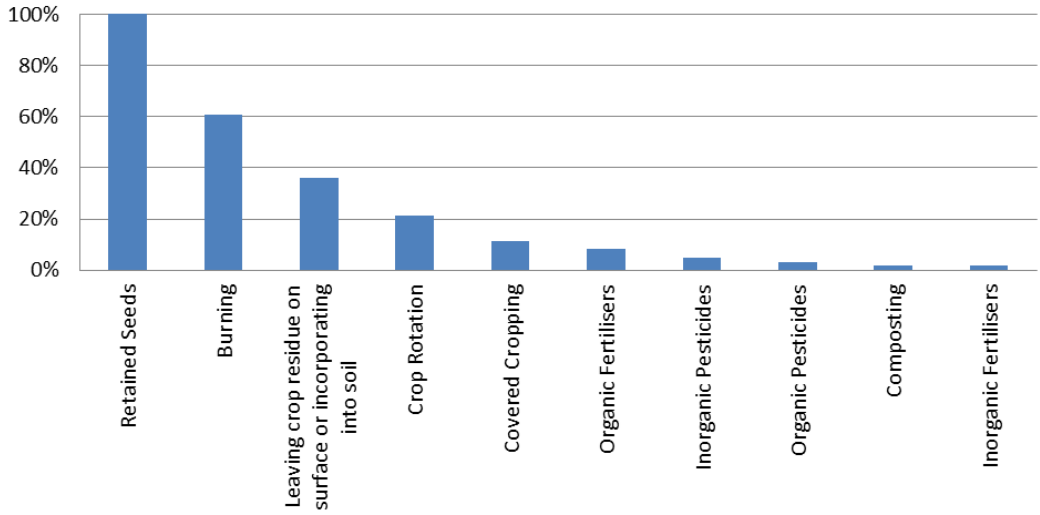

Figure 29: Percentage of peanut producers using most common production methods

Respondents were asked to report on the constraints they face during the preparation and growing seasons of peanut production. Fifty-seven percent (57%) of respondents (35 peanut producers) selected multiple constraints. These results demonstrate there are fewer perceived constraints faced by peanut producers than by red rice producers during the preparation and growing seasons.

The majority of peanut producers interviewed reported disease management (64%) as a major constraint faced during peanut production. This is a smaller percentage than found for red rice, however together these figures demonstrate that disease management is one of the most common constraints faced by producers in Timor-Leste. Less than half of the respondents listed weather conditions (39%) and labour and farmhand shortage (31%) as major constraints during peanut production. Other constraints reported were access to inputs (15%) and a lack of technical support from AEWs at 11%. Eleven percent (11%) of peanut producers reported that they did not face any constraints during peanut production, more than found in the red rice respondents.

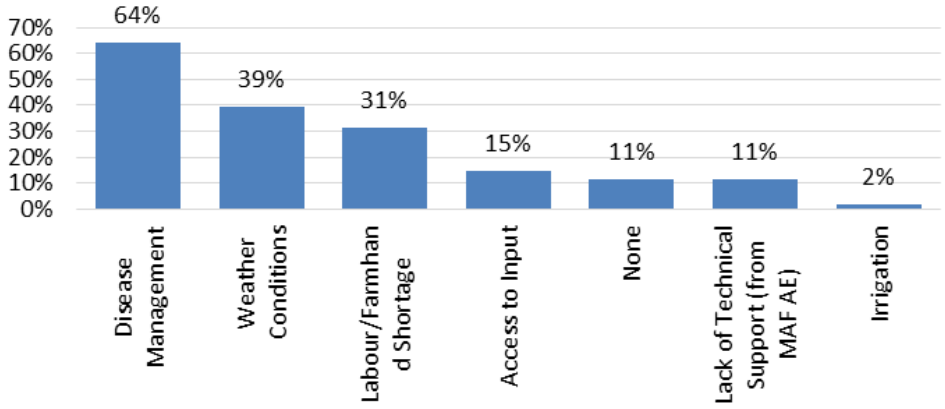

Figure 30: Peanut preparation and growing constraints

In a related question, respondents were asked to report on the constraints they face during harvest and post-harvest periods of peanut production. Thirty-one percent (31%) of respondents (19 peanut producers) selected multiple constraints.

During the harvest and post-harvest period, 43% of respondents reported storage of the harvested peanut crop as a constraint faced, while 38% reported that access to markets was an issue. A lack of sufficient labour and/or farmhands was reported by 26% of peanut producers. Twenty-eight percent (28%) reported that they did not face any of these constraints. One peanut producer noted that they typically had trouble transporting their harvested crop from the field due to problems with road access (shown as 'other' in Figure 31 below). Again, processing was not mentioned by any of the peanut producers, and therefore is not included in Figure 31.

Storage and access to market remain the most common harvest and post-harvest constraints faced by both red rice and peanut producers.

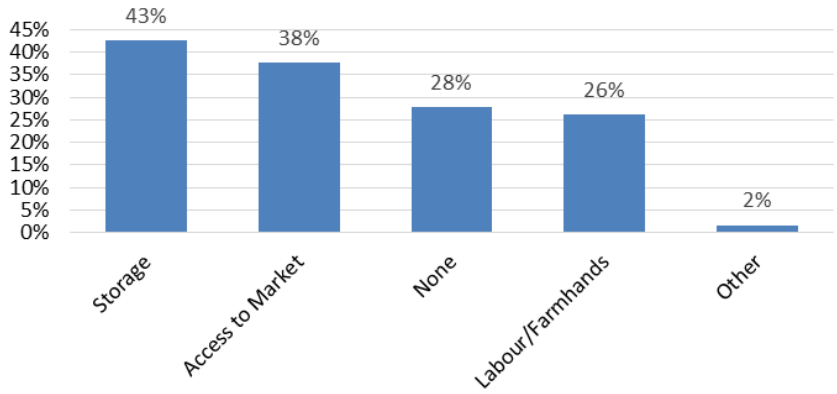

Figure 31: Peanut harvest and post-harvest constraints

4.3.3.3. Workloads

Peanut producers were also asked to report on who in their family or household is involved in the activities undertaken during each stage of farming and production. Most respondents selected multiple responses for each activity.

