TOMAK Component 1 Midline Evaluation

Full Report | March 2021

TOMAK
To'os ba Moris Di'ak

Australian Aid

Acronyms

CA	Conservation agriculture
CDB	Caritas de Baucau
CRS	Catholic Relief Services
CSA	Climate smart agriculture
CVTL	Cruz Vermelha Timor-Leste
DFAT	Australian Department of Foreign Affairs and Trade
DGLV	Dark green leafy vegetables
FCS	Food Consumption Score
FGD	Focus group discussion
FIES	Food Insecurity Experience Scale
HHDM	Household decision-making
INS	National Institute of Health (Instituto Nacional de Saude)
KEQ	Key evaluation question
MAD	Minimum Acceptable Diet
MAF	Timor-Leste Ministry of Agriculture and Fisheries
MDD-C	Minimum Dietary Diversity for Children
MDD-W	Minimum Dietary Diversity for Women
MELF	Monitoring, Evaluation and Learning Framework
MMF	Minimum Meal Frequency
MoH	Timor-Leste Ministry of Health
PCA	Principal component analysis
NGO	Non-governmental organisation
S&L	Savings and loans
SBC	Social and behaviour change
SDG	Sustainable Development Goal
TOMAK	*To'os Ba Moris Di'ak* (Farming for Prosperity) Program
WG-SS	Washington Group Short Set
WHO	World Health Organization
WRA	Women of reproductive age

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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. Its goal is to ensure rural households live more prosperous and sustainable lives. To achieve this, TOMAK has implemented parallel and linked interventions that aim to:

- Establish a foundation of food security and good nutrition for rural households (Component 1); and
- Build their capacity to confidently and ably engage in profitable agricultural markets (Component 2).

Component 1 (Food Security and Nutrition) has promoted nutrition-sensitive agriculture (NSA) approaches to improve the availability and utilisation of nutritious food. These activities have been implemented at the community level through lead NGO partners Catholic Relief Services (CRS), Mercy Corps and World Vision, each targeting different geographical areas. While there was some variation across partner approaches and training materials, approaches were aligned across three main community group types: farmer groups, nutrition groups, and savings and loans (S&L) groups. Nutrition content was layered on early into the establishment of farmer groups and into S&L groups later on in the establishment process.

TOMAK conducted a requisite midline evaluation as it neared the end of its first phase. The midline aimed to gather data that would help the Australian Department of Foreign Affairs and Trade (DFAT) and TOMAK assess program performance, particularly in relation to the intermediate and end of program outcomes (EOPOs) of TOMAK's Theory of Change (Annex 1). The Component 1 midline included 1,489 survey respondents (70.2% women of reproductive age (WRA)), and 232 women and 155 men participated in 51 focus group discussions (FGDs). Respondents were either part of a nutrition group, S&L group, farmer group, or were involved in multiple groups. In addition, a control group was surveyed that has not been subjected to TOMAK programming. Where possible, a comparison has been made with baseline data, covering 480 respondents (50% women).

Key findings

Overall, the Component 1 midline demonstrates that TOMAK has significantly influenced improvements across target households on access and consumption of nutritious foods, access to financial services and increased joint household decision-making on production and nutrition topics.

Income sources

Midline respondents had a higher average number of income sources than the control group respondents. Most midline respondents received income from the sale of crops (64.8%) or livestock (63.9%) and these income sources accounted for almost 50% of midline respondents' biggest income sources. On average, households in the midline received income from 2.48 different income sources. Households that were part of multiple groups (e.g. an S&L group and a farmer group, or a farmer group and a nutrition group) had a significantly higher average number of income sources compared to respondents in the S&L group, the farmer group, and the control group.

Crop production

Households in the midline produced a significantly higher quantity and number of food groups compared to the control group. In addition, households from the farmer group produced significantly more crops per household compared to the S&L group, compared to respondents that participated in multiple groups, and compared to the control group. Respondents who were part of multiple groups produced significantly more crops per household compared to the control group.

Crop sales

The average number of crops sold, and the average number of food groups sold, was significantly higher in the midline, compared to the control group. When comparing all groups, results show that households in the control group sold significantly fewer crops per household compared to the farmer group and compared to respondents that participated in multiple groups. In addition, the average number of food groups sold per household was significantly higher in the farmer group compared to the S&L group, compared to households that participated in multiple groups, and compared to the control group. A greater proportion of households in the baseline (compared to the midline) sold carbohydrates and fruits, while a greater proportion of households in the midline (compared to the baseline) sold legumes and vegetables.

Crop storage

Midline results show that white rice and red rice were stored for the longest period of time (at six months) compared to other crops. In terms of using improved storage methods, utilisation of the preferred method for maize was significantly higher in the midline than the control group, while utilisation of the preferred method for red rice was higher in the control group than the midline. There was no significant difference across midline and control for storage of other crops. The proportion of respondents storing maize, cowpea and red rice for the preferred duration was higher for midline respondents compared to the control group. For other crops, there was no significant difference.

Nutrition knowledge and attitudes

Calculations of dietary diversity scores in the midline survey were complemented with nutrition knowledge and attitude questions. Overall, more midline respondents gave correct answers to the knowledge and attitude questions than control group respondents. For example, significantly more midline respondents were familiar with the three food groups[1] (75.1%) compared to respondents from the control group (19.7%). Results show that on average, respondents from the control group gave significantly fewer correct answers compared to all other group types. The nutrition group gave significantly more correct answers compared to the S&L group and the farmer group.

Minimum Dietary Diversity for Women (MDD-W)

Midline results show that almost 50% of WRA had consumed food from five or more food groups in the last 24 hours. The average number of food groups consumed by WRA was significantly higher in the midline (4.69) compared to the control group (4.43). When comparing the midline groups, the average number of food groups consumed was significantly higher in the S&L group compared to every other group. Among WRA in the midline, 49.2% met the MDD-W requirement compared to only 16.4% in the baseline. This difference was significant. However, there was no significant difference between the midline and control group (44.9%).

[1] The Timor-Leste Ministry of Health uses a model of three food groups (carbohydrates, protein, and vitamins and minerals) as a simplified method of promoting dietary diversity. Numerous partners now reinforce this model in community-based nutrition promotion.

Minimum Dietary Diversity for Children (MDD-C)

Just over a third of children (34.7%) in the nutrition group met the MDD-C, compared to 28.0% in the control group, but this difference was not significant. However significantly more children met the MDD-C in the midline (35.8%), compared to the baseline (10.8%). In addition, the proportion of breastfed children that met the MDD-C was significantly higher in the midline (44.4%) compared to the control group (32.9%). For non-breastfed children, the difference between the midline and control group was not significant.

Minimum Meal Frequency for Children (MMF)

Midline results do not show significant differences in MMF for breastfed or non-breastfed children (6-8 months and 9-23 months), when comparing between baseline and midline or between midline and control groups.

Minimum Acceptable Diet (MAD)

The proportion of breastfed children that met the MAD is significantly higher in the midline (40.3%) compared to the baseline (11.6%). However, there was no significant difference in the proportion of breastfed children that met the MAD between the nutrition and control group. There was also no significant difference in the proportion of non-breastfed children that met the MAD between midline and baseline, or between the nutrition and control group. It should be noted that the percentage of non-breastfed children who met the MAD is much lower than for breastfed children.

Food Consumption Score (FCS)

The average FCS was significantly higher among midline respondents (52.95) compared to baseline respondents (43.79). In addition, midline respondents scored significantly higher on the FCS than respondents from the control group (48.64). The proportion of households with an acceptable FCS was higher in the midline (85.6%), compared to the baseline (62.9%). When comparing across group types, the average FCS was significantly lower for respondents in the nutrition group than for respondents in the S&L group and farmer group, and compared to respondents that participated in multiple groups.

Household decision-making (HHDM)

Results reveal that 71.5% of WRA perceived that women make the decisions about what the household eats and 63.2% of men perceived that women make these decisions. Roughly 25-30% of WRA and men believed that couples share the decision, with only 3.5% of WRA and 4.5% of men perceiving that men alone take decisions about what the household eats. The vast majority (95.7%) of WRA reported being satisfied or very satisfied with their role in these decisions, compared to 93.7% in the control group; this difference was not significant. For decisions about buying protein-rich foods such as eggs, fish, tofu, beans, both WRA (59.6%) and men (46.2%) reported that these decisions are predominantly made by women.

Finance

Access to financial training in the last 12 months was significantly higher among midline respondents (35.4%) compared to the control group (6.3%). In terms of taking out loans, significantly more midline respondents (54.0%) had taken out a loan compared to the control group (27.9%). In addition, significantly more midline respondents (83.4%) made savings compared to the control group (64.4%). The proportion of respondents that made savings was higher for the S&L group as well as for respondents that participated in multiple groups, compared to the other groups.

Money borrowed from S&L groups was mostly spent on school fees and other school-related costs and on food purchases. Food types that were bought most often were meat, eggs and fish.

Key findings across group types

- Dietary diversity in WRA was highest in S&L groups, then farmer groups, then multiple groups and lastly nutrition groups.
- Food Consumption Scores were highest in S&L, multiple groups, then farmer groups and lastly nutrition groups.
- Nutrition groups had the highest nutrition knowledge. This did not equate to the highest dietary diversity for WRA or FCS for the household.
- Participation in multiple groups was linked to households having a greater number of income sources.
- S&L group members mainly took out loans for education expenses and for food purchases (e.g. meat, fish, eggs).
- Farmer groups produced the highest volume and more diverse crops compared to other groups.

Recommendations/Lessons learned

NSA is an impactful approach

TOMAK's overarching goal is to ensure that rural households live more prosperous and sustainable lives. Results show that TOMAK has made a positive and significant contribution to increased access and consumption of nutritious foods. Utilising an NSA approach and strengthening the link between agriculture and nutrition to focus on the promotion of nutritious crops that address known nutrient gaps in Timor-Leste has demonstrated impact for TOMAK.

While substantial areas for further improvement still remain, approaches that show the greatest impact should be continued as a key component of TOMAK's approach in Phase 2. S&L groups demonstrated the highest improvement across key assessment areas in the midline. A key emerging finding from the midline is that when nutrition content is layered on to other group types, there is greater impact.

Farmer groups have also shown significant change across key assessment areas, especially production of diverse crops. TOMAK should build off these lessons in Phase 1 and seek to strengthen the linkages across S&L and farmer groups going forward. Agriculture, nutrition and access to financial services are key components in meeting TOMAK's broader outcomes and should be fully integrated going forward. This may result in an approach where there is full integration of group types and little to no distinction between groups.

Social behaviour change (SBC) should continue to be an integral part of TOMAK's approach to NSA

Midline results showed higher levels of NSA knowledge, more positive attitudes, and behaviour change in intervention areas. There is also evidence to show that TOMAK's key messages are consistent and reinforced through multiple platforms (e.g. across community group types and government service

providers). A strong SBC approach should continue in Phase 2 and include regular monitoring and tracking of uptake of key practices, in between larger midline and endline studies.

Household decision-making should continue to be an integral aspect of TOMAK's approach

Changing gendered social norms requires a long-term commitment. The midline demonstrated some level of movement in increased household decision-making between couples on farming and the prioritisation of nutritious foods. The importance of gender equity and an equitable division of labour should continue to be an essential aspect of TOMAK's approach. This includes further layering of HHDM modules early on into community groups to promote shared decision-making and male involvement in household nutrition, and encouraging reinforcement and support from government service providers.

Mainstream disability inclusion and support

Approaches should be adopted that encourage and enable participation of people with disabilities in all activities. TOMAK should continue to support people with disabilities that participate in TOMAK activities to be referred to disability services as needed and explore ways to ensure that the needs of people with disabilities are met in TOMAK activities so that they are able to apply what they learn through the activities to the same extent as people without disabilities.

Deepen the focus on water conservation and access to water within a broader resilience strategy

Challenges around water access were raised repeatedly in the FGDs as a key barrier to increased and diverse household production. TOMAK supported a variety of agriculture approaches such as conservation agriculture (CA) approaches, climate smart agriculture (CSA), water-efficient systems such as drip irrigation, rain water harvesting, and drought resistant seeds. In Phase 2, TOMAK should develop a water access and management strategy for target communities and households that is consistent across components and implementing partners.

Consolidate learnings across TOMAK and partners on storage techniques

Food storage is a key component that contributes to food stability (one of the four pillars of food security) and household resilience. Midline results showed that respondents are practicing food storage and to some extent utilising improved storage techniques. These efforts should be increased in Phase 2 to further influence Food Insecurity Experience Scale (FIES) scores, improve resistance to various climatic shocks, and increase household capacity to withstand annual lean seasons.

1. Introduction

Australia's TOMAK program supports rural households in Timor-Leste to live more prosperous and sustainable lives. It works to improve food security and nutrition (Component 1) and to strengthen agricultural market systems (Component 2). The program is currently in its first phase (2016- 2021).

As the program neared the end of its first phase, TOMAK was required to conduct a midline study. This midline aimed to gather data that would help DFAT and TOMAK assess program performance, particularly in relation to the intermediate and end of program outcome levels of TOMAK's theory of change (Annex 1). The Component 1 EOPOs and their corresponding immediate outcomes are as follows:

EOPO 1: Households have year-round access to sufficient and nutritious food

The intermediate outcomes under EOPO 1 are:

1.1: Households apply NSA knowledge and skills

1.2: Households use surplus income to purchase nutritious food

EOPO 2: Households consume more nutritious foods

The intermediate outcomes under EOPO 2 are:

2.1: Households adopt improved nutrition behaviours

2.2: Households adopt more gender equitable and inclusive decision-making behaviours

To assess progress towards the EOPOs, the midline evaluation sought to answer the two Component 1 Key Evaluation Questions (KEQs):

KEQ1: *To what extent has TOMAK contributed to households having year-round access to sufficient and nutritious food?*

KEQ2: *To what extent has TOMAK contributed to household consumption of more nutritious food?*

A major emphasis of the Component 1 midline evaluation was a large survey, which collected information on various TOMAK beneficiary groups, and compared these (where such data were available) with a baseline and control group.[2] The midline survey was complemented by FGDs designed to probe further on beneficiary perceptions, attitudes and behaviours related to the program's activities and expected outcomes. The survey tools were checked against the TOMAK monitoring, evaluation and learning framework (MELF) and included suggestions and recommendations made in the TOMAK Program Evaluation Preliminary Report[3] – June 2020. The various indicators of the TOMAK intervention that were measured through the survey modules are included in Annex 2.

The methodology for the midline evaluation including the survey and FGD tools were developed by TOMAK in close collaboration with M&E House and reviewed by the DFAT activity manager for TOMAK, the DFAT agriculture and food security team in Canberra, as well as the three lead NGO partners. Data collection was conducted in September 2020, corresponding to the same time

[2] The baseline data was collected in August and September 2017.

[3] This report was prepared by a group of consultants conducting an external evaluation of the TOMAK program. The evaluation was cut short however due to travel limitations resulting from COVID-19 so the resulting report presents only emerging findings.

of year that the baseline data was collected in 2017. External consultants performed the data analysis and write-up of results. TOMAK provided the consultants with a methodological guidance document that provided guidance on sampling, survey question design, FGD development, and analysis.

This report reflects the findings of the midline evaluation. The results of the study will feed into design considerations for TOMAK Phase 2. The midline report is structured in the following sections: Section 1 provides an overall introduction with background on TOMAK Component 1, the key objectives and the Component 1 Theory of Change. Section 2 outlines the methodology applied and the limitations of the study. Section 3 provides the findings of the midline study, including a summary of results against impact and outcome indicators. Finally, Section 4 contains conclusions and a discussion section. Recommendations based on the key findings from the report are also detailed in this section.

1.1. Background of Lead NGO Partners

TOMAK's food security and nutrition activities have been implemented at the community level through selected lead NGO partners, each targeting different geographical areas or suku (villages):

- Catholic Relief Services (CRS), in partnership with Cruz Vermelha de Timor-Leste (CVTL) Caritas de Baucau (CDB), in East Baucau and Viqueque; covering 35 suku (19 in Baucau and 16 in Viqueque);
- World Vision in West Baucau, covering 18 suku; and
- Mercy Corps in Bobonaro, covering 13 suku.

The partners commenced implementation of four-year activity workplans in mid-2017, incorporating a mix of NSA and SBC activities tailored to the specific development needs and opportunities of different geographic locations, and reflecting their own experiences. These included a varying mix of activities, aimed at increasing production and consumption of nutritious foods (e.g. legume crops, moringa, orange fleshed sweet potato, fish, eggs), targeting the main nutrient deficiencies in Timor-Leste. Approaches included the establishment of farmer groups, S&L groups, and community nutrition groups as a conduit for promoting improved nutrition practices.

An important feature of all three partner activities was to ensure deliberate integration, sequencing and layering. Interventions were designed to integrate approaches and promoted practices across sectors and activities. For example, home gardening and maize/bean production modules included nutrition messages as well as training on the technical aspects of production; and S&L group meetings encourage production and consumption of nutritious foods.

Partner community level interventions have been complemented by TOMAK-led support to the Timor-Leste Ministry of Agriculture and Fisheries (MAF) and Ministry of Health (MoH) that focus on institutional strengthening of NSA and SBC approaches.

TOMAK and Component 1 partner approaches have been guided by TOMAK's SBC strategy. The SBC strategy articulates the key behaviours to be promoted through TOMAK, and describes specific approaches, actors, intended audiences, communication channels, materials, and platforms used to create change. The key behaviours described in the strategy aim to promote a targeted set of feasible practices that have been monitored and revised based on audience movement along a continuum of change. Key behaviours take into consideration what audiences are already doing (e.g.

mothers are able to make decisions around what vegetables to prepare for family meals) and attempt to prioritise and focus on key practices that audiences are not doing and which are most likely to have a significant impact on nutrition at household level.

2. Methodology

2.1. Sample size parameters and characteristics

The midline followed the standard sampling parameters for unpaired data as follows:

- Confidence Level: 95%
- Margin of Error / Confidence interval: 5%
- Population Proportion: 50%
- Population Size: 100,000
- This equates to a sample size of ~384 for each outcome variable of interest

Given the resourcing constraints associated with a sample of this size (n=1,890), a reduced and more realistic sampling frame was decided upon (Table 1). It featured a sample size of around 250 for each of the TOMAK groups. The sample criteria required that only WRA were interviewed across all groups and only WRA with a child aged 6-24 months were included in the nutrition group sample. This sample size enabled several things:

- Each TOMAK group could be compared with a control group containing sufficiently similar characteristics.
- The control group had a similar size, power and characteristics to the original baseline.
- The control group could possibly be used as a baseline for TOMAK Phase 2 (depending on the updated program design).

Table 1: Reduced sample size as per TOMAK resources (n = 1480)

Respondent type	Farmer group	S&L group	Nutrition group	Control group	(Baseline)
Male	125	125		250	240
WRA	125	125		250	
WRA with child 6-23 months			240	240	240
Total	**250**	**250**	**240**	**740**	**480**

A more robust midline sample was sought as the baseline sample was designed for a confidence level of 90% and margin of error of 10%, meaning it was likely that the mean values reported in the baseline data fell somewhere within a 20 percent range, which was considered too weak for such an important study. In practice, the TOMAK baseline collected 240 surveys for women and 240 surveys for men, however the male and female surveys captured responses to different modules and questions, further reducing the robustness of the baseline study.