Figure 32 below shows the percentage of men (total of 31 respondents) and women (total of 30 respondents) who selected the "Me" option for each stage of peanut production. A majority of female respondents self-reported involvement in the production stages of land preparation (57%), planting seeds (100%), weeding (87%), harvesting (100%), travelling to the farm (100%), and selling the produce (87%). Male respondents self-reported the highest involvement in the same production stages of land preparation (100%), planting seeds (77%), weeding (100%), harvesting (100%), travelling to the farm (100%) and selling the produce (61%). Based on survey results, women and men both self-reported involvement in travelling to the farm and harvesting the crop 100% of the time.

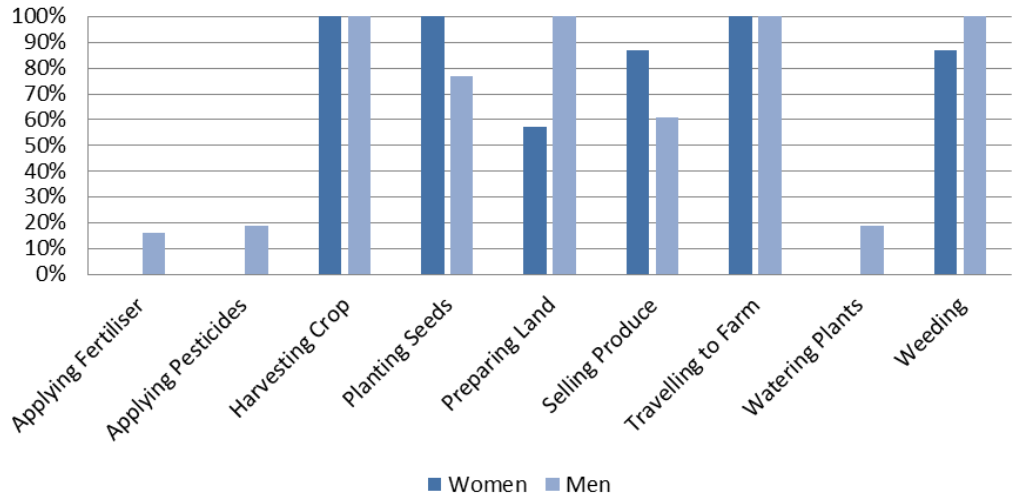

Figure 32: Percentage of women and men self-reporting input into peanut production

According to peanut producing respondents (total of 61), children of the family (girls and boys) are also reported to be involved in many of the production stages of peanut, but most often in planting seeds (49%), weeding (56%), harvesting (57%), and travelling to the farm (64%). Other family members are typically involved in planting seeds (57%) and harvesting (59%).

Many respondents reported that the household does not water their crop (85%), apply fertilisers (89%) or apply pesticides (84%), meaning these respondents selected "does not apply/do not do this activity" for those stages of production.

During semi-structured interviews, two respondents reported formation of a group for the whole production process, moving from one farm to another. Generally, these were groups formed with neighbours in order to reduce the work required from each person. One respondent noted "*for big farms, you need a group – you can't do it alone"* (female respondent, Bobonaro). One respondent commented that their group was comprised only of men, although women were involved in planting and were responsible for cooking for the group (male respondent, Baucau).

Another respondent reported only having a small farm for peanut production, so work could be done individually (male respondent, Bobonaro). The same respondent also identified gendered work with land preparation and transport of produce being the responsibility of men, with women planting the peanuts. Both women and men harvested peanut crops.

4.3.4. Access and agency

4.3.4.1. Decision-making authority in household resources and finances

Respondents were asked to report on how much input they have into decisions related to farming and production. Response options were presented as a scale.

According to survey results, most women interviewed reported that they have input into some (38%) or all (37%) farming and production decisions, with women reporting a higher degree of input into production-related decisions than found in the TOMAK Mung Bean and Shallot Baseline Study. The majority of men interviewed (72%) reported that they have input into most production-related decisions, while only 5% of men reported input into all of these decisions, much lower than the report from women.

Table 9: Input into farming and production decisions

Response	% women agreeing	% men agreeing
No input	0%	8%
Input into very few decisions	10%	3%
Input into some decisions	38%	12%
Input into most decisions	15%	72%
Input into all decisions	37%	5%

Regarding management of income from agricultural sales (this question relates to who receives and handles cash on a daily basis), women and men who were surveyed largely agreed that women 'manage' household cash, although slightly more men perceive a shared responsibility.

Table 10: Income management

Response	Women	Men
I manage the income from agricultural sales	98%	8%
My spouse manages the income from agricultural sales	0%	87%
My spouse and I manage the income from agricultural sales together	2%	5%

When asked who makes decisions around the use of income generated from agricultural sales, women's survey responses largely mirrored those of decisions related to production inputs (see Table 10 above), again similar to results found in the TOMAK Mung Bean and Shallot Baseline Study. Both men and women agreed that they have input into at least a few expenditure decisions (0% reported no input). Forty percent (40%) of women reported input into all expenditure related decisions, a much higher percentage than for men (7%).

Table 11: Input into expenditure decisions

Response	% women agreeing	% men agreeing
No input	0%	0%
Input into very few decisions	10%	5%
Input into some decisions	33%	33%
Input into most decisions	17%	55%
Input into all decisions	40%	7%

4.3.4.2. Agricultural land

Respondents were asked to report on the current status of ownership over their agricultural land. More than half of respondents (62%) reported that they owned the land, but did not have any 'reference number' or certificate to prove their ownership. Only 22% of the respondents (27 people) reported that they did have a reference number to prove their ownership over their agricultural land. Other responses were very limited, with 8% (10 respondents, mainly from the Baucau municipality) reporting their land as a rent and share product, and 3% or less reporting rent free, communal land, ownership with Indonesian certification, or ownership with Portuguese certification. Results are shown in Figure 33 below.

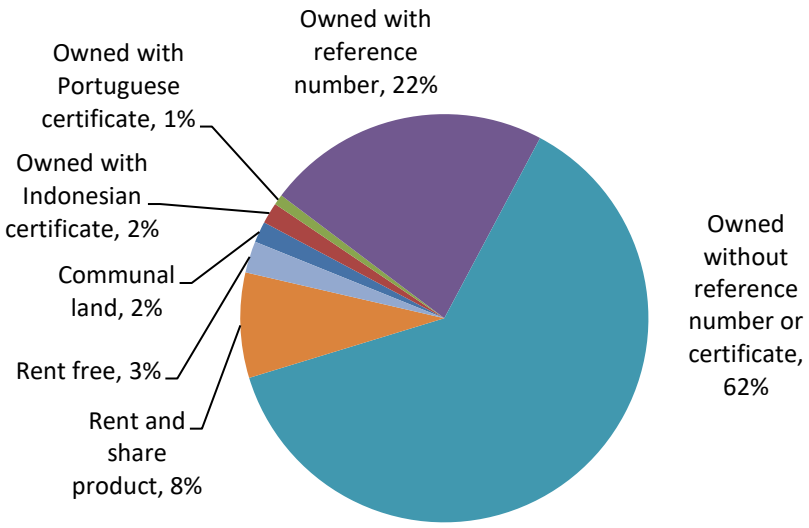

Figure 33: Land ownership

In semi-structured interview, land was often reported as family owned. One respondent reported that rent is not paid on land although support is provided to the land owner, such as providing lodging or selling some of the harvest to provide support for schooling of the landowner's child, for instance (female respondent, Viqueque). Another respondent reported paying a portion of the harvest for the use of the land, although no formal agreement underpinned this arrangement (female respondent, Baucau). One respondent reported using communal land, with plots recorded by government but without formal certification (female respondent, Baucau).

Land was reportedly passed down through male family members by one respondent (male respondent, Baucau). In another interview, land had been passed from a father to a daughter (according to the tradition of "*feto kaben tama*" – when the woman stays in the family home and a new husband joins her, the assets are passed to the woman). Men are able to use this land, but not own it (female respondent, Bobonaro).

Decisions on land use were down to the land owner and the *xefe suku* (village chief), according to one respondent (male respondent, Viqueque).

4.3.4.3. Support for Farming

When asked if they had received any external farming or production related support over the last 12 months, only 33 of the 120 respondents reported that they had received support (28%). Of these 33 respondents, 17 were male and 16 were female.

Table 12: Percentage of respondents receiving support

Response	% women	% men
Yes	28%	27%
No	72%	73%

Twelve of the 33 respondents that reported receiving farming support were peanut producers (36%), and 21 were red rice producers (64%).

Overall, when respondents who received external support were asked what type of support they received over the last 12 months, the majority (67%) reported that this support came in the form of training. Sixteen of the 33 respondents (48%) reported that they had received support in the form of seeds, and 12 reported assistance in the form of farming and agricultural equipment (36%).

These results are disaggregated by gender in Table 13 below. The majority of both women (69%) and men (65%) reported receiving assistance in the form of training, while about half of men (47%) and women (50%) reported receiving support in the form of seeds.

Table 13: Type of external support received for farming activities

Type of support received	% of total	% of men	% of women
Training	67%	65%	69%
Information materials	21%	24%	19%
Market information	6%	12%	0%
Agricultural equipment	36%	24%	50%
Seeds	48%	47%	50%
Other	0%	0%	0%

Eighteen of the 33 support recipients (55%) reported receiving their assistance from MAF's Agricultural Extension Workers (AEWs), while the remaining 15 respondents (45%) reported receiving the assistance from NGOs. Other support providers were not reported.

More than half of men (53%) reported that they received assistance from NGOs, while the majority of women (63%) reported that they received assistance from MAF's AEWs.

Table 14: Agricultural support providers

Support provider	% of total	% of men	% of women
MAF AEW	55%	47%	63%
NGO	45%	53%	37%
SISCA	0%	0%	0%
Friends	0%	0%	0%
Group	0%	0%	0%
Other	0%	0%	0%

Overall, when respondents were asked about the frequency of external support over the last 12 months, none of the respondents reported receiving assistance on a monthly basis. Rather, this support was typically offered once (39%) or twice (42%) over the past year. Three of the respondents reported receiving support three or four times per year.

When disaggregated by gender, half (50%) of women reported receiving external support twice per year, while almost half of men (47%) reported assistance twice per year.

Table 15: Support frequency

Frequency	% of total	% of men	% of women
Once	39%	47%	31%
Twice	42%	35%	50%
Three or four times	18%	18%	19%
Every month	0%	0%	0%

4.3.4.4. Crops grown

The baseline survey asked 120 respondents if they have produced any of the following 14 crops in the last 12 months: mung bean, shallot, upland rice, white rice, red bean, red rice, peanut, vegetables, maize, cassava, sweet potato, coffee, coconut and fruits. There were no household respondents who reported production of shallot, red bean, coffee or coconut, and therefore, these crops were not covered in this report.

As mentioned in the impact section above, a large majority of the household respondents (83%, or a total of 99 respondents) reported that they had produced maize in the last 12 months. More than half of respondents reported production of vegetables (62%, or 74 respondents), cassava (61%, or 73 respondents), white rice (60%, or 72 respondents), peanut (51%, or 61 respondents), and half reported production of red rice (50%, or 60 respondents). Figure 34 below shows this information in more detail.