The TOMAK program is very diverse in its programming activities, even within Component 1 alone. TOMAK's midline survey focused on its core programming areas and did not dilute its results by assessing small pilot activities. To ensure that change realistically occurred, only beneficiaries who had been exposed to core TOMAK programming (farmer groups, S&L groups, nutrition groups) for a minimum period of exposure (one year or more) were sampled. Where possible, results have been

disaggregated by group type (i.e. farmer group, S&L group, nutrition group) and gender (i.e. gender of respondent or gender of household head depending on the variable).

2.2. Randomisation

The TOMAK midline employed random sampling in order to generalise the effect of its activities on its broader population of beneficiaries. A two-stage random sampling approach was used:

- Listing all candidate suku for all TOMAK groups meeting the condition of sufficient exposure;
- Listing all candidate suku for the control group, ensuring that they have similar characteristics to the treatment group, and were not recently exposed to a similar project from a different organisation;
- Stage one: Randomly selecting which suku were included in the sample;
- Stage two: Randomly selecting individual beneficiaries from within the suku groups who received the minimum exposure to TOMAK programming.[4]

This two-stage random sampling approach using clusters of suku and groups had the distinct advantage of being cheaper and more efficient to implement than simple random sampling from a geographically dispersed population.

2.3. Survey preparation, training and testing

2.3.1. Enumerator training

TOMAK trained 18 enumerators to administer the midline surveys, with 12 enumerators in the field at any one time. Enumerators were selected based on their existing data collection experience and took part in a two-day training to familiarise them with the survey questions and the use of tablets. Taking part in both days was compulsory. Enumerators tested the surveys in the field and their understanding of the survey and performance was checked.

2.3.2. Survey testing

The draft survey tool was field-tested for language comprehension, format and duration. Surveys were administered on digital tablets and submitted to the online ONA platform, identical to that on which the final survey was deployed. Feedback from testing was incorporated into the final survey.

2.3.3. Ethics approval and local permission to conduct research

TOMAK followed the National Institute of Health (INS) ethical approval process for the research. This involved providing the INS ethics board with an application detailing all components of the study, including the pre-tested research tools. After the board reviewed the application, TOMAK was invited to present the research to the ethics board members. The INS provided TOMAK with an approval letter that could be presented to local authorities and respondents. Permission was sought from local authorities, including xefe suku (village chiefs), xefe aldeia (sub-village or hamlet chiefs), prior to conducting research.

[4] Control group individuals were selected by working with the community leaders in the randomly selected suku to identify men, WRA and WRA with children under 2 who were available for interview, skipping one or two houses between each respondent to further randomise the sample.

2.3.4. Informed consent

Survey respondents were asked for their consent prior to beginning a survey. The enumerators read a consent statement to each respondent which can be viewed in the survey tool. If consent was given, the respondent was asked to sign on the tablet with their finger[5] and the survey then proceeded. If consent was not given, the tablet screen instructed the enumerator to stop and select another respondent.

2.4. Survey modules

This section provides an overview of the modules included in the baseline and midline survey. In general, the midline survey tool was based, as far as possible, on the baseline survey tool, so that a comparative analysis could be performed. Nonetheless, the baseline had certain weaknesses, making a comparison between midline and baseline impossible for several modules (Table 2).

Table 2: Survey modules and comparison potential

Module	Included in baseline	Included in midline	Comparison possible
Respondent and Household Demographics	X	X	X
WG-SS: Washington Group Disability		X	
Hygiene	X	X	X
Land	X	X	X
Income sources	X	X	X
Crop production, sales and storage	X	X	X
Livestock assets (animals)	X	X	X
Wealth and poverty index		X	
MDD-C: Minimum Dietary Diversity for Children	X	X	X
MMF: Minimum Meal Frequency for Children	X	X	X
MAD: Minimum Acceptable Diet Score	X	X	X
MDD-W: Minimum Dietary Diversity for Women	X	X	X
Nutrition knowledge		X	
FCS: Food Consumption Score	X	X	X
FIES: Food Insecurity Experience Scale		X	
Household Decision Making	X	X	
Nutrition Attitudes		X	
Finance	X	X	

2.5. Data cleaning and analysis

Data was collected through mobile devices meaning there were no unanswered questions, as enumerators were instructed to move to the next screen when answers were recorded in the device.

[5] Due to the hygiene risk associated with COVID-19, in most cases the enumerator signed the tablet on behalf of the respondent after they had given their verbal consent. This approach was discussed and agreed upon with INS.

Therefore, there was no need for extensive data cleaning. Where inserted data did not make sense, the consultant made adjustments. For example, if the year of birth was recorded as 2069, the consultant would change this to 1969. However, if the age of the respondent was recorded as 3, 4, 8, or 562 years, for example, this would be changed to a "missing value" indicating that it could not be included in the analysis of age.

No weighting was used to come up with the estimates of the indicators, except for when guidelines of international indicators advised doing so, such as for the FCS. A significance level of 0.05 was utilised, with a corresponding confidence level of 95%. For categorical values, Chi-square tests were performed. For continuous values, ANOVAs were used, with LSD post-hoc tests in cases of multiple groups. For every ANOVA that was performed, Levene's test was included to check for homogeneity of variances. If variances were not equal (and Levene's test was significant), a Welch's test was performed to compare groups, and a Games-Howell post-hoc test to compare multiple groups, as these tests are more robust to variables with unequal variances.

2.6. Focus group discussions

To complement the quantitative household survey, qualitative data was collected through FGDs. Each FGD was led by one facilitator (external consultant) and one note taker (enumerator) and were run separately for women and men. FGDs were conducted with WRA, older women (grandmothers/ mothers-in-law) and men to explore a range of target topics relating to household nutrition. Topics included: attitudes and beliefs on nutrition and food security topics, agency and decision-making in households, and access to inputs. The FGDs were also an opportunity to dig deeper into sub-topics and activities that were not addressed in the household survey.

TOMAK carried out three types of FGDs in its target municipalities with the three implementing NGO partners (CRS, Mercy Corps and World Vision), organised by group type: S&L groups, farmer groups and nutrition groups.[6] Participants were invited to attend the discussions by TOMAK program staff and participation was voluntary.

Table 3: Numbers of focus groups and participants[7]

Partner		# of groups			# of participants		
		M	F	Total	M	F	Total
CRS	S&L	3	3	**6**	18	17	**35**
	Farmer	2	2	**4**	12	17	**29**
	Nutrition	1	3	**4**	5	22	**27**
Mercy Corps	S&L	4	4	**8**	26	31	**57**
	Farmer	4	6	**10**	24	36	**60**
	Nutrition	-	8	**8**	-	55	**55**
World Vision	Farmer	3	2	**5**	28	16	**44**
	Nutrition	2	4	**6**	12	38	**50**
Total		**19**	**32**	**51**	**125**	**232**	**357**

[6] Most members of S&L groups are active as farmers and have been trained on S&L practices, nutrition and growing food crops. Most of the famer groups that engaged in FGDs (though not all) are also active in S&L activities and participated in training in all three areas. Some of the nutrition group members that participated in FGDs reported also being trained on production of healthy food (training which they likely encountered through their participation in non-nutrition groups) and others reported they were trained in bookkeeping and S&L techniques, however these respondents were limited.

[7] Although an even number of FGDs per group type were planned for each NGO, challenges with scheduling and unavailability of community members at the time of data collection resulted in varied numbers of FGDs conducted between each partner.

In total, 357 respondents were interviewed through 51 FGDs, 232 women and 125 men. A minimum of six people participated in each FGD. There were 19 male groups and 32 female groups, two of which were with mothers-in-law (Table 3).

The findings are based on the analysis of aggregated responses, obtained from the above FGDs. Where possible, findings have been disaggregated to gender or location. The findings were used to complement the quantitative findings and provide more details on the thinking behind certain findings.

2.7. Limitations of the midline study

There are several limitations to this study. Firstly, it was not possible to statistically compare variables related to household decision-making and finance between midline and baseline, due to unsatisfactory baseline survey questions.

Secondly, for several modules, the baseline data was measured at a different level than the midline data, in many cases offering categories for responses rather than exact responses (e.g. grouping crop types together in the baseline rather than allowing the respondent to select the exact crops they grow, as in the midline). These inconsistencies are relevant for: the number of household members, education, land ownership, income sources, crop production and crop sales. Details of the differences between baseline and midline can be found in each of these sections within the findings of the survey.

With regard to the Minimum Dietary Diversity for children (MDD-C), World Health Organization (WHO) guidelines about calculating this indicator have been revised since the baseline study. Whereas previously the minimum number of food groups was four out of seven, this guidance has been revised to five out of eight, where eight is breastfeeding. Baseline data was recalculated accordingly but results regarding the MDD-C in the baseline report may differ from the baseline results used in the midline report. As the Minimum Acceptable Diet (MAD) is based on the MDD-C, the MAD results reported in the baseline report may also differ from the baseline results used in the midline report.

For the Food Consumption Score (FCS), biases are inherent in the tool. For example, a survey instrument that gathers the consumption of two food items from the same group separately will double count the frequency of consumption in cases where these foods are eaten in combination. In addition, in the baseline, the food group 'Vegetables' was a combination of two items, dark green leafy vegetables (DGLV) and orange-coloured vegetables. In the midline, the food group 'Vegetables' was a combination of three items, DGLV, orange vegetables, and other vegetables. The food group 'Fruit' was measured with one item in the baseline (Did any family member eat fruit?), while in the midline 'Fruit' consisted of two items (Vitamin A-rich fruits and other fruits). An increase in the number of food items used (and later collapsed into the food groups for the FCS calculation) will bias the score upwards for the FCS that consists of more items. In other words, the FCS established on midline data might be biased upwards, as two food groups consist of more items compared to the food groups in the baseline.

Lastly, collecting qualitative data through FGDs at community level in Timor-Leste presented challenges. This is in part related to the skills of facilitators. Facilitating FGDs is a highly skilled and nuanced role, and these skills are often challenging to find and/or develop in Timor-Leste. Despite an orientation to the FGD guides, responses indicated that the external facilitators at times may not have been clear on the purpose of a certain line of questioning or failed to follow-up if a participant did not fully understand. Nonetheless, the FGDs provided a large body of useful data.

3. Findings of the survey

This section outlines the findings of the midline survey and the FGDs. The key results under each KEQ have been included in Table 4, together with the relevant indicators that were measured. Across these key indicators, the majority of targets have been achieved.

Table 4: TOMAK indicators, survey modules and results

Indicator	Baseline	Midline	Yr 5 target/ assessment
KEQ 1: To what extent has TOMAK contributed to households having year-round access to sufficient and nutritious food?			
Proportion of households producing nutritious food	• Orange flesh fruit = 86% • DGLV = 79% • Orange flesh vegetables = 66% • Legumes = 29% • Other fruit = 24% • Other vegetables = 19% AVERAGE 50% respondents producing these crops	• Orange flesh fruit = 62% • DGLV = 66% • Orange flesh vegetables = 67% • Legumes = 53% • Other fruit = 64% • Other vegetables = 51% AVERAGE 92% respondents producing these crops	20% average increase across all crop types **Assessment:** Reached
Proportion of households reporting purchase of identified nutritious foods	• Orange flesh fruit = 6% • DGLV = 31% • Orange flesh vegetables = 23% • Legumes = 41% • Other fruit = 16% • Other vegetables = 27% • Meat, eggs and fish = 32% AVERAGE 25% purchasing these foods.	• Orange flesh fruit = 22% • DGLV = 33% • Orange flesh vegetables = 43% • Legumes = ?[9] • Other fruit = 20% • Other vegetables = 18% • Meat, eggs and fish = 92% AVERAGE 37.95% purchasing these foods	30% average increase across all food types **Assessment:** Reached
Proportion of households with improved year-round food security	60% of respondents reported food insecurity in the preceding 12 months	26% of respondents reported food insecurity in the preceding 12 months	Reduction to 40% **Assessment:** Comparisons with baseline not possible as baseline did not use FIES

[8] The FCS score was used to generate this data. The FCS does not include Legumes.

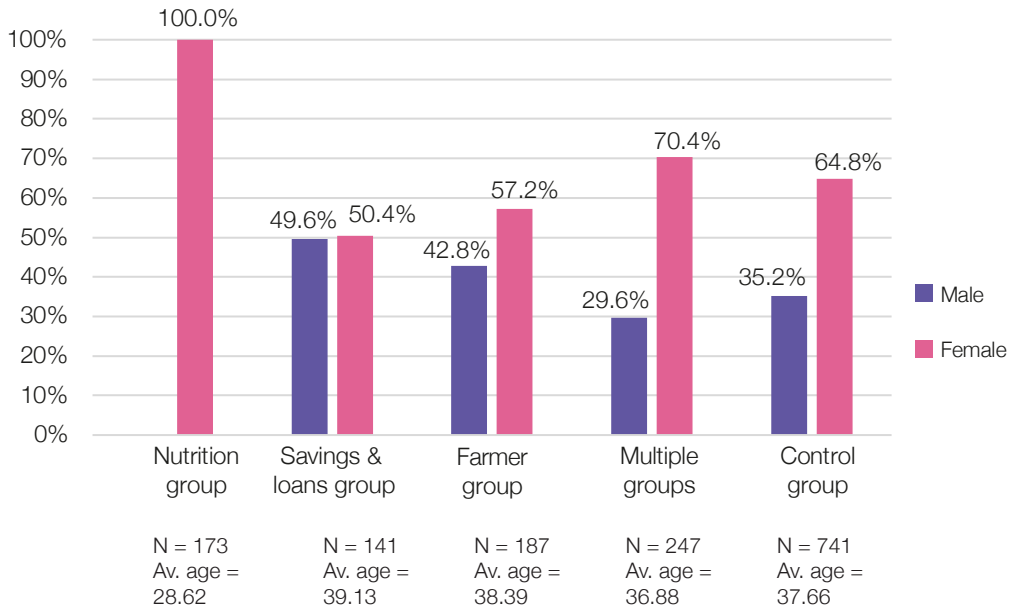
Indicator	Baseline	Midline	Yr 5 target/ assessment
KEQ 2- To what extent has TOMAK contributed to household consumption of more nutritious food?			
Proportion of WRA that report having greater decision-making power and satisfaction in regard to household decision making, especially household food production, consumption and related expenditure	• 80% WRA reported having decision-making responsibility for which food would be purchased for family consumption • 69% WRA reported having decision-making responsibility for which animals would be raised on the farm • 42% WRA reported having decision-making responsibility for which crops would be eaten or sold • 42% WRA rated their satisfaction with decision-making responsibilities as 3/5 and 54% gave a rating of 4/5	• 98% WRA reported having decision-making responsibility for which protein rich food would be purchased for family consumption • 84% WRA reported having decision-making responsibility for which animals would be raised on the farm • 87% WRA reported having decision-making responsibility for which crops would be eaten or sold • 96% WRA rated their satisfaction with decision-making responsibilities (purchase of protein rich food + livestock raising) as satisfied or very satisfied	15% increase on the baseline average score of the 4 questions together **Assessment:** Comparisons with baseline not possible as questions were asked differently between studies
Proportion of WRA with improved dietary diversity score (MDD-W)	AVERAGE: 16% WRA reach MDD-W • Baucau: 15% • Viqueque: 16% • Bobonaro: 19%	49% of WRA reach the MDD-W	25% **Assessment:** Reached
Proportion of children between 6-23 months of age with improved minimum acceptable diet score (MAD)	• 7% of breastfed children aged 6-8 months reach MAD • 17% of breastfed children aged 9-23 reach MAD • (12% of breastfed children aged 6-23 months reached MAD) • 4% of non-breastfed children aged 6-23 months reach MAD	• 24% of breastfed children aged 6-8 months reach MAD • 46% of breastfed children aged 9-23 reach MAD • (40% of breastfed children aged 6-23 months reach MAD) • 7% of non-breastfed children aged 6-23 months reach MAD	10% 25% N/A 5% **Assessment:** Reached
Proportion of households with improved food consumption score (FCS)	• Average FCS= 43.79 63% have acceptable FCS	• Average FCS = 52.95 86% have acceptable FCS	30%[10] **Assessment:** Improved (target no longer relevant)

[9] The baseline FCS required recalculating and consequently changed from 19% of households having an acceptable diet to 63%. Therefore, the target is no longer relevant.

3.1. Respondent and household demographics

There were 1,489 midline and control survey respondents in total. Respondents were part of a nutrition, S&L, farmer or control group. When respondents participated in two or more types of groups, they were categorised under "multiple groups". The respondents who were part of multiple groups were not counted in the totals for the other three groups. Chart 1 shows the distribution of respondents per group, and distribution of sex per group.

Chart 1: Demographics per group



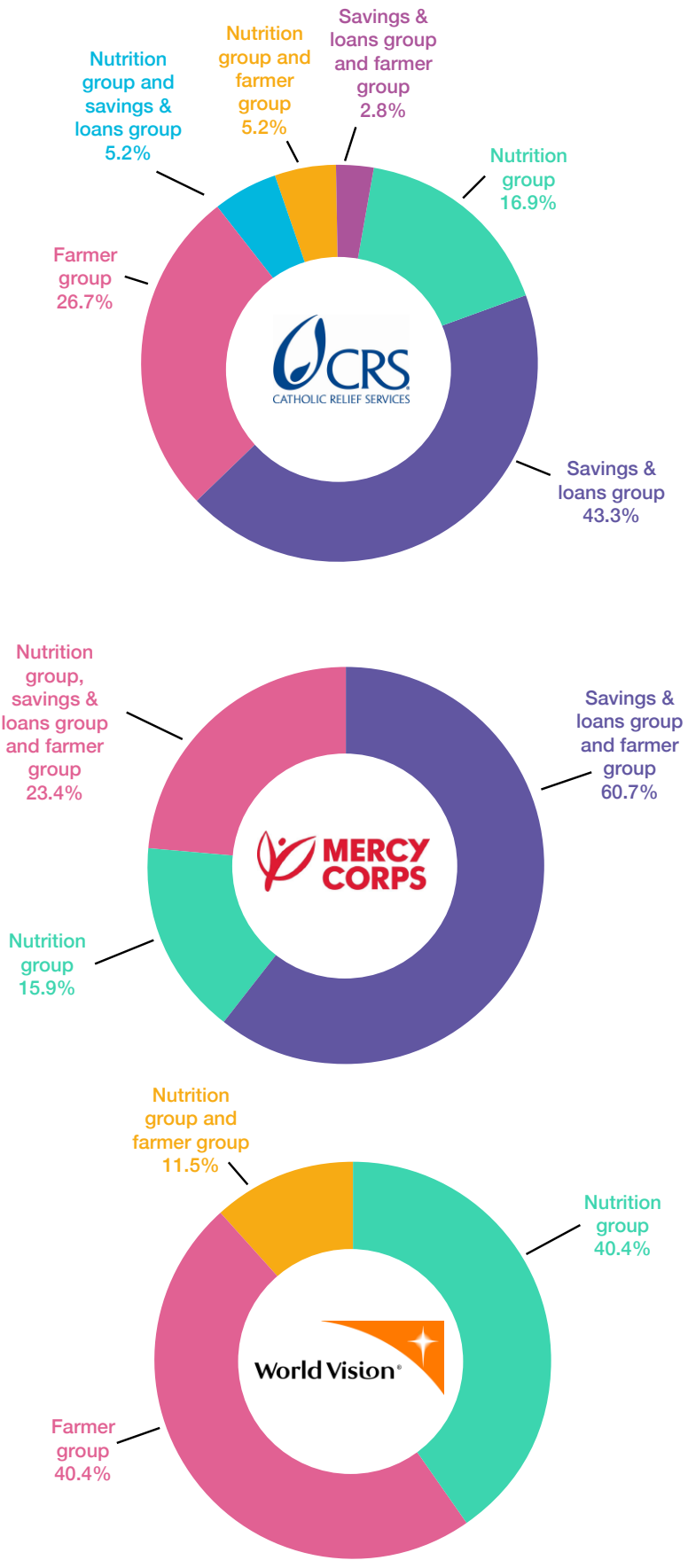
The distribution of men and women per group was significantly different between the groups.[10] In addition, the average age was significantly different between groups.[11] Respondents in the nutrition group were significantly younger compared to the other groups.[12] This is likely due to the sampling criteria that nutrition group respondents must be WRA with a child aged 6-23 months.

Three Lead NGOs are involved in TOMAK programming; CRS, Mercy Corps, and World Vision. For CRS, 16.9% of respondents were part of the nutrition group, 43.3% of the S&L group, 26.7% of the farmer group, and 13.2% of respondents were part of multiple groups; either of the nutrition and S&L group (2 groups), both the nutrition and farmer group (2 groups), or the S&L group and farmer group (2 groups). For Mercy Corps, S&L groups and farmer groups are the same thing (i.e. the same group performs both functions) (60.7%), while 15.9% of respondents were part of the nutrition group, and 23.4% of respondents were part of multiple groups.

For World Vision, 40.4% of respondents were part of the nutrition group, 48.1% were part of the farmer group, and 11.5% were part of multiple groups. World Vision did not have an S&L group. Respondents that were part of multiple groups were all part of both the nutrition and farmer group. The distribution of respondents per group for each NGO can be seen in Chart 2.

[10] X^2 (4, N = 1489) = 114.67, $p < .001$
[11] As Levene's test for homogeneity of variance was significant, a Welch test was performed, Welch's $F(4,476.06) = 64.14$, $p < .001$. As the variances were unequal, a Games-Howell post-hoc test was performed.
[12] $p < .001$ for every comparison between the nutrition group and one of the other groups.

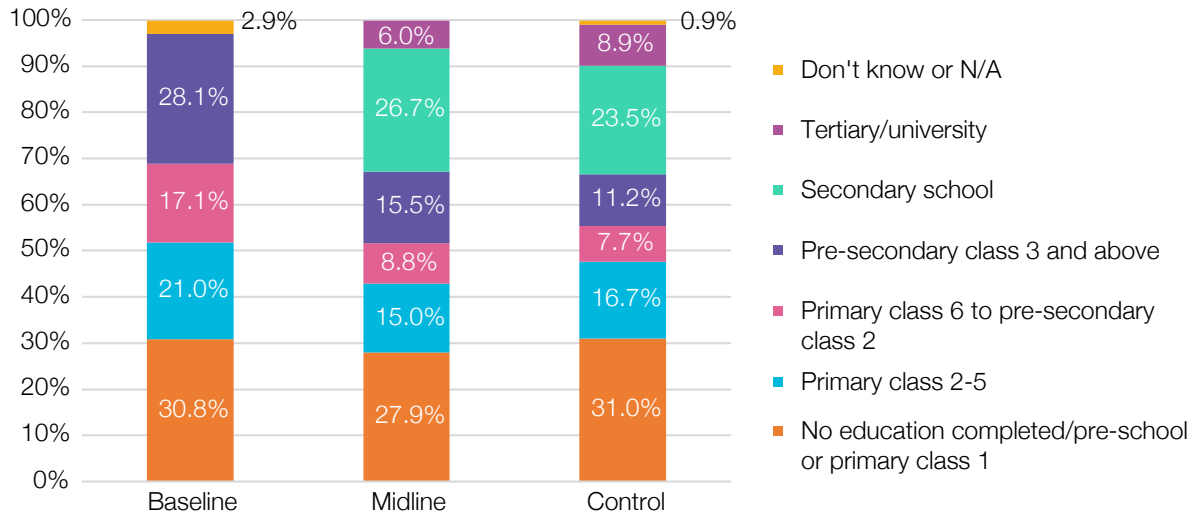
Chart 2: Distribution of respondents per group, for each NGO



For both midline and baseline, almost all the household heads were male. For the baseline, 99.2% of household heads were male and for the midline, 94.1% of household heads were male. The distribution of sex between midline and baseline was significantly different,[13] showing that the midline contained more households with a female head compared to the baseline. Over 90% of respondents were married and almost 35% of the respondents had completed secondary education or higher.

Chart 3 shows the distribution of highest completed education of the household head for midline and baseline. Education of the household head was measured differently in the midline and baseline (education of the respondent was not measured in the baseline). In the baseline the options "no education" and "pre-school or primary school group 1" were grouped together. The highest level of education option in the baseline was "pre-secondary class 3 or above", while the midline also included "secondary education" and "tertiary education/university." Adding up the percentages of pre-secondary class 3 or above, secondary and tertiary education in the midline shows that 48.2% had completed pre-secondary class 3 or above, as opposed to 28.1% in the baseline. Among the control group, 43.6% of the household heads had completed pre-secondary class 3 or above.

Chart 3: Education of household head



The average age of the household head for the nutrition group was 36.16 years, for the S&L group the average age was 45.28 years, for the farmer group 43.81 years, for the participants from multiple groups 42.84 years, and for the control group 42.35 years. The average age of the household head was significantly different between the groups, with household heads in the nutrition group being significantly younger compared to the household heads in the other groups.[14]

The average number of household members for the nutrition group was 7.19, for the S&L group 6.50, for the farmer group 6.80, for the participants from multiple groups 6.67, and for the control group 6.33. The average number of household members per group was significantly different.[15] The

[13] X^2 (1, N = 1228) = 19.84, p < .001.

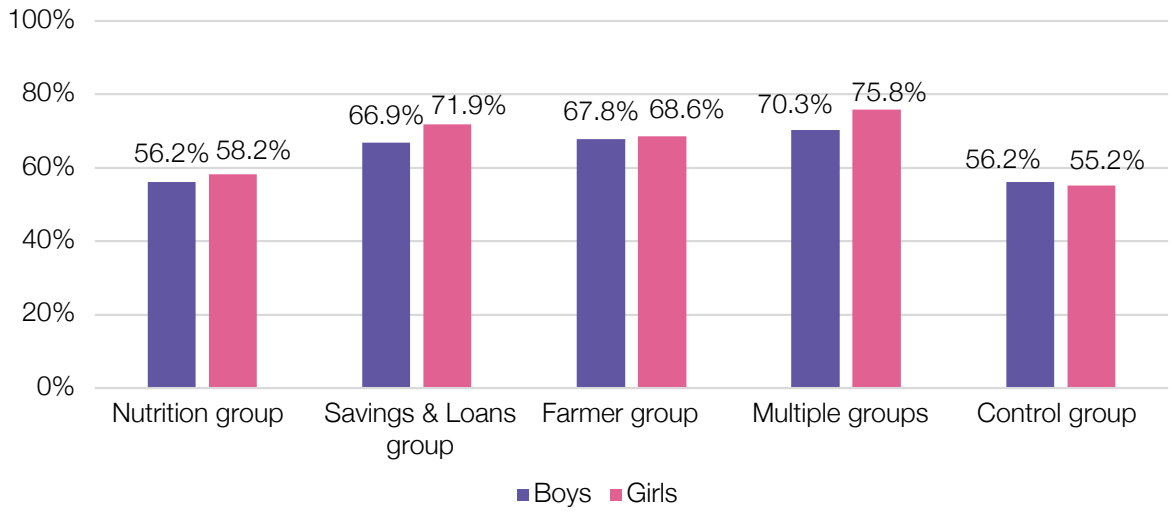
[14] To analyse if the average age of the household head was different between groups, a Welch test was performed (Levene's test for homogeneity of variance was significant), showing a significant difference, Welch's $F(4,456.75) = 15.89$, $p < .001$. A Games-Howell post-hoc test was performed, showing that the respondents in the nutrition group were significantly younger compared to the other groups ($p < .001$ for every comparison between the nutrition group and one of the other groups).

[15] Welch's $F(4,1484) = 4.62$, $p = .001$

average number of household members was significantly lower in the control group compared to the nutrition group[16] and the farmer group.[17] In addition, the average number of household members was significantly higher in the nutrition group compared to the S&L group[18] and the group with respondents that were part of multiple groups.[19]

Chart 4 shows the distribution of children aged between 5 and 17 that were currently attending school, per group. As can be seen, for most groups the percentage of girls attending school was higher than for boys. In the baseline it was asked if all household members aged between 8-17 are currently attending school. Because the answer options were either "yes" or "no", or "no household members aged between 8-17", this variable was not comparable to the midline.

Chart 4: Proportion of children aged 5-17 currently attending school



3.2. Disability

The Washington Group Short Set (WG-SS) on disability was asked to the survey respondents and consists of six questions about experiencing difficulty with seeing, hearing, walking, remembering, self-care, and communicating. Respondents answered to indicate whether they have no difficulty, some difficulty, a lot of difficulty or are not able to do it at all. Of the midline respondents 15.6% experienced difficulty seeing, 2.9% experienced difficulty hearing, 10% experienced difficulty walking, 9.5% experienced difficulty remembering, 1.6% experienced difficulty with self-care, and 0.9% experienced difficulty with communicating. Based on these answers, four disability identifiers were calculated:

- Disability 1: At least one domain/question was coded some difficulty or a lot of difficulty or cannot do at all
- Disability 2: At least two domains/questions were coded some difficulty or any one domain/question was coded a lot of difficulty or cannot do at all
- Disability 3: Any one domain/question was coded a lot of difficulty or cannot do at all
- Disability 4: Any one domain was coded cannot do at all

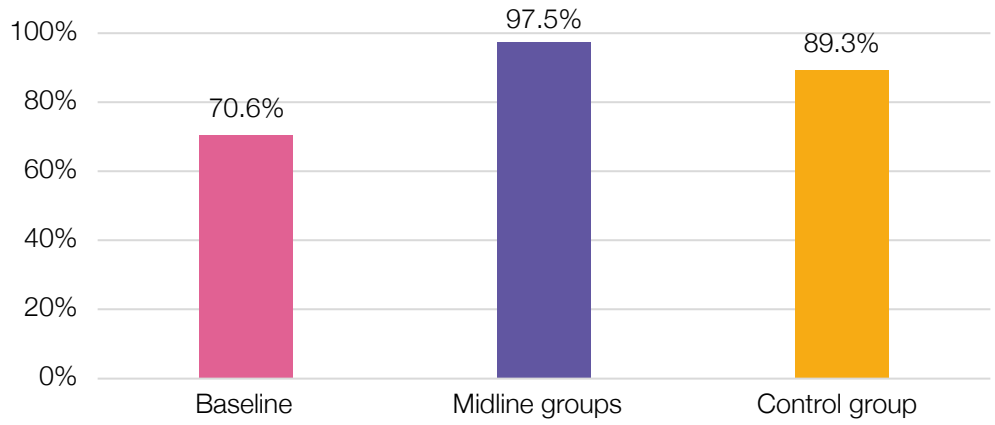
[16] LSD post-hoc test results ($p < .001$)
[17] LSD post-hoc test results ($p = .026$)
[18] LSD post-hoc test results ($p = .018$)
[19] LSD post-hoc test results ($p = .043$)

The disability identifiers define disability in different ways. When using Disability 1 (the least restrictive threshold for identifying disability), 28.1% of midline respondents were identified as having a disability. When defined using Disability 2, 10.3% were identified, and when defined as Disability 3 (a more conservative threshold), 1.6% of respondents were identified as having a disability. There were no respondents indicating that they "cannot do at all" for any of the six questions. Therefore, Disability 4 was not calculated.

3.3. Hygiene

Handwashing with soap was promoted by TOMAK and integrated across community activities. Most respondents mentioned this practice in the FGDs. Chart 5 shows the distribution of households with access to a handwashing station or basin for baseline, midline and control group. There was a significant difference in the distribution of households with access to a handwashing station between baseline and midline.[20] Additionally, there was a significant difference in the distribution of households with access to a handwashing station between the midline and control group.[21] There were more households with access to a handwashing station in the midline compared to the baseline or the control group. The vast majority (93%) of respondents reported using water and soap to wash their hands and 5.2% used water only.

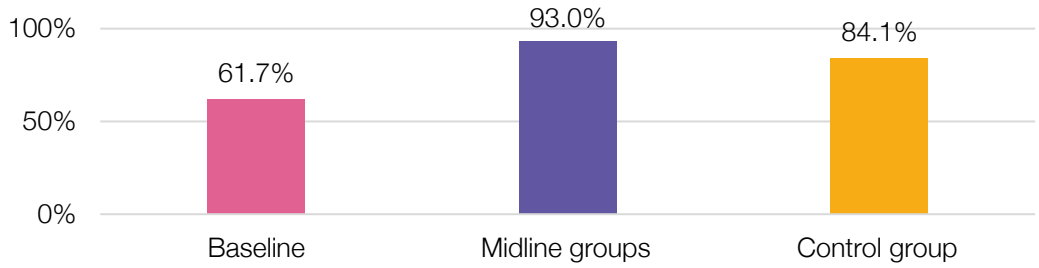
Chart 5: Households with access to a handwashing station or basin



The midline asked about how respondents usually wash their hands and the baseline asked about the availability of soap at the handwashing station in the household. Assuming that when soap is available, it is also used, the practice of washing hands with soap is compared between the midline and baseline, and between midline and control group as can be seen in Chart 6. There was a significant difference in the distribution of people using soap when washing hands between the baseline and midline,[22] as well as between the midline groups and control group.[23] Respondents from the midline used soap to wash their hands more than respondents from the baseline and control group.

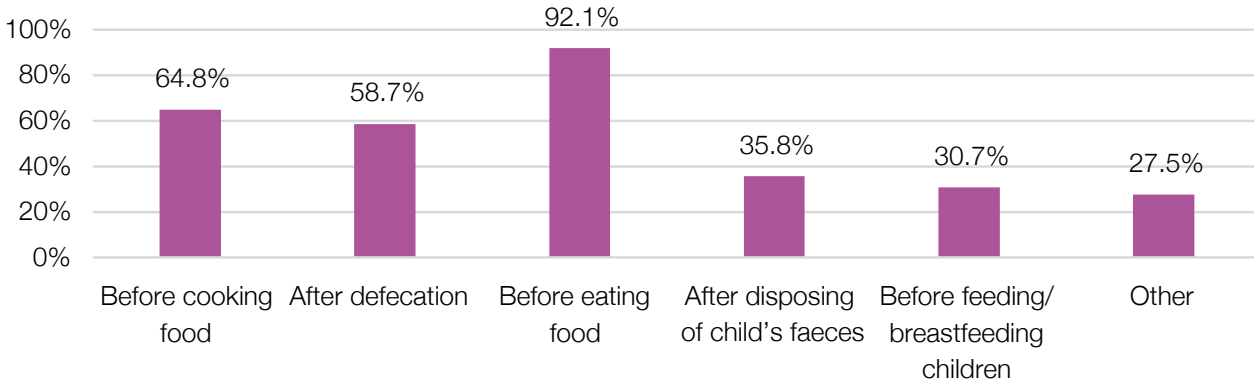
[20] X^2 (1, N = 1228) = 185.80, $p < .001$
[21] X^2 (1, N = 1489) = 39.93, $p < .001$
[22] X^2 (1, N = 1228) = 185.47, $p < .001$
[23] X^2 (1, N = 1489) = 29.63, $p < .001$

Chart 6: Proportion of respondents washing hands with soap



The midline asked when respondents think it is important to wash their hands. Respondents could select multiple answers. These can be seen in Chart 7. Most respondents reported that it is important to wash their hands before eating food (92.1%). However, the percentage of respondents that believe it is important to wash their hands before feeding children was fairly low (30.7%).

Chart 7: Proportion of respondents selecting moments for handwashing



3.4. Land

Respondents were asked about the total land area being cultivated by the household.[24] In the midline this question was measured by asking the exact number of hectares. The average amount of land cultivated by midline respondents was 2.02 hectares, and 3.44 hectares in the control group. However, this difference was not significant. In the baseline survey, respondents chose between different answer options indicating different ranges of land sizes. Therefore, the midline data was recoded into the same categories as the baseline. Chart 8 shows the distribution of land size per household for baseline and midline.[25] There was a significant difference in the distribution of land size between baseline and midline. As can be seen, there were more households in the midline reporting that they own one or more hectare than in the baseline.

[24] To support more accurate responses to this question, the question was prefaced by checking whether or not the respondent knew how many hectares of land their household cultivates. If the respondent knew their land size, the number of hectares was then asked. 34.4% of midline respondents knew how much land their household cultivates versus 35.0% for the control group.
[25] X^2 (4, N = 731) = 170.11, $p < .001$

Chart 8: Land size under cultivation per household

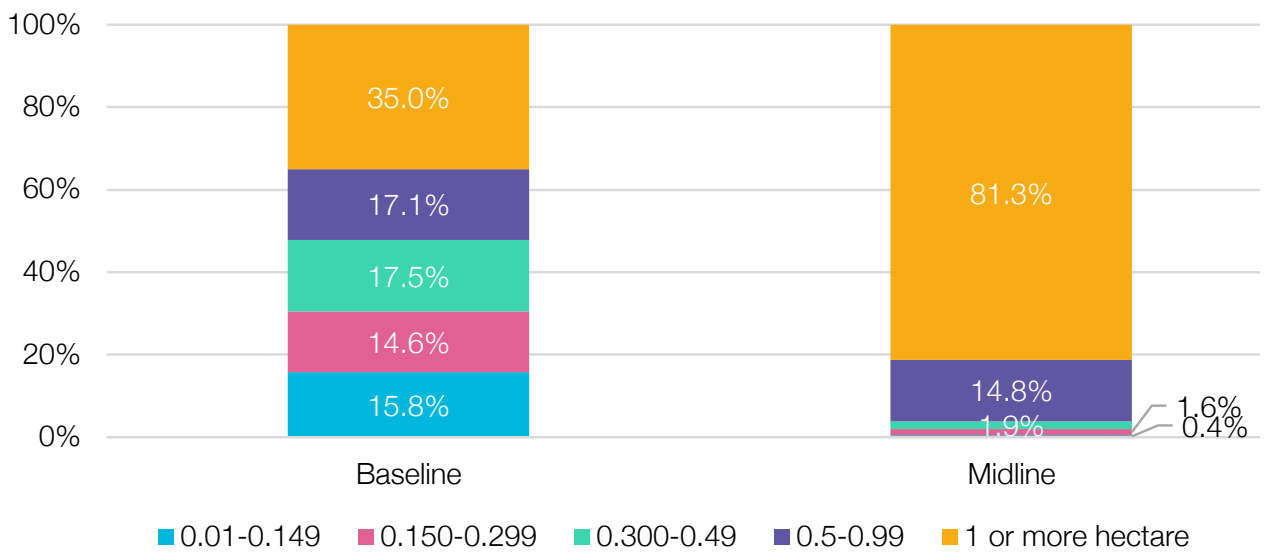
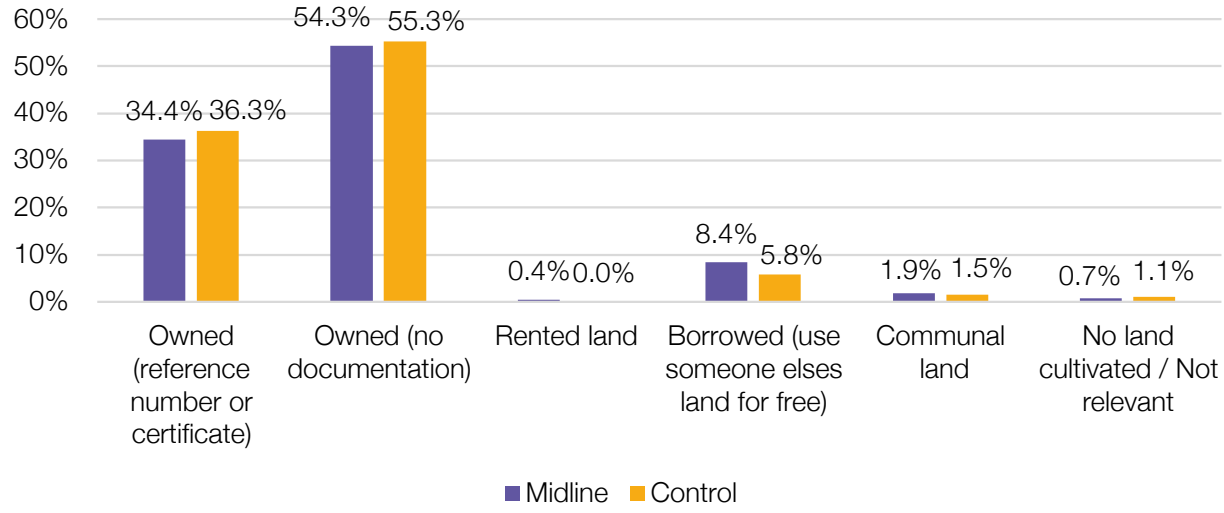


Chart 9 shows the distribution of land ownership in the midline and control group. Several households had multiple ownership statuses for different parts of land they own. There was no significant difference between the distribution of land ownership between both midline and control groups.