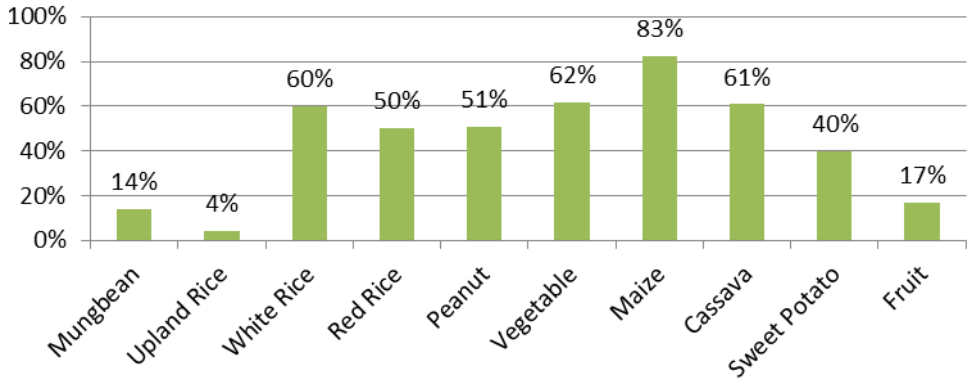

Figure 34: Percentage of households producing specified crops

Ninety-eight percent (98%) of household respondents (118 households) reported production of more than one of the ten specified crops in the past 12 months (respondents were able to select multiple crops in the survey), demonstrating that there is some variety of crop types in their household production.

The largest number of households to produce multiple crops reported production of five of the ten specified crops (30%, or 36 households). Two households interviewed (one in Baucau, and one in Viqueque) reported production of only one of the ten specified crops. One household in Bobonaro produced eight of the ten specified crops in the past year (this household did not produce red rice or upland rice). There were no households producing nine or all ten of the specified crops. The percentage of households producing multiple crops is shown in Figure 34.

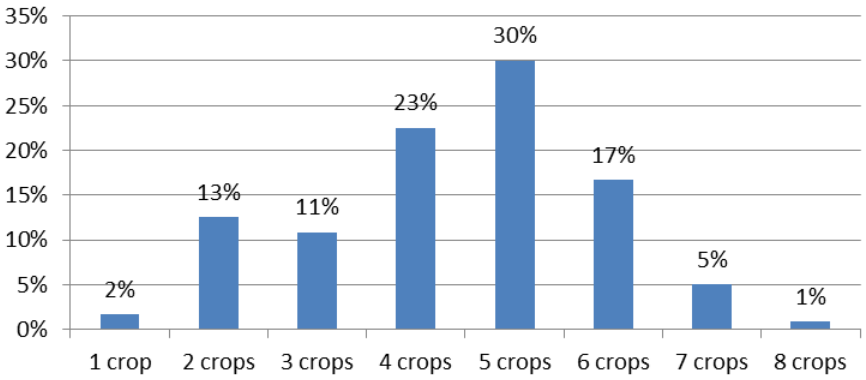

Figure 34: Percentage of households producing multiple crops

5. Conclusions

Summary of findings

Demographics:
The Progress Out of Poverty index results show respondents are highly likely to be living below the upper international poverty lines. Households are typically large, with an average size of 13 members. Landholdings, on the other hand, are small: On average, the land size available to farmers was approximately 0.75 hectares, 98.9% of this land being cultivated. Most households interviewed did not have access to any electronic assets.

The main occupation of most heads of household was reportedly related to agriculture and animal husbandry. Level of education of the head of household was relatively low across the sample, with one-third having no education, or only up to primary class 1. Most school-aged children (8 to 17 years) in households interviewed are currently in school.

Overall – Income from agricultural sales:
Ten specified crops were identified as being produced by the respondents. Maize was the most common crop, followed by vegetables, cassava, and white rice. The baseline specifically targeted red rice and peanut producers, with half of respondents growing red rice, and half of respondents growing peanut. On average, respondents growing red rice are using the most available land for production.

Overall, the average revenue per household across the ten specified crops is USD1,627 per year, translating to an annual per capita revenue of USD239.04.

The large majority of red rice producers and sellers ranked red rice as the top agricultural earner for their household, while thirty-nine percent of peanut producers who also sell peanuts reported peanut as the top agricultural income earner for their household. Sweet potato was ranked as the number one agricultural income earner by about one-third of the sweet potato producers and sellers.

Overall – Sales and practices:
Overall, almost half of respondents reported that they reinvest only a very small portion of their income from crop production into the next production season.

Peanuts and red rice had the highest proportion of harvest sold, with more than half of harvest sold. Overall, the average proportion of total harvest sold is more than one quarter of the harvest for each of the ten specified crops.

November was the most common planting month for cassava, fruit, maize, sweet potato and vegetables. Peanut and upland rice were most commonly planted in December. Producers of white rice and mung bean most often selected February as their planting month, while red rice was most commonly planted in April.

Red rice – Income from agricultural sales:
Farmers dedicate an average of 0.24 hectares to red rice farming (32% of land available) currently cultivated for red rice. The average yield for red rice is approximately 1,200kg/hectare, with an average selling price per kg of USD0.60.

Average profit per household for red rice is approximately USD -10 per year, translating to average profit per capita of USD -1.52 per year. Almost all red rice producers (98%) ranked red rice as one of the top 3 agricultural income earners for their household, demonstrating that producers are typically unaware that the costs incurred during red rice production are greater than sales revenues.

On average, red rice producers reported selling 53% of their crop, consuming 24%, bartering or donating 7%, wasting 4% and retaining 12% of the harvest for seeds.

Red rice – Sales, costs, practices and constraints:
Overall, little of the income from crop sales is reinvested into the next season of production, with half of red rice producers and sellers reporting a very small amount of income reinvested. More than half of the harvest is typically sold.

The vast majority of red rice producers and sellers report normally selling directly to consumers, most commonly from home or through district markets.

All red rice producers reported using retained seeds, and almost all reported using flood irrigation (93%) and seedling nurseries (95%) during production. All red rice producers selected multiple production methods. Mention of other practices was limited.

A majority of red rice producers cited labour/farmhands and tractor rental as major costs incurred during production, followed by seeds and pesticides. Most red rice producers selected multiple costs. The average amount spent on costs of red rice production was USD139 per household.