Chart 9: Land ownership status for midline and control



For land ownership, the answer options in midline and baseline were not the same. Therefore, the baseline answer options were recoded to fit the midline answer options. The distribution of land ownership status for midline and baseline were significantly different.[26] However, as the midline allowed for multiple answer options (for different parts of land that the family owns) and in the baseline, respondents could only choose one answer option, for reasons of analysis, the first answer that was given is counted in the comparison with the baseline. In addition, the answer option "Owned (no

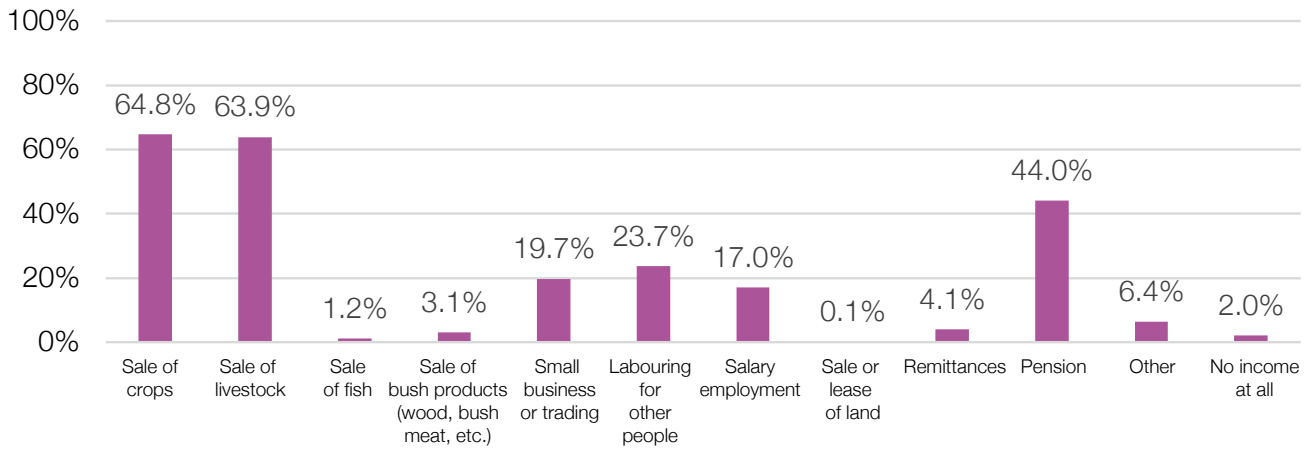
[26] X^2 (5, N = 1228) = 410.08, $p < .001$.

documentation)" was not available in the baseline answer options, while this option was selected the most among the midline respondents. Both of these issues indicate that this result and the differences between baseline and midline should be interpreted with caution.

3.5. Income sources

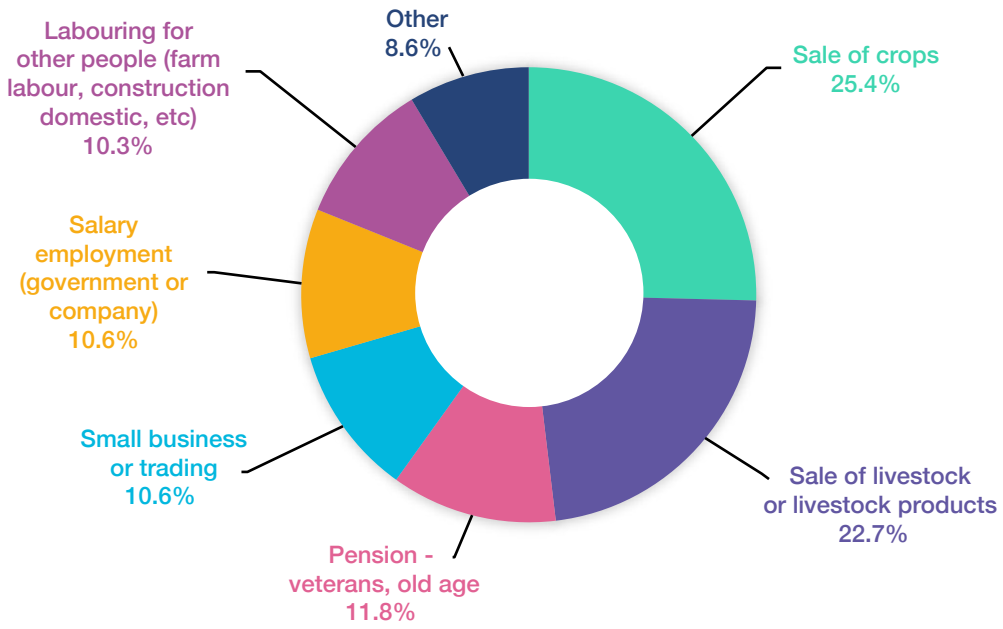
In the midline, the question was asked if anyone in the household received any income from several income source options. The proportion of household members who received income from these income source options can be seen in Chart 10.

Chart 10: Sources that contribute to household income



The respondents were then asked was what the biggest source of household income was. An overview of the biggest income sources can be seen in Chart 11. Income from sale of crops and sale of livestock or livestock products together accounted for almost 50% of the respondents' biggest income sources.

Chart 11: Distribution of biggest income sources



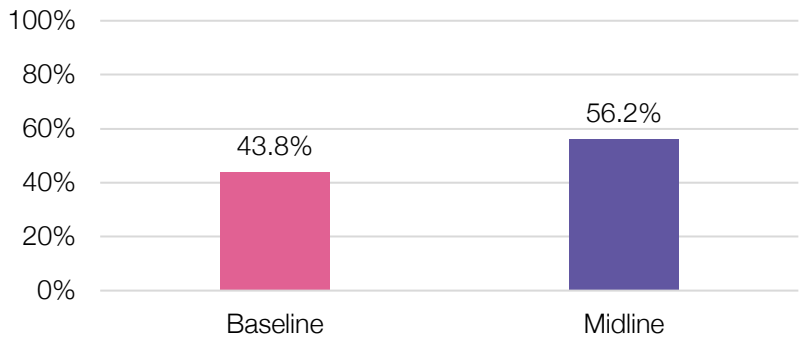
It was calculated how many different income sources households receive income from. Households in the midline received income from an average 2.48 income sources. The distribution of number of income sources per household can be found in Table 5. The average number of income sources per group was significantly different.[27] The average number of income sources was significantly higher among respondents who are part of multiple groups, compared to the S&L group,[28] compared to the farmer group,[29] and compared to the control group.[30]

Table 5: Distribution of number of income sources per household

Number of income sources	Distribution
0 income sources or ≥ 5 income sources	5.0%
1 income source	19.0%
2 income sources	30.7%
3 income sources	30.9%
4 income sources	14.4%

Income source in the baseline was measured by asking what the main occupation of the male head/spouse in the household was. The answer options were 1) No male head/spouse, 2) Agriculture and animal husbandry, forestry, fishing, or hunting, 3) Does not work, or 4) Other. As the agriculture and livestock option from the midline was the only one comparable to the baseline, a dichotomous variable was constructed for both midline and baseline indicating whether or not the household had any income from agriculture and livestock, but other comparisons could not be made. A distribution of this variable for midline and baseline can be seen in Chart 12.

Chart 12: Income from agriculture and livestock



The distribution of income from agriculture or livestock was significantly different between midline and baseline;[31] more respondents in the midline worked in agriculture and livestock compared to the baseline. In the FGDs, most respondents said that their situation had improved in terms of income, mostly from agriculture.

[27] *Welch's F(4,1484) = 12.00, p = .043.*
[28] LSD post-hoc test results (p = .030)
[29] LSD post-hoc test results (p = .026)
[30] LSD post-hoc test results (p = .007)
[31] X^2 (1, N = 1214) = 31.05, p < .001

Most groups reported using improved farming techniques and noted that this had good results in terms of increased production; two out of 19 FGD groups admitted that while they knew about improved practices, they were still using traditional techniques like they had always done. Most respondents had been able to increase their production and hence their income from agriculture, either through group work (as a result of task distribution and lower cost), and/or by using improved agricultural techniques, or because they were able to buy inputs (e.g. better seeds or a hand pump) through S&L activities. As a result, they had more crops for household consumption and a number of respondents noted that they were able to sell more and increase their income. In one of the female S&L groups, the members, who had not been engaged in vegetable production before, bought seeds with their collective savings, and with training support were able to successfully generate an income stream. Most respondents expected the benefits to continue after the project has finished. Some observed that their investments in productive assets, notably water pumps, would benefit their farmer groups and their households for a long time and help them create a steady income. Some groups also found that through S&L group activities they had acquired knowledge about financial management, which could enable them to set money aside to invest in replacing assets as needed.

3.6. Crop production, sales and storage

Promotion of nutritious crops is a key component of TOMAK farmer group activities. FGD respondents indicated that through access to finance and/or having more and more nutritious food produced by better agricultural techniques and training, there was more nutritious food available at household level.

> ***"If we compare our situation with the last three years, now it is far better because each week, we can actively look for money to put it in the safe."***
>
> Male farmer group,
> Mercy Corps area

FGD participants stated that in addition to nutrition topics, farmer groups were trained on improved agricultural techniques such as planting in a line and distance techniques, creating raised beds, using organic pesticides, soil improvement, seed selection and preservation and making compost. If the market was not too far away, farmer group members sold their produce together and benefited from lower transport costs and a better bargaining position.

Three farmer groups had bought a hand pump through their collective savings. The majority of farmer group FGD respondents stated that this addressed their biggest priority related to farming – consistent access to water. Lack of water hampers crop production and makes growing vegetables very difficult or sometimes impossible. Setting up irrigation or building a water tank is too expensive for most farmers, and respondents reported that the government is insufficiently organised to solve this problem. As a result, some respondents have to carry water in jerrycans to the field. Erratic rainfall is seen as aggravating the problem. Whereas for men water shortages were viewed mostly as inhibiting crop production, for women there was the additional constraint of having to

> ***"The public water supply is distributed from 8 a.m. to 12 noon, and there is not even enough water for going to the toilet, let alone for growing vegetables."***
>
> Female farmer group,
> Mercy Corps area

walk long distances, sometimes an entire day, to fetch water. Only one group said that water access was not a challenge for them because there had been an externally funded intervention in their community to canalise water.

> ***"When we work individually there is less motivation; through groups, work becomes lighter, we help each other, reduce working hours, and alleviate the work burden."***
>
> Male farmer group,
> World Vision area

Another challenge identified through the FGDs, is that farmers do not always manage to sell their produce before it spoils. As the harvest takes place at the same point in time for many farmers, it is not always easy to sell. If the nearest market is far away, farmers have to sell the produce in their local community or along the roadside. One group shared that they would like to sell to buyers in Dili, but that the transport cost would eat up their profit.

Farmers also mentioned additional challenges such as lack of equipment meaning that they have to do all of the work manually, because all they have are machetes and hoes. Pests and diseases are frequent, and quality seeds scarce and expensive.[32]

The midline survey asked what the household's most important and second most important crop was. The responses provided align crop importance with food staples for the household. Table 6 provides an overview for the most important crops for the midline and control group. As can be seen, white rice and maize were considered important crops for both groups.

Table 6: Most important crops (reported by proportion of respondents)

No	Midline		Control	
	Crops	%	Crops	%
1	White rice	45.1	Maize	39.8
2	Maize	29.7	White rice	26.3
3	Red rice	6.7	Red rice	6.9
4	Mustard	2.8	Beans - Kidney beans / red beans	5.8
5	Not applicable	2.4	Bok choy	2.8

For crop production and crop sales, the midline survey had 52 different crop options that respondents could select. The 52 different crops used in the midline can be grouped into five food groups: carbohydrates, legumes, vegetables, fruits and spices. Table 7 shows the average number of crops and food groups produced by the households, per group. Households in the midline produced significantly more crops compared to the control group.[33] The average number of crops produced per household was significantly different between the groups.[34] The households in the farmer group produced significantly more crops per household compared to the S&L group,[35] compared to respondents from multiple groups,[36] and compared to the control group.[37] In addition, respondents

[32] The FGDs did not reveal which seeds were expensive considering that MAF subsidises rice, maize, peanut seeds.
[33] Welch's $F(1,1477.22) = 31.42$, $p < .001$
[34] Welch's $F(4,443.01) = 10.11$, $p < .001$.
[35] Games-Howell post-hoc test ($p = .001$)
[36] Games-Howell post-hoc test ($p = .001$)
[37] Games-Howell post-hoc test ($p < .001$)

who were part of multiple groups produced significantly more crops per household compared to the control group.[38]

Table 7: Average number of crops and food groups produced

Group type	Total no. of crops produced	Total no. of food groups produced
Farmer group	13.19	3.78
Nutrition group	11.10	3.53
Multiple groups	10.92	3.47
Savings & loans group	10.63	3.36
Total midline (exc. control)	11.47	3.54
Control group	9.41	3.34

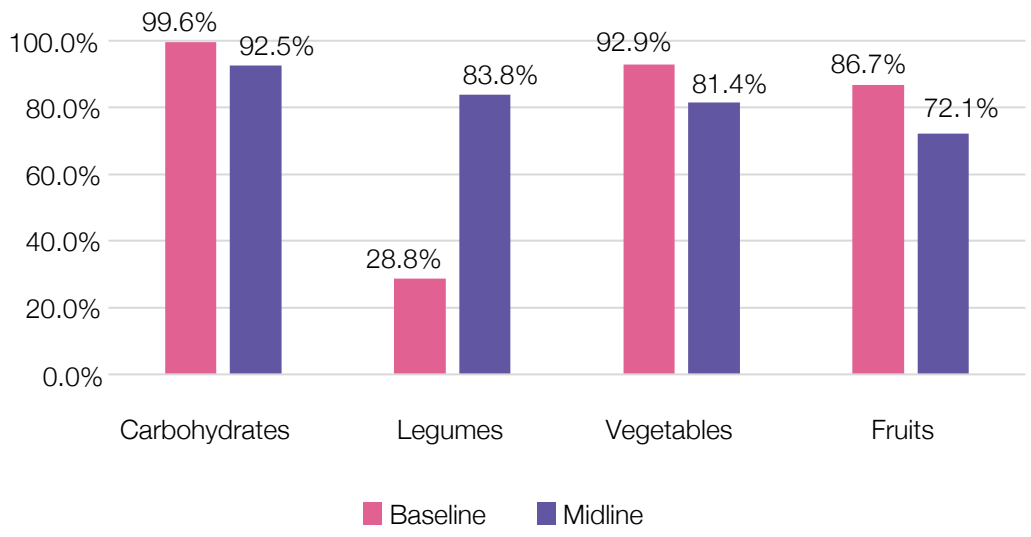
Households in the midline also produced significantly more food groups compared to the control group.[39] The average number of food groups produced per household was significantly different per group.[40] Results show that the average number of food groups produced per household was significantly higher in the farmer group compared to every other group.[41]

In the baseline, there were eight answer options for crop production with each answer option consisting of multiple crops in the same food group, such as "maize, rice, sorghum, other cereal." Therefore, the average number of crops produced could not be established for the baseline data. The baseline answer options were however recoded into carbohydrates, legumes, vegetables and fruits to make a comparison with the midline. Spices were not part of the answer options in the baseline and were therefore left out of this comparison.

Chart 13 shows the distribution of crops produced by households in both midline and baseline. There was a significant difference in the distribution of households producing crops between midline and baseline for every group of crops.[42] It can be seen that the proportion of households producing legumes is significantly higher in the midline than in the baseline, while the proportion of households producing carbohydrates, vegetables and fruits is significantly higher in the baseline than the midline.

[38] Games-Howell post-hoc test ($p = .004$)
[39] Welch's $F(1,1480) = 10.57$, $p = .001$.
[40] Welch's $F(4,1477) = 5.61$, $p < .001$.
[41] LSD post-hoc test: compared to the nutrition group (p = .050), compared to the S&L group (p = .001), compared to respondents from multiple groups ($p = .008$), and compared to the control group ($p < .001$).
[42] Carbohydrates, X^2 (1, N = 988) = 16.71, $p < .001$, legumes, X^2 (1, N = 988) = 264.71, $p < .001$, vegetables, X^2 (1, N = 988) = 18.08, $p < .001$, and fruits, X^2 (1, N = 988) = 21.02, $p < .001$.

Chart 13: Proportion of households that produced various types of crops



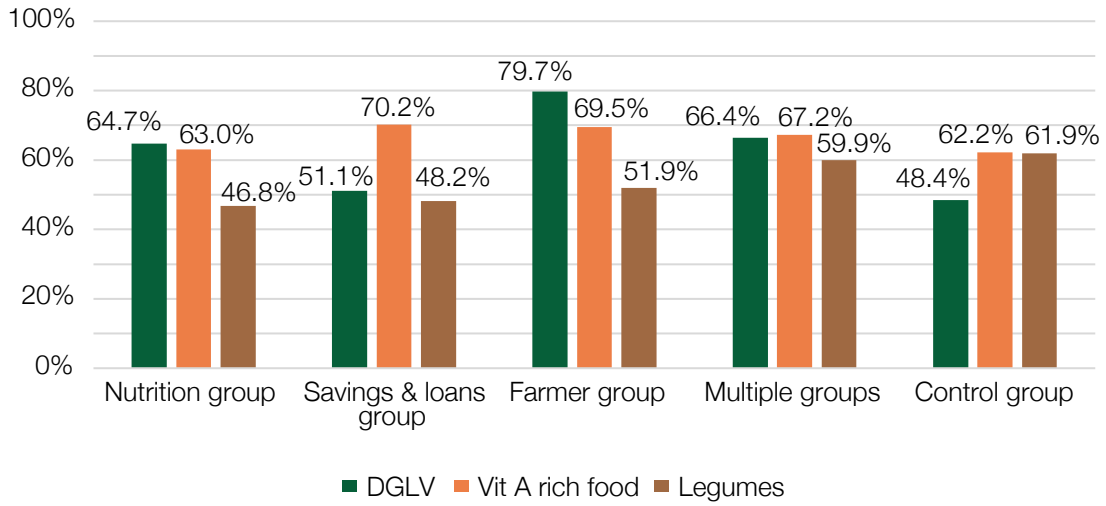
Partner NGOs and MAF agriculture extension workers (through TOMAK support) are promoting production of DGLV, legumes and Vitamin A rich foods in their production activities. To further examine production of these three types of crops, three variables were constructed as follows:

- DGLV (mustard greens, bok choy, kangkung, amaranth, and watercress)
- Vitamin A rich foods (pumpkin and orange fleshed sweet potato)
- Legumes (black bean, kidney bean, mung bean, soybean, and peanut)

Of the midline households, 66.4% produce DGLV (vs. 48.4% in the control group), 67.4% produce Vitamin A rich foods (vs. 62.2% in the control group), and 52.7% produce legumes[43] (vs. 61.9% in the control group). Significantly more households at midline produced DGLV[44] and Vitamin A rich foods[45] compared to the control group, but the control group produced significantly more legumes.[46] Chart 14 shows the distribution in production of DGLV, Vitamin A rich foods, and legumes per group. There was a significant difference in the distribution of DGLV production between the groups.[47] The farmer group had the highest percentage of DGLV produced. There was no significant difference in the distribution of producing Vitamin A rich foods between the groups, although the percentage of respondents producing these foods was lowest in the control group. There was a significant difference in the distribution of legume production between the groups.[48] As can be seen, legumes were reported to be produced more often in the control group.

[43] Note that this is lower than the percentage of midline respondents noted in Chart 13 as producing Legumes, due to the different crops specified for each of these categories.
[44] X^2 (1, N = 1489) = 49.33, $p < .001$.
[45] X^2 (1, N = 1489) = 4.36, $p = .037$.
[46] X^2 (1, N = 1489) = 13.07, $p < .001$
[47] X^2 (4, N = 1489) = 76.58, $p < .001$.
[48] X^2 (4, N = 1489) = 21.98, $p < .001$.

Chart 14: Distribution in production of DGLV, Vitamin A rich foods, and legumes per group



The average number of crops sold[49] and the average number of food groups sold[50] was significantly higher in the midline, compared to the control group. Table 8 shows the average number of crops and food groups that were sold by the households, per group. The average number of crops sold per household was significantly different between groups.[51] A higher production was confirmed in the FGDs, for reasons such as more efficient group work, investment in good seeds and equipment, and training on good agricultural practices. Results show that the households in the control group sold significantly fewer crops per household compared to the farmer group,[52] and compared to respondents of households that were part of multiple groups.[53]

Table 8: Average number of crops and food groups sold

Group	Average no. of crops sold	Average no. of food groups sold
Nutrition group	6.72	2.71
Savings & loans group	6.80	2.50
Farmer group	8.52	2.88
Multiple groups	7.48	2.58
Total midline	7.50	2.69
Control group	6.05	2.51

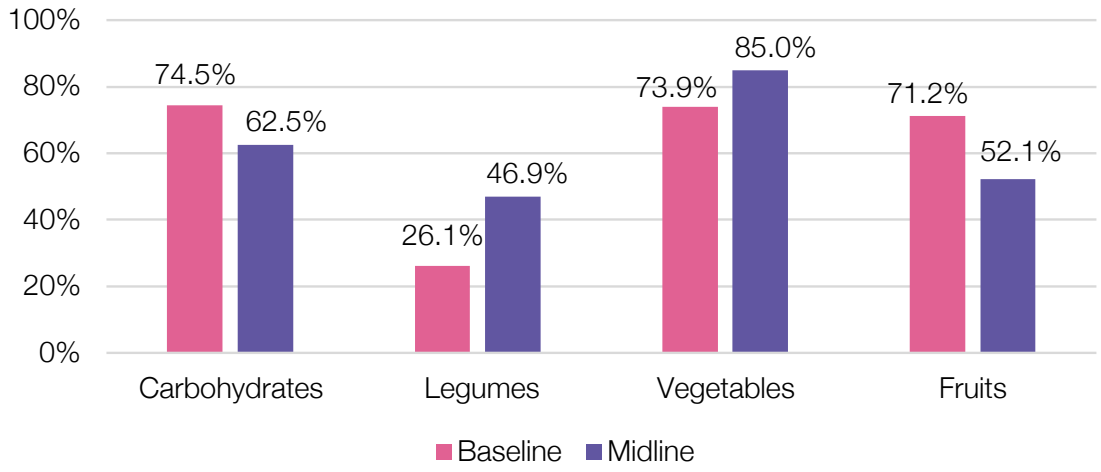
[49] Welch's $F(1,1000.94) = 16.57$, $p < .001$
[50] Welch's $F(1,1025) = 5.43$, $p = .020$.
[51] Welch's $F(4,280.82) = 5.17$, $p < .001$.
[52] Games-Howell post-hoc test ($p = .001$)
[53] Games-Howell post-hoc test ($p = .028$)

The average number of food groups sold per household was also significantly different between the groups.[54] Results show that the average number of food groups sold per household was significantly higher in the farmer group compared to the S&L group,[55] compared to households from multiple groups,[56] and compared to the control group.[57]

The average number of food groups sold per household was also significantly different between the groups.[54] Results show that the average number of food groups sold per household was significantly higher in the farmer group compared to the S&L group,[55] compared to households from multiple groups,[56] and compared to the control group.[57]

There was a significant difference in the distribution of households selling crops between midline and baseline for every group of crops[58] (Chart 15). As can be seen, there were more households in the baseline (compared to the midline) that sold carbohydrates and fruits, but there were more households in the midline (compared to the baseline) that sold legumes and vegetables.

Chart 15: Households that sell crops



In the midline, it was asked which of the harvested crops were stored. Chart 16 shows an overview of the 10 crops that were stored most. For several crops, it was also asked how this crop was stored and how many months of the year this stored crop fed the family. The results for the midline and control group can be seen in Chart 16. Pumpkin is among the crops that were stored most, but data on storage method and storage period was not available for this crop. White rice and red rice were stored for the longest period compared to the other crops.

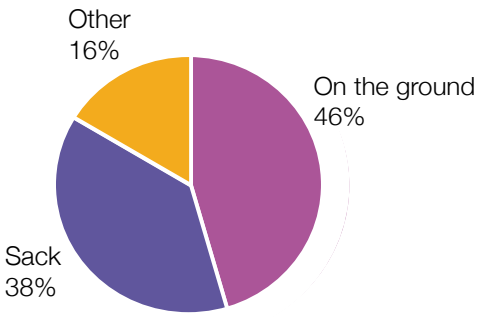
[54] Welch's $F(4,1022) = 3.02$, $p = .017$.
[55] LSD post-hoc test ($p = .030$).
[56] LSD post-hoc test ($p = .032$).
[57] LSD post-hoc test ($p = .001$).
[58] Carbohydrates, X^2 (1, N = 665) = 7.50, $p = .006$, legumes, X^2 (1, N = 665) = 20.77, $p < .001$, vegetables, X^2 (1, N = 665) = 10.02, $p = .002$, and fruits, X^2 (1, N = 665) = 17.48, $p < .001$.

Chart 16: Storage methods and average storage period per crop

a. Midline group

Carbohydrates: Cassava

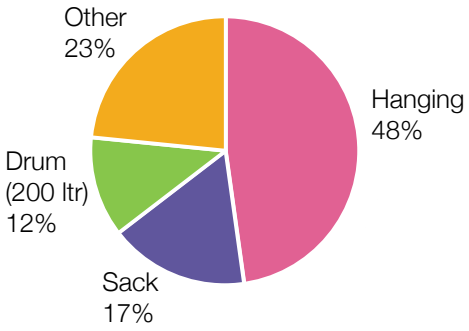
Stored by 11.3% people



Months stored:
4.29

Carbohydrates: Maize / corn

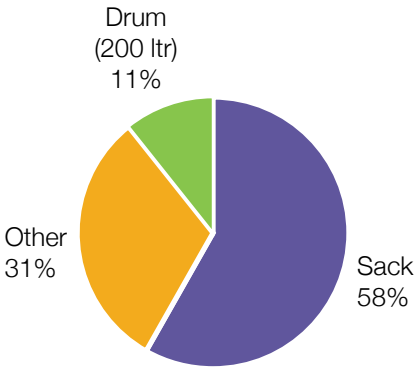
Stored by 89.3% people



Months stored:
6.00

Carboyhdrates: Red rice

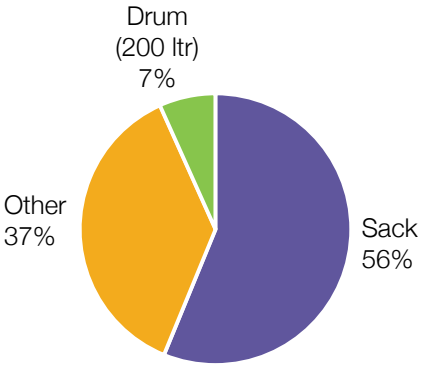
Stored by 17.5% people



Months stored:
7.48

Carbohydrates: White rice

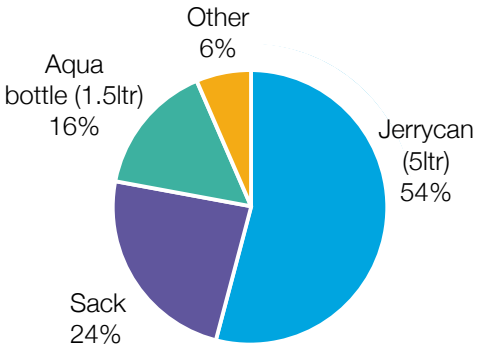
Stored by 59.8% people



Months stored:
7.98

Legumes: Cowpea / black-eyed pea

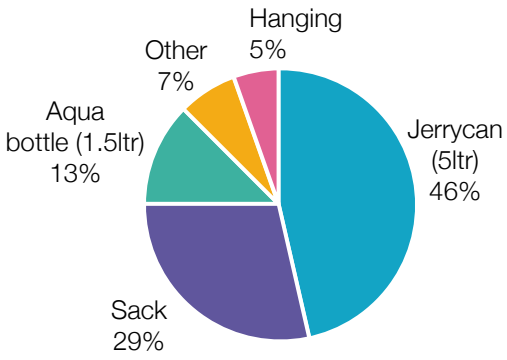
Stored by 17.5% people



Months stored:
3.52

Legumes: Yard bean / snake bean

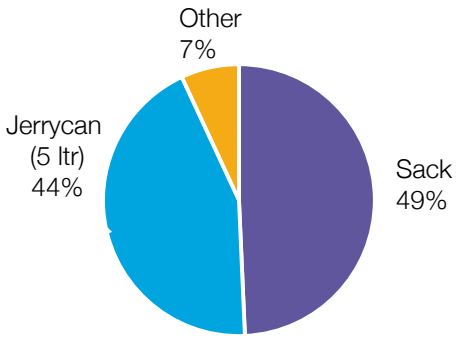
Stored by 8.0% people



Months stored:
3.84

Legumes: Mung beans

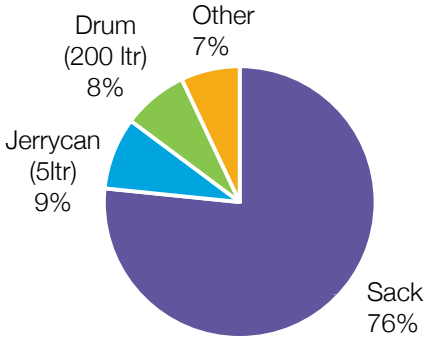
Stored by 10.4% people



Months stored:
3.40

Legumes: Groundnuts / peanuts

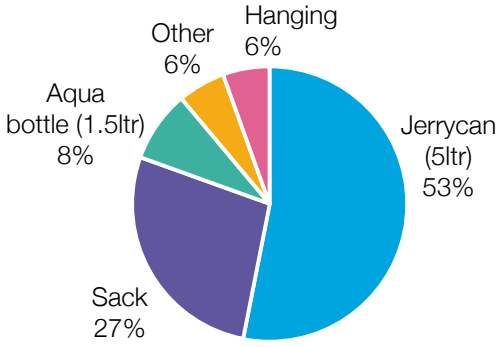
Stored by 18.3% people



Months stored:
3.58

Legumes: Black beans

Stored by 25.6% people

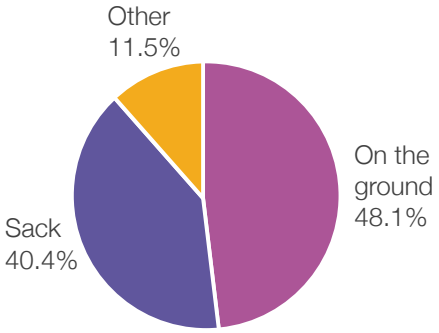


Months stored:
3.16

b. Control group

Carbohydrates: Cassava

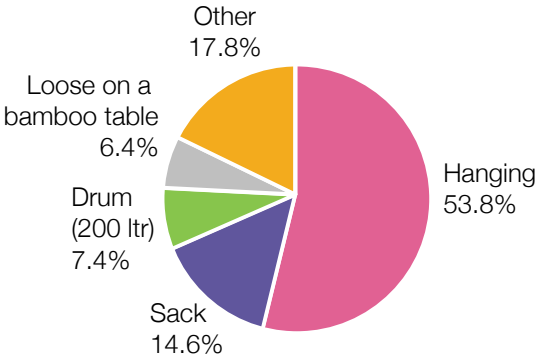
Stored by 7.5% people



Months stored:
4.47

Carbohydrates: Maize / corn

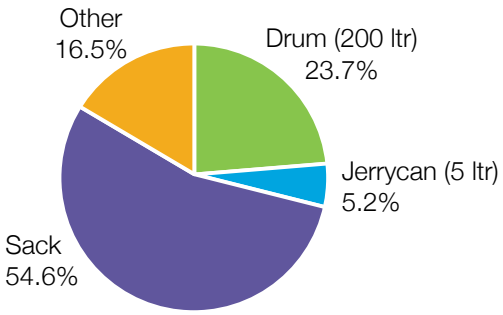
Stored by 87.5% people



Months stored:
5.73

Carbohydrates: Red rice

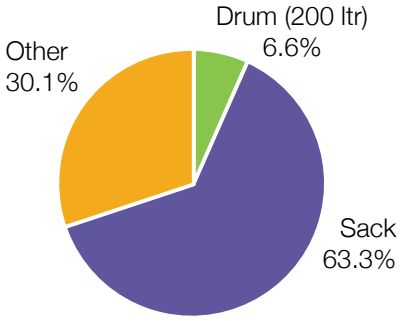
Stored by 13.9% people



Months stored:
6.51

Carbohydrates: White rice

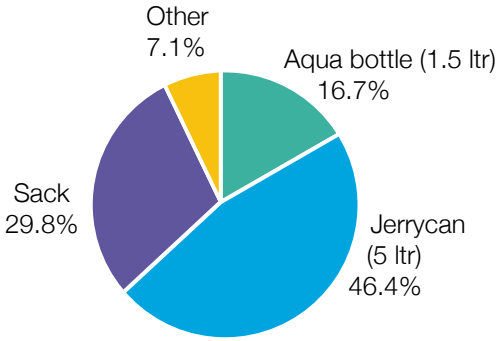
Stored by 37.2% people



Months stored:
7.29

Legumes: Cowpea / black-eyed pea

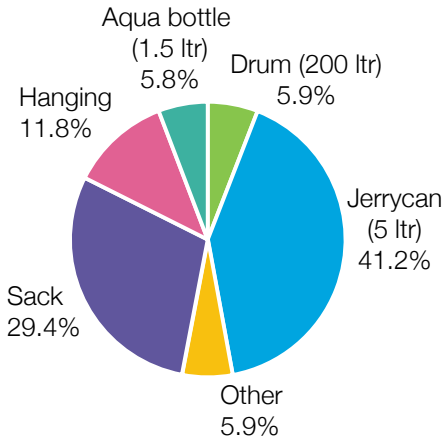
Stored by 12.1% people



Months stored:
2.79

Legumes: Yard beans / snake bean

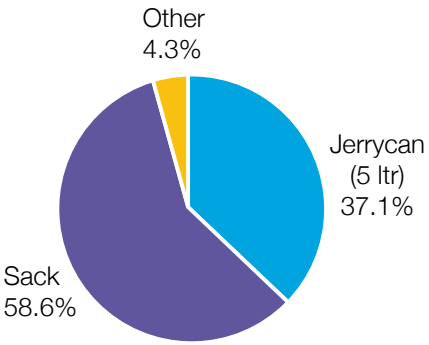
Stored by 4.9% people



Months stored:
2.69

Legumes: Mung beans

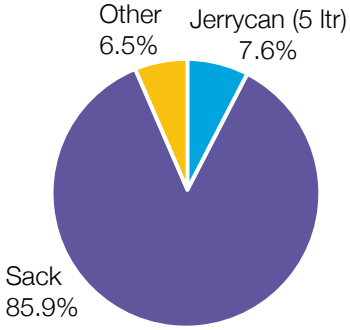
Stored by 16.6% people



Months stored:
2.76

Legumes: Groundnuts / Peanuts

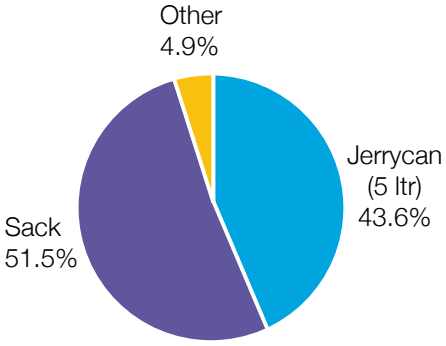
Stored by 28.4% people



Months stored:
2.54

Legumes: Black beans

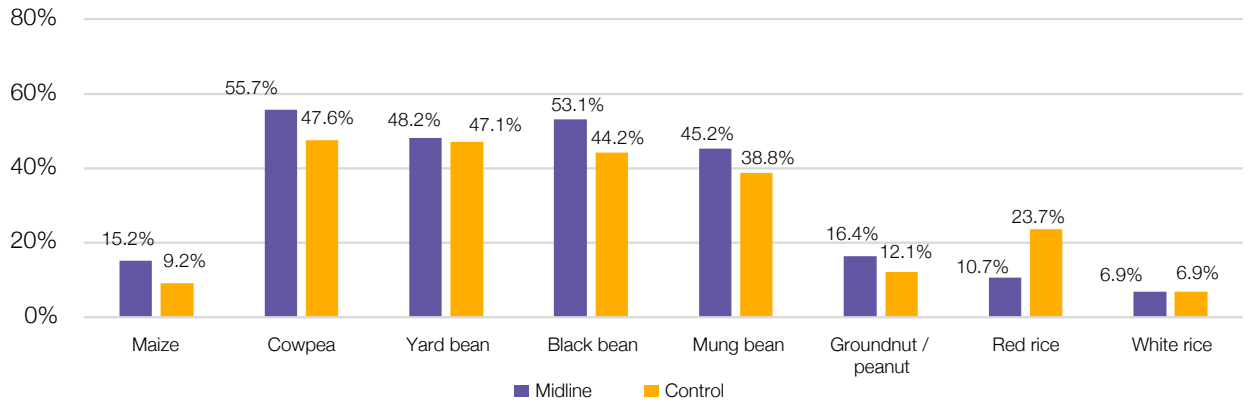
Stored by 23.4% people



Months stored:
2.41

Promoted methods for food storage for all food crops (except for pumpkin and cassava) are drums (including silos) and jerrycans. Partners also promoted sacks but the survey tool did not probe into what type of sack (e.g. regular rice sack versus improved sacks with seals promoted by partners). Therefore, sacks were not included as a preferred storage method. Chart 17 shows the distribution of respondents utilising the promoted storage methods (drum or jerrycan) per crop for the midline and control group.