Red rice producers most commonly cited disease management and irrigation as major constraints faced in the preparation and growing stages of production, followed by labour and farmhand shortage. More than three-quarters of red rice producers selected multiple constraints.

Red rice producers most commonly cited access to markets and storage as major constraints faced in the harvest and post-harvest stages of production, followed by labour and farmhand shortage. A little over one-third of red rice producers selected multiple constraints.

Female red rice producers most commonly self-reported involvement in the production stages of travelling to the farm, planting seeds, transplanting, harvesting, and selling the produce. Male responses were similar, but men were more likely to self-report involvement in land preparation and applying pesticides than women were. During red rice production, women and men both self-reported involvement in travelling to the farm and harvesting the crop 100% of the time.

Peanut – Income from agricultural sales:
Relatively small amounts of land are currently dedicated to peanut with an average of 0.11 hectares (15% of land available) currently cultivated for peanut. The average yield for peanut is approximately 1,247kg/hectare, with an average selling price per kg of USD1.25.

Average profit per household for peanut is approximately USD63 per year, translating to average profit per capita of USD9.24 per year. Almost all peanut producers (95%) ranked peanut as one of the top 3 agricultural income earners for their household.

On average, peanut producers reported selling 57% of their crop, consuming 17%, bartering or donating 7%, wasting 5% and retaining 14% of the harvest for seeds.

Peanut – Sales, costs, practices and constraints:
Overall, little of the income from crop sales is reinvested into the next season of production, with 46% of peanut producers and sellers reporting a very small amount of income reinvestment. More than half of the harvest is typically sold.

A vast majority of peanut producers and sellers report normally selling directly to consumers, most commonly through district markets.

All peanut producers reported using retained seeds, and more than half reported burning during production. 90% of peanut producers selected multiple production methods. Mention of other practices was limited. Using retained seeds remains the most common method of production across red rice and peanut producers, with 100% of survey respondents reporting this technique.

The majority of peanut producers reported seeds and labour/farmhands as a cost incurred during peanut production, followed by tractor rental and farming equipment (buying or renting). About three-quarters of peanut

producers selected multiple costs. The average amount spent for peanut production was USD70 per household, demonstrating that the costs of peanut production are, on average, half that of red rice production.

Peanut producers cited disease management as the main constraint faced in the preparation and growing stages of production. Fifty-seven percent (57%) of peanut producers selected multiple constraints. Disease management remains the most common preparation and growing constraint faced by both red rice and peanut producers.

Peanut producers most commonly cited storage and access to market as major constraints faced in the harvest and post-harvest stages of production. About one-third of peanut producers selected multiple constraints.

Female peanut producers most commonly self-reported involvement in the production stages of travelling to the farm, planting seeds, weeding, harvesting, and selling the produce. Male responses were similar, though men were more likely to self-report involvement in land preparation and weeding, and were less likely to report selling the produce. During peanut production, both women and men are almost equally involved in travelling to the farm and harvesting the crop.

Access and agency:
A majority of respondents (62%) reported that they own the land, but do not have any reference number or certification as proof of ownership.

A majority of women interviewed reported that they have input into some (38%) or all (37%) farming and production decisions. About three-quarters of men interviewed reported input into most of these decisions, while only 5% of male respondents reporting input into all of these decisions, much lower than the report from women.

Both men and women agreed that they have input into at least a few expenditure decisions (0% of respondents reported no input). Just under half of women reported input into all expenditure decisions, a much higher percentage than men.

Both men and women largely agreed that women 'manage' household cash, although slightly more men perceive this as a shared responsibility.

Less than one third of respondents reported that they had received support to improve their farming. Of these respondents, about half were men and half were women. The majority of this support came in the form of training and support and was typically received once or twice per year. More than half of those who reported that they had received support also reported that this support came from MAF AEWs.

Outcomes:
Ten of the fourteen specified crops were reported as grown by the sample. Almost all households (98%) reported production of more than one of the ten specified crops, demonstrating that there is some variety of crop types in household production.

Recommendations

- **Level of education of head of household:** The baseline found that the average level of education of the head of household was relatively low across the sample, with one-third having no education, or only up to primary class 1. When TOMAK is communicating with farmers or providing training at the community level, TOMAK staff should consider the level of education of participants when designing training components for more advanced agricultural techniques and methods of production.

- **Household electronic assets:** The baseline found that only one-third of households have access to electronic assets such as television and radio, which limits access to information for the majority of the respondents. When working with these respondents, TOMAK should find other channels to communicate with and share information to farmers, such as through community leaders and suku councils.

- **Crop profitability:** The baseline found that on average, red rice producers are operating at a loss where the costs of production are typically higher than revenue from sales. This demonstrates a lack of understanding and awareness among red rice producers about the total amount they are spending on costs, the total amount of revenue they are bringing in, and how these two values correlate. Within the context of Timor-Leste, most producers are unlikely to keep written records of costs incurred and sales. TOMAK should work with producers (especially red rice) to develop record keeping skills so that producers understand the merit of tracking revenues and costs, and are able to make more evidence based decisions about production. In addition, TOMAK should conduct further research into the typical costs of production for crops like red rice to make further recommendations about how TOMAK can help farmers to reduce some of these costs, making production for profitable.

- **Income reinvestment:** Overall, almost half of respondents reported that they reinvest a very small portion of their income from crop production into the next production season. It is clear from the baseline findings that this does not apply to retained seeds, as all respondents are currently using this technique. There may be merit in TOMAK considering ways that farmers can expand the amount of reinvestment of income from production into the next season, as well as the means of reinvestment into the next season of production in order to increase productivity and next season's yield and income, whether this is on an individual level or at the community level.