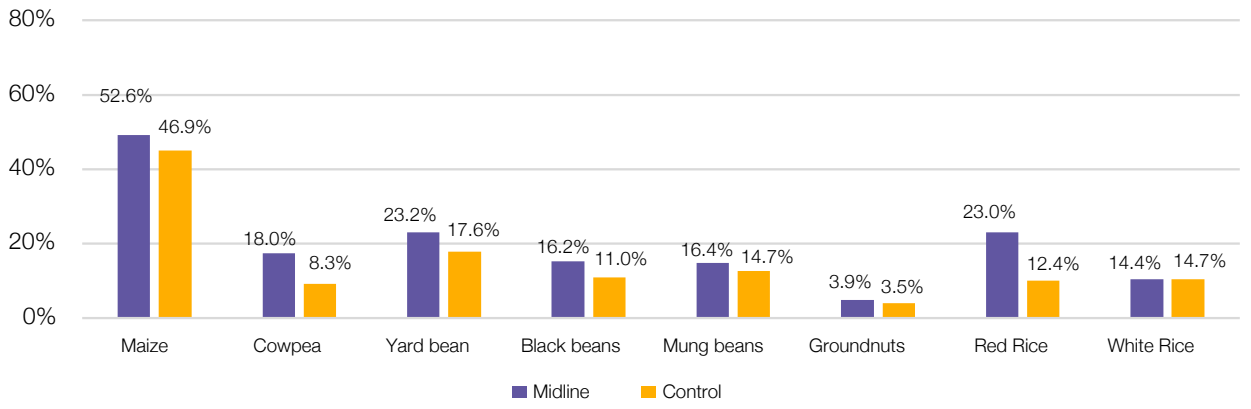
Chart 17: Use of preferred storage methods



There was a significant difference in the distribution of respondents utilising the promoted storage method for maize,[59] with a higher proportion of the midline group utilising the promoted method. There was also a significant difference in the distribution of respondents utilising the promoted storage method for red rice,[60] with a higher proportion of the control group utilising the promoted method compared to the midline. For the other crops, there was no significant difference.

The preferred storage duration for rice and maize is six to 12 months, for beans six to eight months, and for peanuts eight to 10 months. Chart 18 shows the distribution of preferred storage duration per crop, for midline and control group.

Chart 18: Storing for the preferred duration



[59] X^2 (1, N = 1234) = 10.49, p = .001.
[60] X^2 (1, N = 219) = 6.71, p = .010.

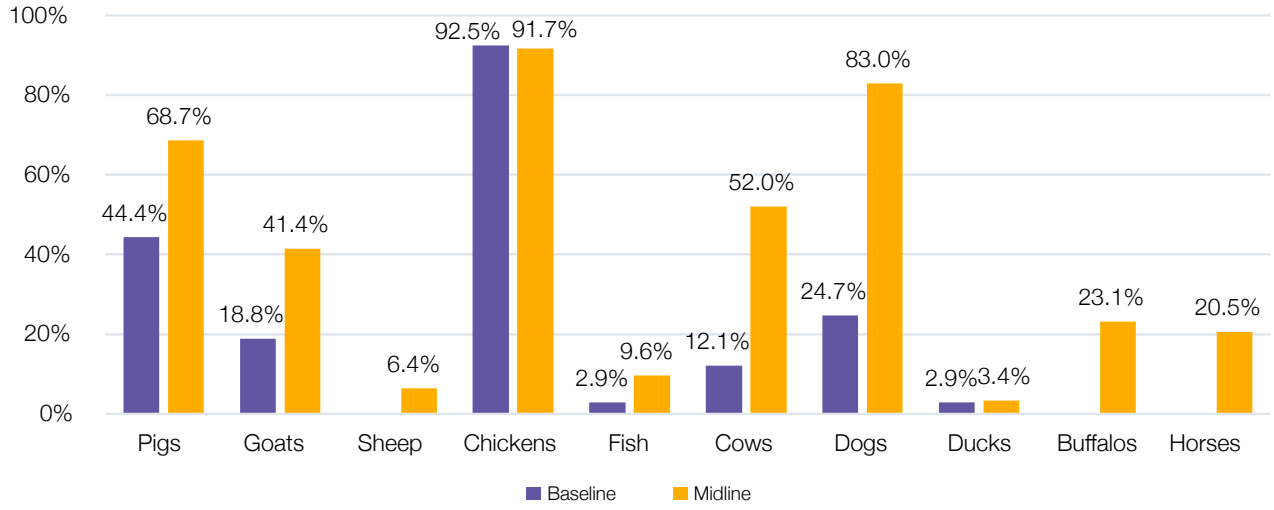
There was a significant difference in the distribution of food storage for the preferred duration for maize,[61] for cowpea,[62] and for red rice.[63] The proportion of midline respondents storing these crops for the preferred duration, was higher compared to the control group.[64] For the other crops, there was no significant difference.

3.7. Livestock assets and animals

In both the midline and the baseline, it was asked if the household raises animals. Of respondents in the baseline, 99.6% raised animals. For the midline groups, this was 98.5% and for the control group 97.7%. There was no significant difference in the proportion of households raising animals between baseline and midline, nor between midline and control group. In addition, there was no significant difference in the distribution of households raising animals between the midline groups.

Chart 19 shows the proportion of households owning different kinds of animals for both midline and baseline. There was a significant difference in the proportion of households that own pigs between the midline and baseline.[65] In addition, there was a significant difference in the proportion of households that owned goats,[66] fish,[67] cows,[68] and dogs.[69] The percentage of households that owned each of those animals was higher in the midline compared to the baseline. The number of households owning sheep, buffalos and horses was not measured in the baseline.

Chart 19: Proportion of people who raise various types of animals



[61] X^2 (1, N = 1234) = 3.98, p = .046.
[62] X^2 (1, N = 206) = 3.87, p = .049.
[63] X^2 (1, N = 219) = 4.05, p = .044.
[64] NB. The question asked in the survey was "How many months of the year does […] feed your family? (0-12 months)" and not how long the family stores the crops.
[65] X^2 (1, N = 976) = 45.59, p < .001
[66] X^2 (1, N = 976) = 39.92, p < .001
[67] X^2 (1, N = 976) = 11.03, p = .001
[68] X^2 (1, N = 976) = 117.39, p < .001
[69] X^2 (1, N = 976) = 286.04, p < .001

The average number of animal species in the household was significantly higher in the midline, compared to the control group.[70] Table 9 shows the average number of animal species in the household per group. The average number of animal species per group was significantly different.[71] Results showed that the average number of animal species in the household was significantly lower among households that were part of multiple groups compared to the S&L group[72] and compared to the farmer group.[73] In addition, the average number of animal species in the household was significantly lower in the nutrition group compared to the farmer group.[74] Lastly, the average number of animal species in the household was significantly lower in the control group compared to the S&L group[75] and compared to the farmer group.[76]

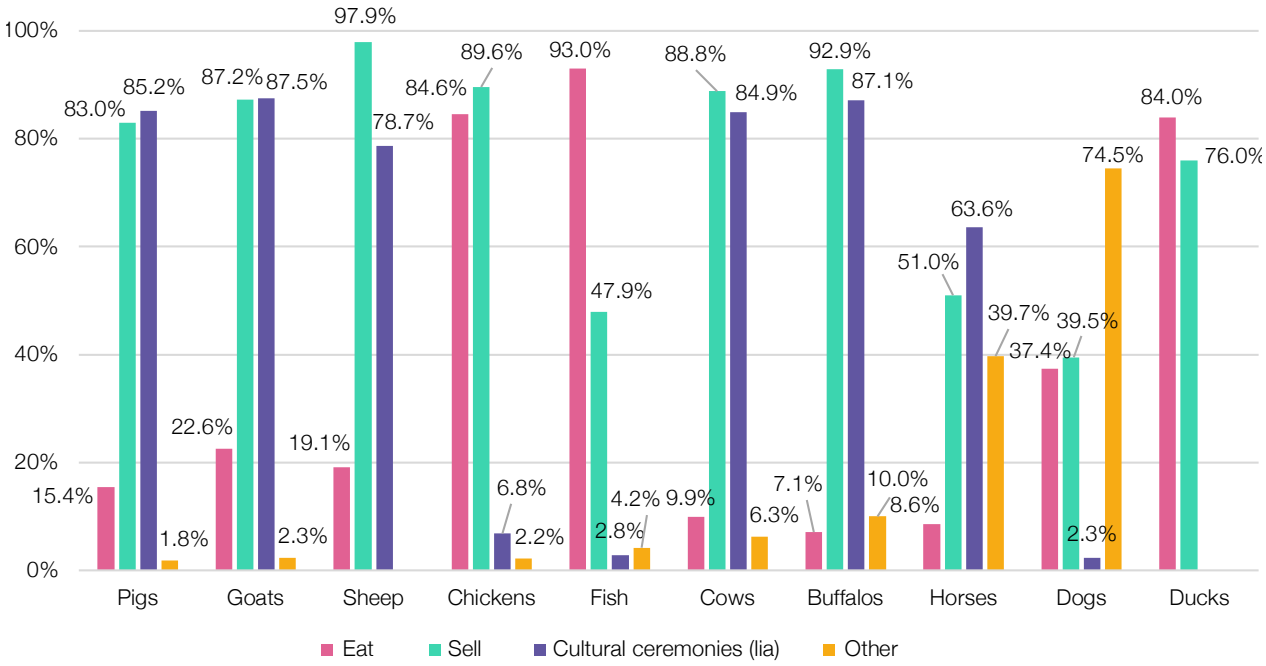
Table 9: Average number of animal species per household group

Group	Average no. of animal species in the household
Nutrition group	3.86
Savings & loans group	4.12
Farmer group	4.42
Multiple groups	3.70
Total midline	4.00
Control group	3.64

In the midline it was asked why the household raises animals; to eat, to sell or for *lia*.[77] Chart 20 shows the distribution of reasons to raise animals, per animal. Animals that were raised to eat were predominantly fish, chickens and ducks. Sheep, buffalos, chickens, cows, goats, pigs, ducks, and to a lesser extent horses and fish, were often raised to sell. Goats, buffalos, pigs, cows, sheep, and to a lesser extent horses, were often raised to use for cultural ceremonies. The 'other' option mainly accounted for protection, work or transportation. Most of the respondents in the FGDs reported that they consumed eggs from their chickens. Nonetheless, in a few nutrition groups, some women mentioned challenges accessing chickens and eggs.

[70] Welch's $F(1,1459) = 21.92$, $p < .001$.
[71] Welch's $F(4,1456) = 12.94$, $p < .001$.
[72] LSD post-hoc test ($p = .006$)
[73] LSD post-hoc test ($p < .001$)
[74] LSD post-hoc test ($p < .001$)
[75] LSD post-hoc test ($p < .001$)
[76] LSD post-hoc test ($p < .001$)
[77] *Lia* refers to cultural ceremonies and practices. It often involves providing an animal for exchange or consumption at a cultural ceremony or event like a wedding or funeral.

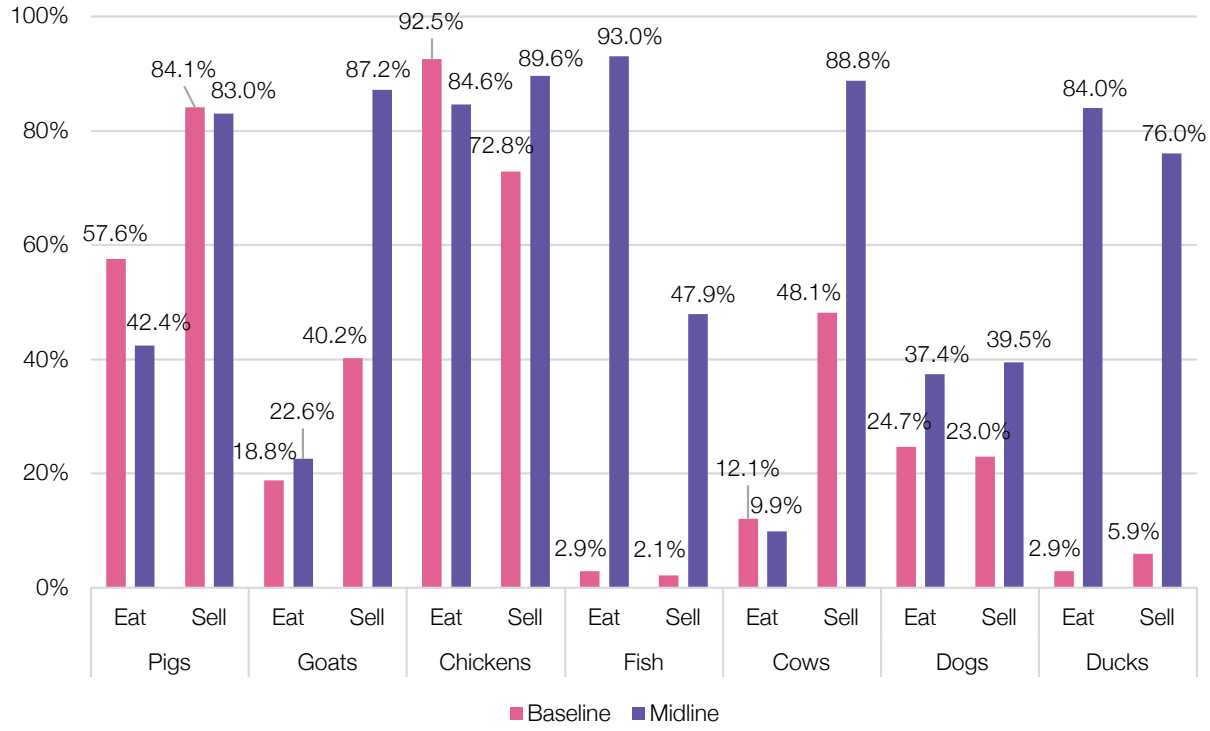
Chart 20: Proportion of respondents reporting various reasons to raise animals



In the baseline it was only asked if animals were raised to eat or to sell. Chart 21 shows the distribution of animals raised to sell or to eat, for midline and baseline. With regard to raising animals to eat, there was a significant difference between baseline and midline for pigs,[78] chickens,[79] fish,[80] dogs,[81] and ducks.[82] The percentage of households that raise pigs and chickens to eat, is higher in the baseline, while the percentage of households that raise fish, dogs and ducks to eat is higher in the midline. When it comes to raising animals to sell, there was a significant difference between baseline and midline for goats,[83] chickens,[84] fish,[85] cows,[86] dogs,[87] and ducks.[88] For each of these animal species, the proportion of households that raised these animals to sell was higher in the midline compared to the baseline.

[78] X^2 (1, N = 745) = 73.08, $p < .001$
[79] X^2 (1, N = 915) = 9.42, $p = .002$
[80] X^2 (1, N = 310) = 246.44, $p < .001$
[81] X^2 (1, N = 851) = 12.45, $p < .001$
[82] X^2 (1, N = 264) = 156.89, $p < .001$
[83] X^2 (1, N = 544) = 133.22, $p < .001$
[84] X^2 (1, N = 915) = 39.82, $p < .001$
[85] X^2 (1, N = 310) = 104.38, $p < .001$
[88] X^2 (1, N = 622) = 123.85, $p < .001$
[87] X^2 (1, N = 851) = 20.67, $p < .001$
[88] X^2 (1, N = 264) = 101.81, $p < .001$

Chart 21: Proportion of respondents raising various types of animals to eat or sell



3.8. Wealth and poverty index

In the baseline, data was collected in order to calculate the Poverty Probability Index. Since the questions and their score weightings are now very outdated, they are unsuitable for the midline and future poverty measurements. The midline included a short selection of questions, based on the most recent Demographic Health Surveys for Timor-Leste, about asset ownership and housing characteristics. From these questions, a new poverty index specific to the TOMAK sample was constructed.

The initial set of questions included:

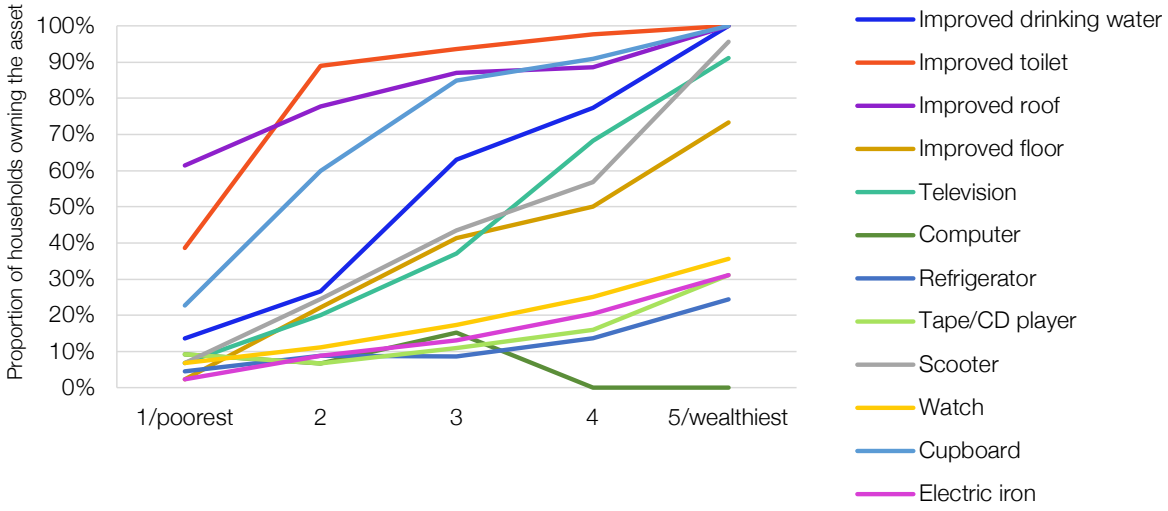
- Three questions about land and livestock
- Eight questions about housing characteristics (e.g. ownership, flooring, material of the floors)
- 23 questions about asset ownership (e.g. radio, refrigerator, television)

In order to select the variables that are capable of distinguishing relatively 'wealthy' households and relatively 'poor' ones, the rule of thumb is that if a variable/asset is owned by more than 95% or less than 5% of the sample, it should be excluded from the analysis. Variables that were removed based on this rule, were house ownership, land ownership, livestock ownership; more than 95% of respondents answered affirmative to these questions. The household assets 'chair' and 'bed' were removed, because more than 95% of respondents are in possession of these assets. 'Sofa', 'sewing machine', 'animal drawn cart', 'car/truck', and 'boat with motor' were removed because less than 5% of respondents own these assets.

In order to create a wealth index, all the variables needed to be coded into binary variables. Items about asset ownership were already coded into binary variables, indicating that the answer options for these questions were 'yes' or 'no'. For items about housing characteristics, however, there were

several answer options. These were recoded into binary variables representing an 'improved' or 'not improved' characteristic. For sanitation facilities and source of water the UNICEF/WHO standards were used. Subsequent to this procedure, several principal component analyses (PCAs) were run to create the wealth index. PCA is a 'data reduction' procedure. It involves replacing many correlated variables with a set of principal uncorrelated 'principal components' which can explain much of the variance and represent unobserved characteristics of the population under study. As a result of this process, the wealth index obtained explained 29.2% of the variance. The variables included can be seen in Chart 22, as well as the proportion of households who owned the household assets and household characteristics included. As can be seen, this chart is divided into quintiles, indicating five equal groups of different wealth distribution, in which the first one is the poorest quintile, and the fifth quintile is the wealthiest. As can be seen, the wealthiest quintile had the highest proportions of households who own the assets included. An exception to this is computers, which were owned more in the middle quintile.