- **Production methods and techniques:** The baseline found that use of retained seeds was mentioned as a method of production by 100% of the sample, while a vast majority of red rice producers reported use of flood irrigation and seedling nurseries. Use of agricultural techniques supporting greater productivity was very limited, reflecting largely subsistence practices and lack of technical knowledge. TOMAK should work to increase the technical knowledge of its farmers around agricultural techniques to improve efficiency and productivity, as well as explore the possibility of improving the types of seeds used by farmers, in order to improve productivity and potentially reduce the need for pest control.

- **Costs of production:** The baseline found that the hiring of labour/farmhands and tractor rent were the most common types of cost incurred during production, and that red rice producers typically incur more types of costs and spend more on these costs than peanut producers. Seeds, pesticides and the buying or renting of farming equipment were other common costs incurred. While costs of production are certainly unavoidable, TOMAK can explore the ways and means for farmers to save on costs or find more efficient methods for farmers to meet their production needs.

- **Preparation and growing constraints:** The baseline found that disease management is the most common preparation and growing stage constraints faced by both red rice and peanut producers. Irrigation was another commonly reported constraint for red rice producers. This provides TOMAK with two potential focus areas for program intervention: contextualised improvements in pest control for the two crops, and contextualised improvements of irrigation techniques for red rice. TOMAK can work with farmers to improve knowledge and practices regarding pest control and irrigation, as well as explore options to provide farmers with better materials to manage pests and diseases and make irrigation a more efficient technique.

- **Harvest and post-harvest constraints:** The baseline also found that storage and access to markets are the most common harvest and post-harvest stage constraints faced by both red rice and peanut producers. Again, this provides TOMAK with two potential focus areas for program intervention at this stage. TOMAK can work with farmers to improve knowledge and practices regarding proper storage of crops to maximise shelf life as well as provide storage materials, or explore the available channels for farmers to obtain storage materials. TOMAK can also explore the current level of market access in more detail in order to identify ways to improve access to markets.

- **Land ownership:** The baseline found that the majority of respondents reported that they own their agricultural land, but do not have a reference number or certificate to prove their ownership. It may be worthwhile for TOMAK to study this result further in order to understand the effects that land ownership has

on farmer practices and decision-making, if any, especially if the lack of certification is deterring farmers from expanding their agricultural land or proportion of land utilisation.

- **Role of women in household decision-making:** Based on baseline results, it is clear that women typically manage the household cash, but less than half of women reported input into all household expenditure decisions. Most women reported that they do have input into farming and production decisions, but level of input was mixed, with 38% reporting input into only some decisions. TOMAK should continue to monitor the roles and responsibilities of men and women in household decision-making during program intervention.

- **Support for farming:** The baseline found that less than one-third of respondents had received some type of support for their farming, while most of those who had received support, received it in the form of training. TOMAK should expand support for farmers at the individual and community levels, as well as explore different methods of support, rather than only through training.

Appendices

Appendix 1: Survey tool

No.	Question	Response options	Survey instructions
SECTION A: OBSERVATIONAL **Information for interviewer. Please answer these questions yourself, by observation only (not by asking the respondent)**			
1	Date of Visit	Month, Day and Year	Required
2	Name of Enumerator	Estefania A. de Andrade Dircia M. B. Caero Paulino da Silva Joaozinho da C. Pires	Required
3a	Consent part 1	Yes No	Required
3b	Consent part 2	Yes No	Required
4	Municipality Administrative Post Suku Aldeia	Cascading list, saved on ONA	Required
5	Name of Respondent	Open text response	Optional
6	Gender of Respondent	Male Female	Required
SECTION B: PERSONAL DETAILS			
7	What year were you born?		Year format, Required
8	How many people live in your household, including yourself?	*Enumerator: Please only include those people that live permanently in the house.* Nine or more Eight Seven Six	Required.

No.	Question	Response options	Survey instructions
		Five Four Three One or two	
9	Are all household members ages 8 to 17 currently attending school?	No, or no members ages 8 to 17 Yes	Required.
10	What is the highest level and class that the male head/spouse has completed in school?	None, pre-school or primary class 1 Primary class 2 to 5 Primary class 6 to pre-secondary class 2 No male head/spouse Pre-secondary class 3, or higher	Required.
11	What was the main occupation of the male head/spouse in the past 12 months?	No male head/spouse Agriculture and animal husbandry (farming), forestry, fishing, or hunting Road construction Government employment Does not work Others	Required.
12	What is the main construction material of the external walls?	*Enumerator: You can observe and record this.* Mud, wood, bamboo, rattan, tin or other Brick, concrete, or unbaked brick	Required.
13	What is the primary material of the floor?	*Enumerator: You can observe and record this.* Earth, clay, wood, bamboo or other Concrete/brick, floor tile/cement, marble/ceramic	Required.
14	What is the primary material of the roof?	*Enumerator: You can observe and record this.* Leaves or other Metal sheets/zinc, concrete, wood, tile or sugar palm fibre	Required.
15	Does the household own any televisions, tape players/CD players or radios?	Yes No	Required.
16	How many clothes cupboards does the household own?	None One Two or More	Required.
SECTION C: PRODUCTION			

No.	Question	Response options	Survey instructions
17	During the last year, what crops did you grow?	*Enumerator: The last year is from March 2017 until now.* Mung bean Red onion Upland rice Lowland rice Red bean Red rice Peanut Vegetable Maize Cassava Sweet potato Coffee Coconut Fruit Other	Can select multiple. Required.
18a -n	When do you grow these crops?	January February March April May June July August September October November December	Applies to each crop selected from question 17. Can select multiple. Required. Note: in survey, changed to: When do you grow your mung bean crop? For each crop grown.
19a -n	In the last year, how much (what proportion) of your total land did you use for each crop grown?	*Enumerator, select from the code below. Respondents may have difficulty with this question. If so, please use the drawing approach to estimate the percentage.* 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%	Applies to each crop selected from question 17. A response is required for each crop grown. The percentages should add up to 100% or less (on the assumption that some land might remain unused). Note: in survey, changed to: In the last year, how much (what proportion) of your total land did you use for your mung bean crop? For each crop grown.

No.	Question	Response options	Survey instructions
20a-n	From the crops you harvested in the last year, were there any crops that you sold (part of the harvest or all of it)?	*Enumerator: The last year is from March 2017 until now. You can select more than one response.* Mung bean Red onion Upland rice Lowland rice Red bean Red rice Peanut Vegetable Maize Cassava Sweet potato Coffee Coconut Fruit	Applies to each crop selected from question 17. Required. Note: in survey, changed to: Did you sell any of your mung bean crop from your harvest last year (part of the harvest or all of it)? For each crop grown. Answers: Yes, No.
21a-n	From the crops you harvested in the last year, how much (proportion) did you sell?	*Enumerator, select from the code below. Respondents may have difficulty with this question. If so, please use the drawing approach to estimate the percentage.* 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%	Applies to each crop selected as sold in question 20a-n. Required. Note: in survey, changed to: From the mung bean you sold in the last year, how much (proportion) did you sell? For each crop grown.
22a-n	In the last year, which crops gave you the most income?	*Enumerator: For this question, we are looking for The top three income earners for the farmer. From the crops they sold in the last year, which earned them the most income? Which one earned the next highest income? And which was the third highest?* Mung bean Red onion Upland rice Lowland rice Corn Red bean Red rice Peanut Vegetable	Ranking. Applies to each crop selected as sold in question 20a-n. Required. Note: in survey, changed to: Is mung bean one of your top 3 income earners? For each crop grown. Answers: First, Second, Third, or not in top 3.

No.	Question	Response options	Survey instructions
		Maize Cassava Peanut Sweet potato Coffee Coconut Fruit Other	
RED RICE QUESTIONS (only occur if user selected red rice in question 19)			
23	How do you normally sell your red rice harvest?	I normally sell directly to consumers I normally sell to someone who sells my products	Applies only if user selected red rice in question 17 AND if user selected yes in question 20f (selling red rice). Required.
24	Where do you normally sell your red rice harvest?	From home Suku market Sub-district market District market Market in another district	Applies only if user selected red rice in question 17 AND if user selected yes in question 20f (selling red rice). Required.
25	What type of costs did you incur to grow your red rice? Enumerator: You can select more than one response from the list below.	Seeds Manure Pesticides Tractor rent Equipment (rental/buying) Land Labor Other No costs	Can select multiple. Required.
26	In total, how much did you spend on these costs over the last year?	0$ 0-5$ Between $5-$10 Between $10-30 Between $30-50 Between $50-$100 Between $100-200 More than $200 Don't know	Required.

No.	Question	Response options	Survey instructions
27	Overall, how did you use the red rice harvest? Enumerator, use the drawing approach with the farmer to help estimate the percentage of crops that was SOLD, CONSUMED, DONATED, GROUND or USED FOR SEEDS.	*Enumerator: If the total of your responses does not equal 100%, review the responses before proceeding.* 27a. How much did you manage to sell? 27b. How much did you/your family consume? 27c. How much was bartered or donated? 27d. How much was wasted? 27e. How much was used for seeds?	Enter an integer for 27a-e. Required. Includes calculation on next page.
28	Calculation Page for question 27a-e.	*Note to enumerators: Total percentage accounted for is x%. If more than 100%, please go back and make changes.*	
29	What are the main constraints you face on your farm during preparation / growing time for red rice?	*Enumerator: You can select more than one response from the list below* Access to input Lack of technical support (from MAF AE) Disease management Irrigation Weather conditions Labour / farmhand shortage Other None	Can select multiple. Required.
30	If other, what were the constraints?		Applies if user selects 'other' in question 29.
31	What are the main constraints you face on your farm during harvest and post-harvest time for red rice?	Labour / farmhands Storage Processing (if any) Access to market Other None *Enumerator: You can select more than one response from the list above*	Can select multiple. Required.
32	If other, what were the constraints?		Applies if user selects 'other' in question 31.
33	In your family, who is involved each stage of production for red rice? *Enumerators: More than one response can be selected.*		
33a	Preparing the land	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.

No.	Question	Response options	Survey instructions
33b	Planting the seeds	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33c	Transplanting	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33d	Watering the plants	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33e	Applying fertiliser	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33f	Applying pesticides	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33g	Weeding	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33h	Harvesting the crop	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
33i	Travelling to the farm (if not close by the house)	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.

No.	Question	Response options	Survey instructions
33j	Selling the produce	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
PEANUT QUESTIONS (only occur if user selected peanut in question 19)			
34	How do you normally sell your peanut harvest?	I normally sell directly to consumers I normally sell to someone who sells my products	Applies only if user selected peanut in question 17 AND if user selected yes in question 20g (selling peanuts). Required.
35	Where do you normally sell your peanuts?	From home Suku market Sub-district market District market Market in another district	Applies only if user selected peanut in question 17 AND if user selected yes in question 20g (selling peanuts). Required.
36	What type of costs did you incur to grow your peanut crops? Enumerator: You can select more than one response from the list below.	Seeds Manure Pesticides Tractor rent Equipment (rental/buying) Land Labor Other No costs	Can select multiple. Required.
37	In total, how much did you spend on these costs over the last year?	0$ 0-5$ Between $5-$10 Between $10-30 Between $30-50 Between $50-$100 Between $100-200 More than $200 Don't know	Required.
38	Overall, how did you use the peanut harvest? Enumerator, use the drawing approach with the farmer to help estimate the percentage of crops	*Enumerator: If the total of your responses does not equal 100%, review the responses before proceeding.* 38a. How much did you manage to sell?	Enter an integer for 38a-e. Required. Includes calculation on next page.