Chart 22: Components of the Wealth Index by quintiles



When comparing the midline respondents with respondents in the control group, results show that there is no significant difference in the average value of the wealth index (see Table 10).

Table 10: Average wealth index and quintile distribution

	Midline	Control
Average Wealth Index value	0.07	0.11
% of HHs in quintiles:		
Q1	19.6%	16.8%
Q2	20.1%	23.1%
Q3	20.1%	22.4%
Q4	20.1%	22.4%
Q5	20.1%	15.4%

When comparing the proportion of control group households with the five wealth index quintiles established for the midline group, it can be seen that the proportion of households that were among the poorest quintile was lower than in the midline. In addition, the proportion of households in the 2nd, 3rd, and 4th quintile was higher than in the midline. Lastly, it can be seen that the proportion of households in the wealthiest quintile was lower than in the midline. However, the distribution of midline and control group was not statistically different. Therefore, it can be concluded that there is no significant difference in wealth distribution between midline and control group.

3.9. Nutrition knowledge

Based on an analysis of FGD results, all respondents could recall some nutrition messages and/or were trained on nutrition, and many of them also enjoyed sharing these learnings with the facilitators. Most of TOMAK's key promoted nutrition behaviours were not only known among the nutrition group members, but also amongst farmer and S&L group members. Some of the nutrition group members were more aware of detailed promoted practices for priority groups such as young children and pregnant women. In some groups, respondents said that TOMAK messages were echoed by health staff at times, during health outreach and mobile clinic activities.

A broad range of messages were recalled by FGD respondents including: increasing the consumption of vegetables (sometimes going into details as to which vegetables), using fresh local food as preferable to canned or processed food, the nutritional needs of pregnant women (though lactating women were not mentioned), as well as breastfeeding and complementary feeding practices for young children. One group mentioned that they no longer gave sugar and sweetened condensed milk to their children. One group was even able to elaborate on anemia.

> ***"We learned about the functions of the foods that we are consuming for our health; previously we did not know, and we just consumed in order to not get hungry."***
>
> Female S&L group,
> Mercy Corps area

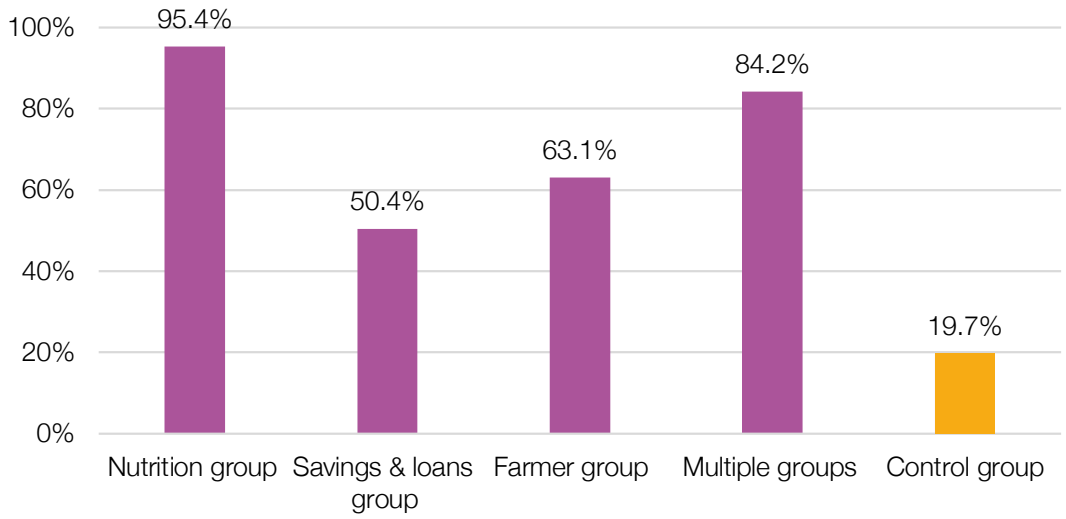
Food items that were mentioned specifically by some of the respondents included tofu and tempeh; these food items did not constitute regular parts of the diet prior to participating in the group. Respondents understood the nutritional value of tofu and tempeh and the affordability, and most respondents reported that they consumed these foods regularly. When it came to meat and fish, only a handful of respondents in the nutrition FGDs were able to use money from surplus vegetable sales to buy them. Many respondents aspired to include meat and fish into their diet, but most of them could not afford it, and meat was not always available.

There were also some challenges to note. In two nutrition groups, even though participants knew about healthy foods, when it came to pregnant women, food taboos still remained. Two groups mentioned that it was difficult to overcome their mother-in-law's resistance to moving away from traditional food habits. In some cases feeding moringa and mung beans had been previously forbidden but was now perceived as healthy food by nutrition group participants (WRA), however consumption was still not encouraged or was even prohibited by mothers-in-law. On the other hand, some respondents acknowledged that their mother-in-law was important in terms of providing help in the household and sometimes providing financial support. Mothers in these two nutrition groups then perceived their role as to try and convince and educate their mother-in-law.

Only one S&L group said they learned nothing from the nutrition training and had not understood the messages, primarily because they were not able to read materials that they had been provided.

In the midline survey, the first question that was asked about nutrition was if respondents had ever heard about the 'three food groups'. Among midline respondents 75.1% were familiar with this concept, as opposed to 19.7% in the control group. This difference was significant.[89] Chart 23 shows the proportion of respondents that answered 'yes' to this question, per group. There is a significant difference in distribution between the groups.[90] Respondents in the nutrition group were more familiar with the concept of the three food groups than any of the other groups. In addition, the proportion of respondents from the control group that had heard of the three food groups, was much lower compared to the other groups.

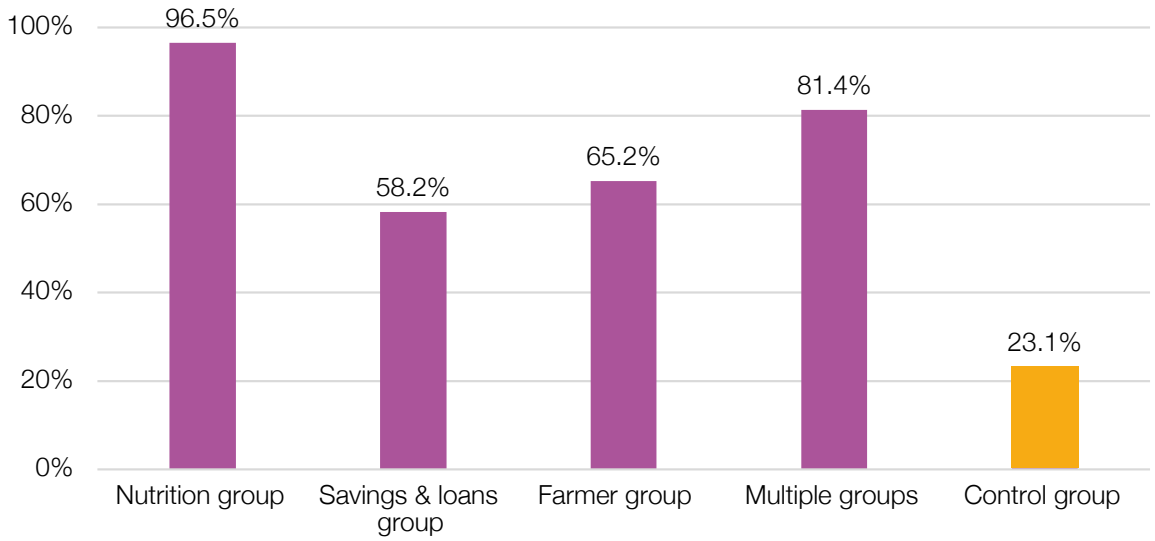
Chart 23: Proportion of respondents per group who had heard of the three food groups



With regard to respondents who received nutrition related information in the last 12 months, there was a significant difference in the distribution of respondents between the groups.[91] More respondents from the TOMAK groups had received nutrition information in the last 12 months compared to the control group (Chart 24).

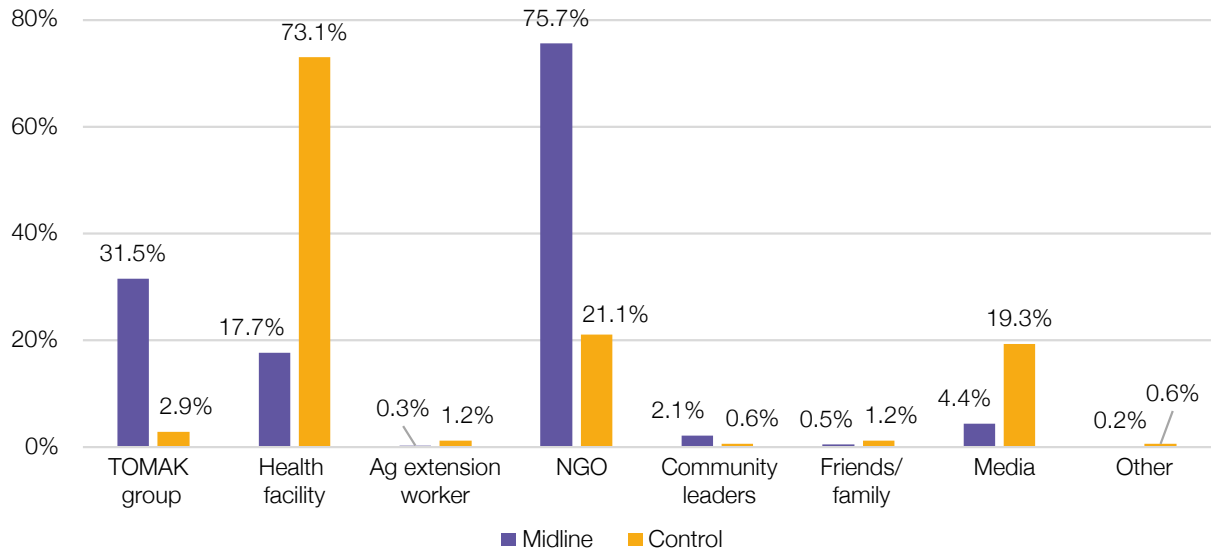
[89] X^2 (1, N = 1489) = 458.60, $p < .001$.
[90] X^2 (4, N = 1489) = 540.75, $p < .001$
[91] X^2 (4, N = 1489) = 483.07, $p < .001$.

Chart 24: Proportion of respondents who received information on nutrition in the last 12 months



In terms of sources of nutrition information, there was a significant difference in the proportion of midline and control group respondents who received nutrition knowledge from either TOMAK groups, a health facility, an NGO, and from the media (Chart 25). More midline respondents (compared to control group respondents) received nutrition information from TOMAK groups[92] and from an NGO[93], and more control group respondents (compared to midline respondents) received information from a health facility[94] and the media.[95] It is likely that many midline respondents selected TOMAK group and NGO interchangeably, referring to the Lead NGO partner that facilitates the group. For the other sources of nutrition knowledge, there was no significant difference between midline and control group.

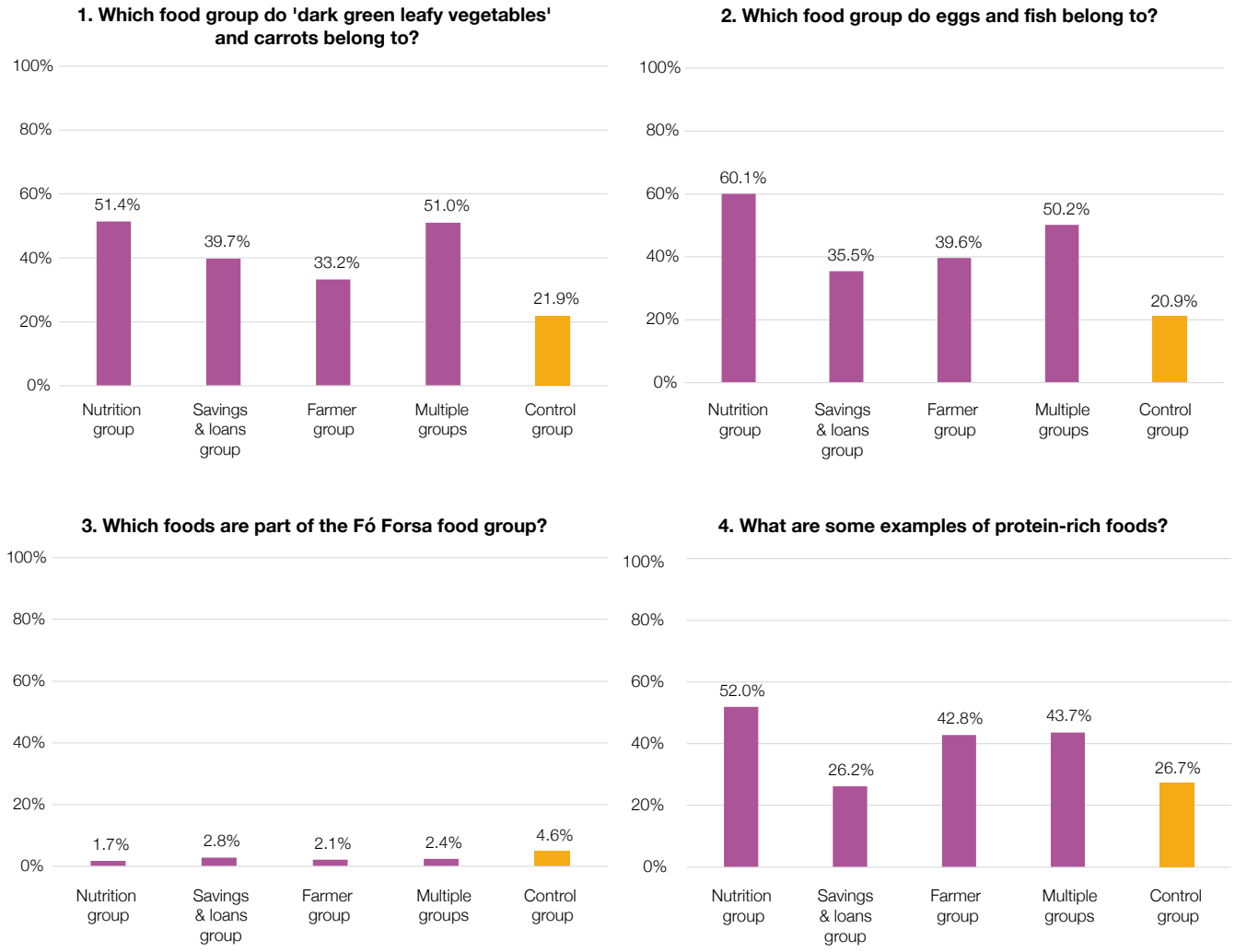
Chart 25: Sources of nutrition information



[92] X^2 (1, N = 743) = 57.36, $p < .001$.
[93] X^2 (1, N = 743) = 168.88, $p < .001$.
[94] X^2 (1, N = 743) = 191.19, $p < .001$.
[95] X^2 (1, N = 743) = 40.76, $p < .001$.

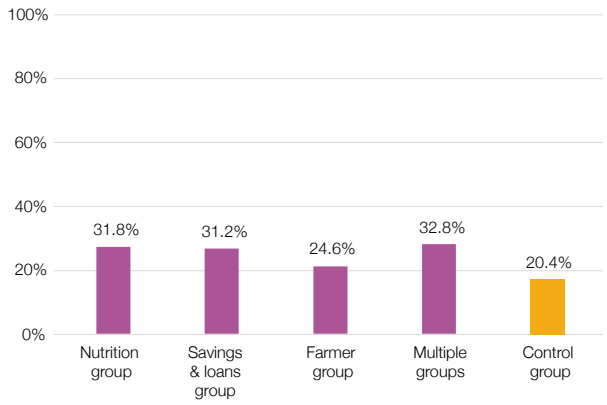
A series of questions was included in the survey that tested respondents' knowledge of good nutrition based on key behaviours promoted by TOMAK. These questions were multiple choice. The proportion of respondents answering these questions correctly, per group, can be seen in Chart 26. The average number of correct answers was significantly higher in the midline (5.58) compared to the control group (4.04).[96] Table 11 shows the average number of correct answers to the questions, per group. The average number of correct answers was significantly different between groups.[97] Results show that on average, respondents from the control group gave significantly fewer correct answers compared to all other groups.[98] Respondents that were part of multiple groups gave significantly more correct answers compared to the S&L group[99] and the farmer group.[100] Lastly, the nutrition group gave significantly more correct answers compared to the S&L group[101] and the farmer group.[102]

Chart 26: Proportion of respondents who answered correctly to nutrition related questions

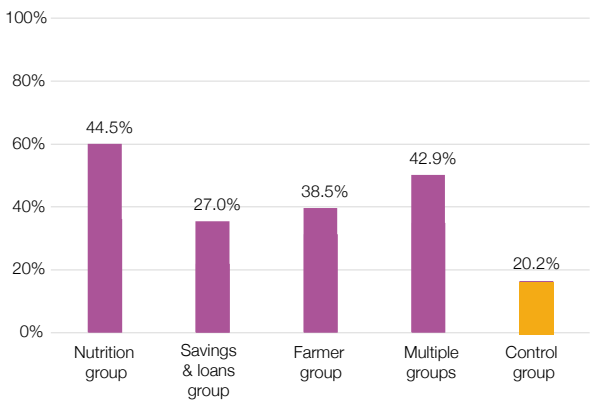


[96] Welch's $F(1,1475.50) = 170.76$, $p < .001$.
[97] Welch's $F(4,448.33) = 64.76$, $p < .001$.
[98] Games-Howell post-hoc test compared to the nutrition group ($p < .001$), the S&L group ($p = .015$), the farmer group ($p < .001$), and compared to respondents that were part of multiple groups ($p < .001$).
[99] Games-Howell post-hoc test ($p < .001$).
[100] Games-Howell post-hoc test ($p = .001$).
[101] Games-Howell post-hoc test ($p < .001$).
[102] Games-Howell post-hoc test ($p < .001$).

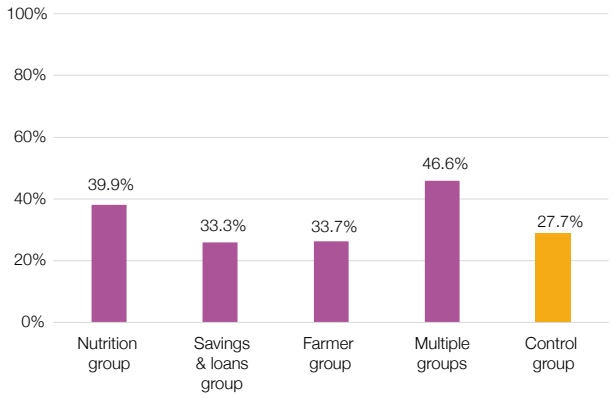
5. Which foods help children grow and build strong muscles?



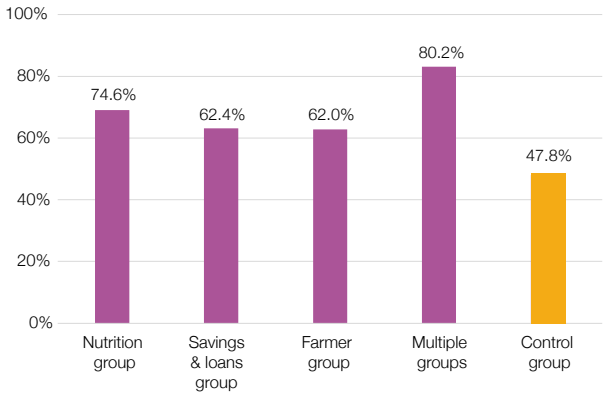
6. What are the benefits for a young child eating foods like carrots, tomatoes and dark green leafy vegetables?