No.	Question	Response options	Survey instructions
	that was SOLD, CONSUMED, BARTERED, DONATED or USED FOR SEEDS.	38b. How much did you/your family consume? 38c. How much was bartered or donated? 38d. How much was wasted? 38e. How much was used for seeds?	
39	Calculation Page for question 38a-e.	*Note to enumerators: Total percentage accounted for is x%. If more than 100%, please go back and make changes.*	
40	What are the main constraints you face on your farm during preparation / growing time for peanuts?	*Enumerator: You can select more than one response from the list below* Access to input Disease management Irrigation Weather conditions Labour / farmhand shortage Other None	Can select multiple. Required.
41	If other, what were the constraints?		Applies if user selects 'other' in question 40.
42	What are the main constraints you face on your farm during harvest and post-harvest time for peanuts?	Labour / farmhands Storage Processing (if any) Access to market Other None *Enumerator: You can select more than one response from the list above*	Can select multiple. Required.
43	If other, what were the constraints?		Applies if user selects 'other' in question 42.
44	In your family, who is involved each stage of production for peanuts? *Enumerators: More than one response can be selected.*		
44a	Preparing the land	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44b	Planting the seeds	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.

No.	Question	Response options	Survey instructions
44c	Transplanting	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44d	Watering the plants	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44e	Applying fertiliser	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44f	Applying pesticides	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44g	Weeding	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44h	Harvesting the crop	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44i	Travelling to the farm (if not close by the house)	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.
44j	Selling the produce	Me My spouse My children Other family members Does not apply/Don't do	Can select multiple. Required.

No.	Question	Response options	Survey instructions
45	During the last year, did you receive any support for your red rice and/or peanut production?	Yes No	Applies if user selected red rice and/or peanuts in question 17. Required. If no, skip to question 50.
46	What type of support did you receive?	Training Farm equipment Seeds Information materials Market information Other *Enumerator: You can select more than one response from the list above.*	Can select multiple. Applies if user selected yes in question 45.
47	Who did you receive the support from?	SISCA NGO ONG sira MAF EO Friends Group Other	Applies if user selected yes in question 45.
48	In the last year, how often did you receive this support?	Once Twice Three-four times Every month I didn't receive this support last year	Applies if user selected yes in question 45.
49	On your farm, do you currently use any of the following methods for peanut and/or red rice production? Enumerator: you can select all that apply.	Retained seeds Mulching Flood irrigation Hose irrigation Covered cropping Burning Composting Crop rotation Use seedling nursery Raised beds Inorganic fertilisers Inorganic pesticides Organic fertilisers Organic pesticides Leaving crop residue on surface or incorporating into soil	Can select multiple. Applies only if user selected red rice and/or peanuts in question 17.
50	How much input did you have in making decisions about farming (production)?	No input/la fo Input into very few decisions/ Input into some decisions Input into most decisions Input into all decisions	Required.

No.	Question	Response options	Survey instructions
		No decisions made	
51	Who receives and manages the income generated from red rice and/or peanut crop sales?	I manage the income from peanut / red rice My spouse manages the income from peanut / red rice Other	Applies if the user selected red rice and/or peanuts in question 17.
52	If other, who?		Applies if user selected 'other' in question 51.
53	How much input did you have in decisions on the use of income generated from crop production?	No input Input into very few decisions Input into some decisions Input into most decisions Input into all decisions No decisions made	Required.
54	How much of your income do you reinvest in next season of crop production?	None Only a very small amount of my income A small portion of my income Half of my income Most of it	Required.
55	How many square-metres of land does the household cultivate (or has or controls, even if the land does not belong to the household) that is for annual crops or fallow, tree crops, pasture, plantation, grassland, or garden/garden plot?	None 0.01 to 0.149 hectares 0.150 to 0.299 hectares 0.299 to 0.5 hectares 0.5 to 0.99 hectares or more hectares	Required.
56	From the land you mentioned before, who owns the land?	*Enumerator: This refers to the whole land mentioned in the last section, including land that is not currently being cultivated* Rent free Owned without número referénsia or certificate Owned with número referénsia Communal land Owned, certificate from Indonesia Rent and share product Owned, certificate from Portuguese Lease/rent for fixed value	Required
57	GPS	Please register the GPS coordinates.	Not required.

Appendix 2: Semi-structured interview outline

Guide for interviewer

The following guide is to help direct the facilitator of the semi-structured interviews on key areas of questioning. The interview should last approximately one hour and should be conducted in a quiet, private place without other people listening.

The interviewer should outline the purpose of the interview, the estimated length of the interview, the sort of topics for discussion and how the information from the interview will be used and stored. This should emphasise the anonymity of the respondent and that their personal details will be kept confidential. If the interviewee is not comfortable to proceed, they can stop the interview at any time.

The interview should be recorded to allow for future confirmation of the information provided. Consent to record must be sought first.

Topics

The key areas for questioning are outlined below, focussing on workload and the time spent on particular tasks relating to crop production on farms.

1. Production-information about labour sharing arrangements

This topic is about how families organise and share labour on their farms. For example, they might have families all working together on each other's land in a schedule, or they may be paying daily rates for labour.

Questions might include:

Ask the respondent to describe who works on the target crop in their family and to explain how they organise this.

In your production are you are member of a group who shares labour across farms (informal & formal labour sharing)? How is it organised? What step in the production is this used for?

Do you pay for labour on your farm? For what step in production and how much?

Do you pay up front or profit sharing?

Compared to 5 years ago are you doing more or less labour sharing? Why?

2. Production if they rent/use someone else's land: Understanding about profit

This topic is exploring whether farmers share land or land rental.

Questions might include:

Do you use someone's land for production of peanuts or red rice?

How do you negotiate and what is the arrangement (length of time, done as group or individual, relationship to farmer (own family or non-family), profit share or payments etc).

3. Selling: Information around level group selling Vs Individual selling

This topic explores whether farmers sell together or individually and the motivations for this.

Questions might include:

For peanuts and red rice do you sell as an individual or with others in a group?

If group…why? If not group…why?

How do they do organise it if they answer yes to being in a group?

Examples they might be giving for benefits of group.

4. Transport of produce: Information on difficulties of getting to and from land to farm and then farm to main selling point e.g. market.

This topic should explore challenges of transportation / mobility and time spent on this.