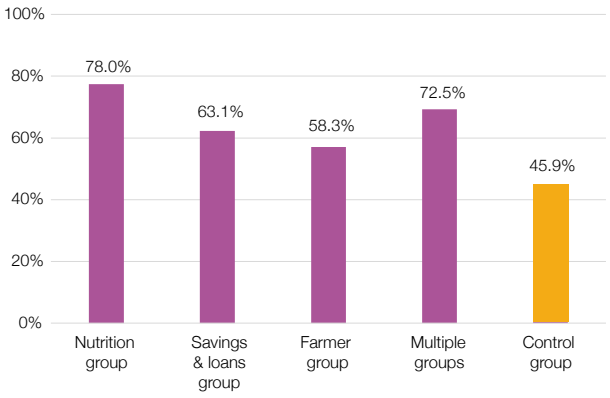
7. What are the benefits for a young child eating foods like eggs, fish and tofu?



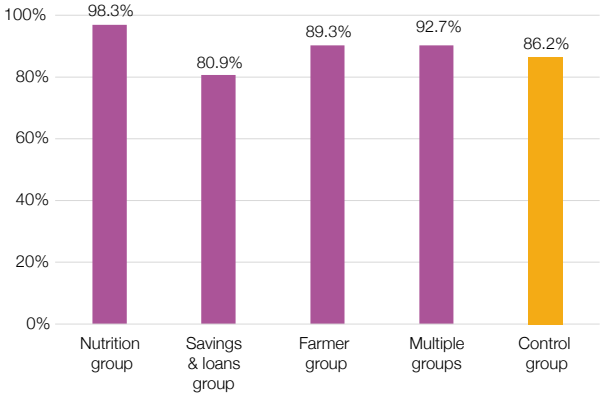
8. How can you help your child to grow, stay healthy and do well in school?



9. Why do you think that Ministry of Health says it is important to eat from all 3 food groups every day?



10. At what age can young children start eating eggs?



11. At what age can young children start eating solid or semi-solid foods?

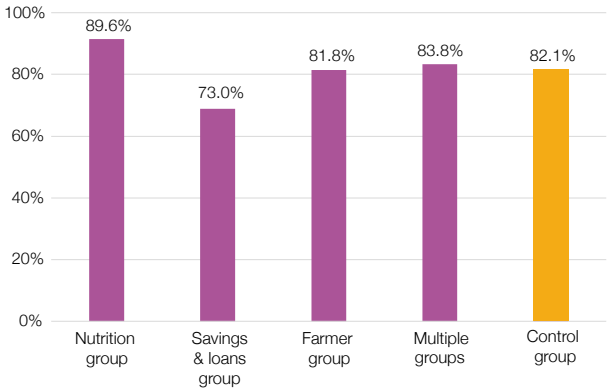


Table 11: Average number of correct answers per group

Group	Average no. of correct answers
Nutrition group	6.22
Savings & loans group	4.75
Farmer group	5.06
Multiple groups	5.99
Total midline	5.58
Control group	4.04

3.10. Nutrition attitudes

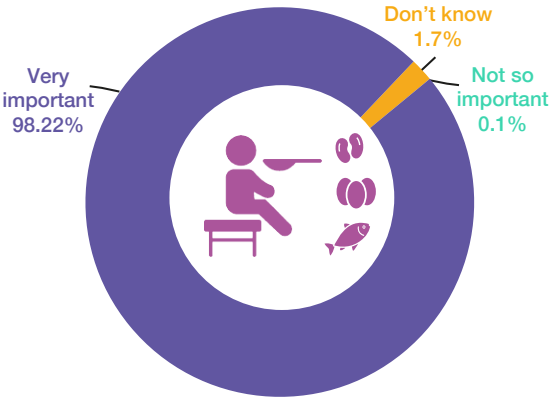
In the midline survey, a small set of questions asked about respondents' attitudes towards purchasing protein-rich foods, and who in the household should receive these as a priority. These questions specifically relate to key nutrition practices promoted by TOMAK. Chart 27 shows the five questions with answer options selected by the respondents. The green part of the pie chart is the percentage of respondents that gave the answer that was preferred based on TOMAK programming.

The total number of preferred answers provided was significantly higher for midline (4.43) respondents compared to the control groups (4.19). Chart 28 shows the distribution (per group) of respondents that gave the preferred answer option to the questions, based on TOMAK programming. The proportion of participants that gave the preferred answer to question 5 is lower compared to the other questions (61.1%). There was a significant difference in distribution between the groups for question 3,[103] question 4,[104] and question 5.[105] For question 3, respondents from the nutrition group, farmer group, and those that were part of multiple groups almost all gave the answer preferred by TOMAK. The control group had the lowest proportion of respondents giving the preferred answer, although the percentage was still high (95%). For question 4, the proportion of respondents giving the preferred answer was lowest in the control group and highest among respondents that were part of multiple groups. For question 5, respondents that were part of multiple groups selected the preferred answer most frequently. The proportion of farmer group and control group respondents who selected the preferred answer for this question were almost identical.

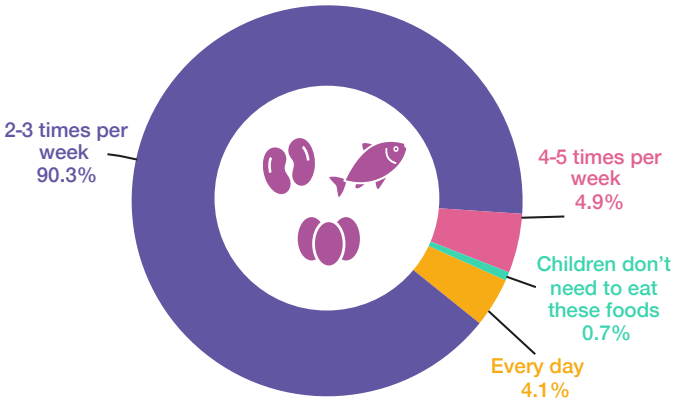
[103] X^2 (4, N = 1489) = 13.73, p = .008
[104] X^2 (4, N = 1489) = 23.23, p < .001
[105] X^2 (4, N = 1489) = 29.11, p < .001

Chart 27: Proportion of responses to nutrition attitude questions

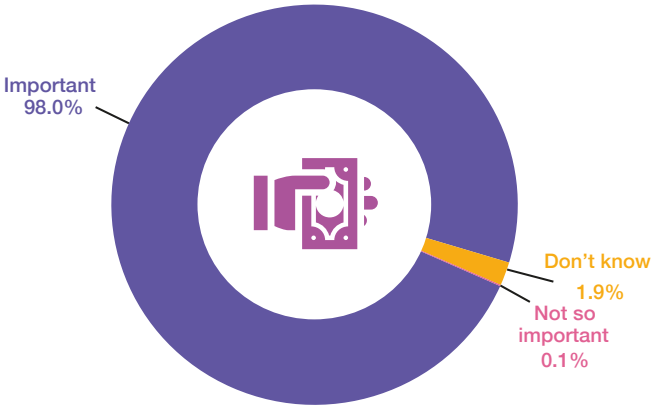
1. How important do you think it is for young children to eat protein rich foods like eggs, beans, tofu or fish?



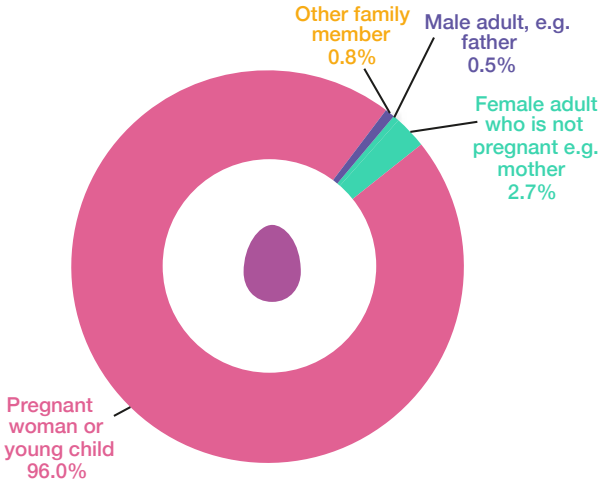
2. How often do you think young children should eat protein rich foods like eggs, beans, tofu or fish?



3. How important do you think it is for fathers to purchase protein rich food such as eggs, beans, fish and tofu for their children?



4. If there is only one egg available, which family member should get to eat it?



5. If you had $2 spare, would you prefer to [...]

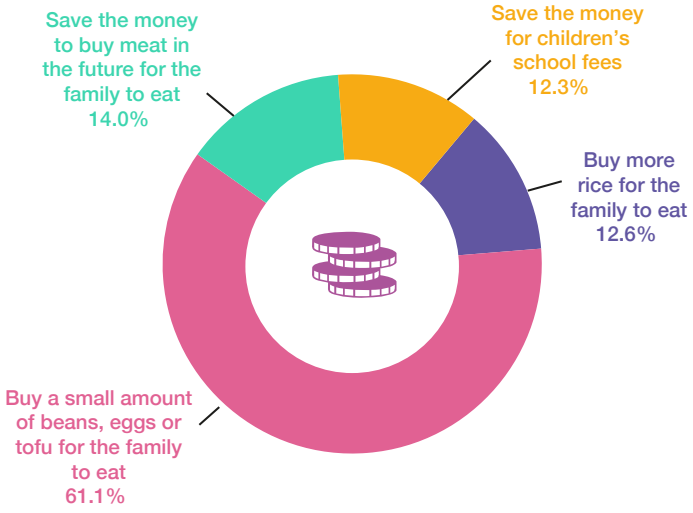
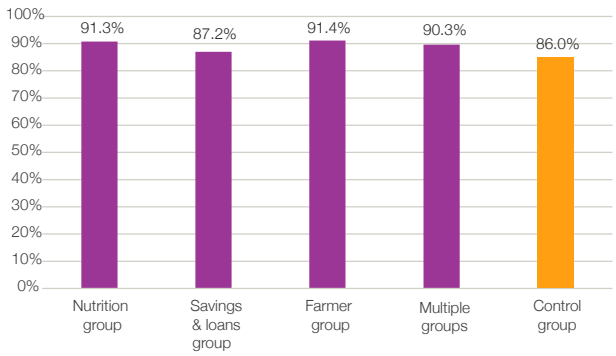


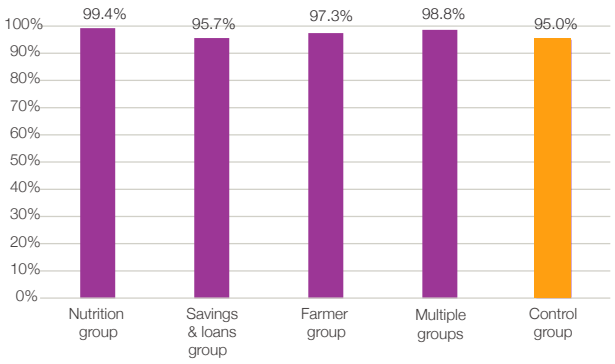
Chart 28: Proportion of respondents per group giving the preferred answers to nutrition attitude questions

1. How important do you think it is for young children to eat protein rich foods like eggs, beans, tofu or fish?

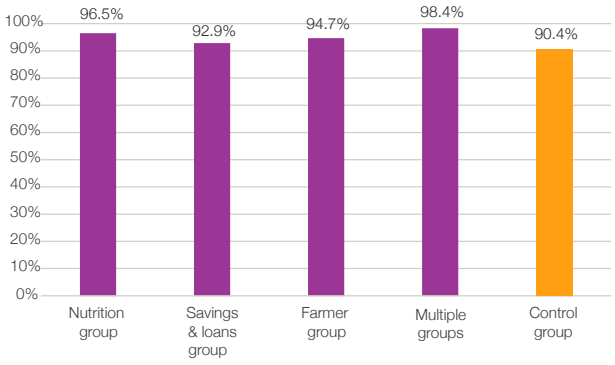
2. How often do you think young children should eat protein rich foods like eggs, beans, tofu or fish?



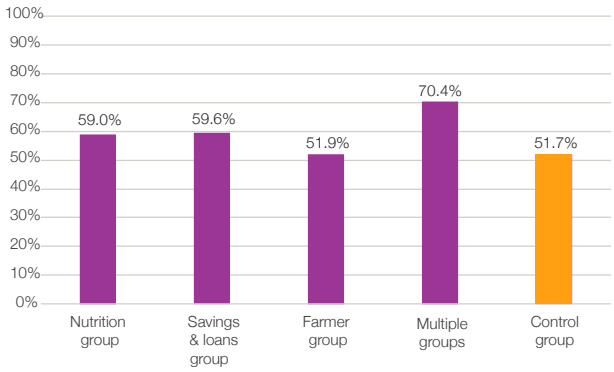
3. How important you do think it is for fathers to purchase protein rich foods such as eggs, beans, fish and tofu for their children?



4. If there is only one egg available, which family member should get to eat it?



5. If you had $2 spare, would you prefer to [...]



3.11. Minimum Dietary Diversity for Children 6-23 months

The MDD-C is defined as the proportion of children 6–23 months of age who receive foods from four or more food groups. The midline survey questions were based on the WHO's Infant and Young Child Feeding module. The World Health Organization (WHO) guidelines about calculating MDD-C have been revised since the baseline study. Whereas previously the minimum number of food groups was four out of seven, this guidance has been revised to five out of eight, where eight is breastfeeding. The midline survey questions followed the WHO tool closely, adapted only slightly by including some local foods within certain categories (aligned with the baseline local foods). The WHO describes the

minimum number of food groups as five of the following eight food groups:

- Grains, roots and tubers
- Legumes and nuts
- Dairy products (milk, yoghurt, cheese)
- Flesh foods (meat, fish, poultry and liver/organ meats)
- Eggs
- Vitamin A rich fruits and vegetables
- Other fruits and vegetables
- Breastmilk

Due to the difficulty of finding WRA respondents with a child 6-23 months who had been sufficiently exposed to TOMAK programming, only the nutrition group was compared to the control group within the midline data. Although the percentage of children between 6-23 months that had received food from five out of the eight food groups is higher in the nutrition group compared to the control group, this difference was not significant (see Chart 29). In comparing the midline and baseline, the midline consists of all WRA with a child from across the midline groups. When comparing the baseline data to the midline data (without the control group), it can be seen that the percentage of children that met the requirements of MDD-C (35.8%) was significantly higher in the midline compared to the baseline (10.8%)[106] (Chart 30).

Chart 29: MDD-C for children 6-23 months nutrition group vs control

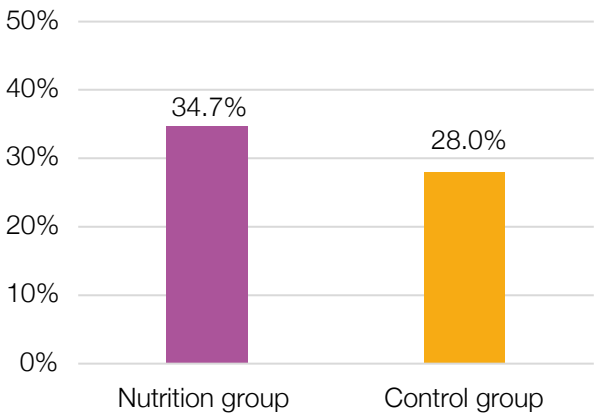
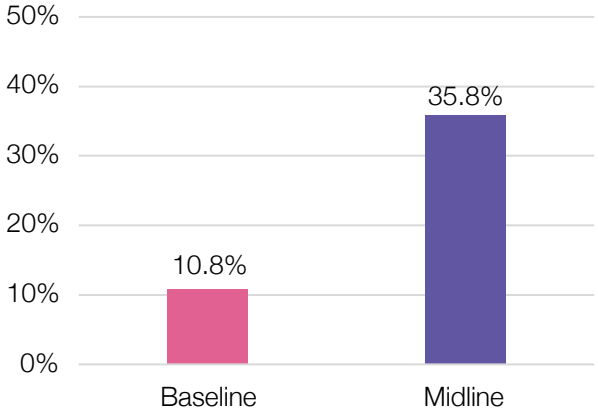


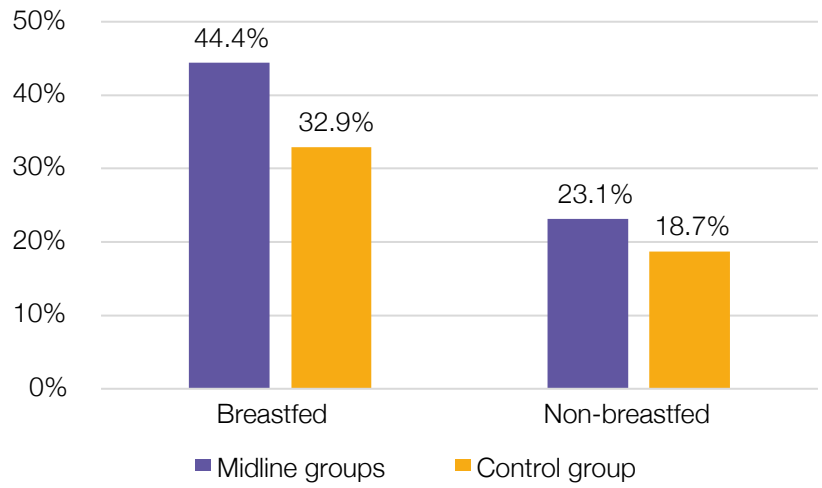
Chart 30: MDD-C for children 6-23 months baseline vs midline



Disaggregation between breastfed and non-breastfed children within the midline shows a significant difference among breastfed children between the midline groups and control group. The proportion of breastfed children that met the MDD-C was higher in the midline groups compared to the control group.[107] The difference among non-breastfed children between the midline groups and control group was not significant (Chart 31).

[106] X^2 (1, N = 508) = 43,322, $p < .001$
[107] X^2 (1, N = 303) = 4.20, $p = .040$

Chart 31: MDD-C for children 6-23 months - breastfed and non-breastfed



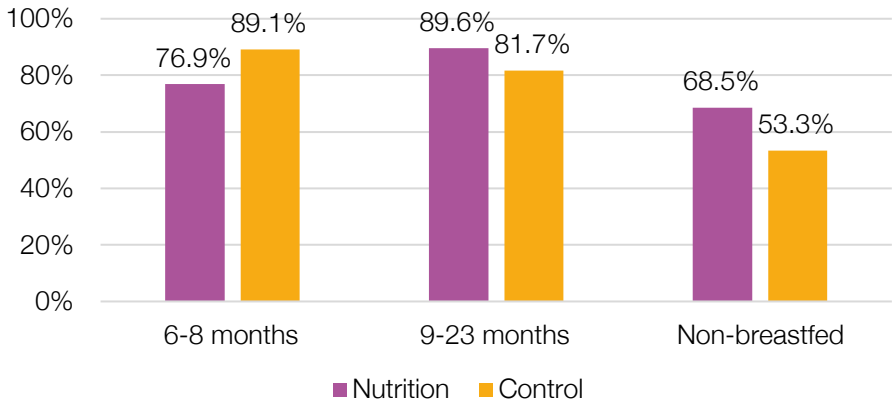
3.12. Minimum Meal Frequency for Children 6-23 months

The Minimum Meal Frequency (MMF) is the proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more. The minimum number of times are:

- 2 times for breastfed infants 6-8 months
- 3 times for breastfed children 9-23 months
- 4 times for non-breastfed children 6-23 months

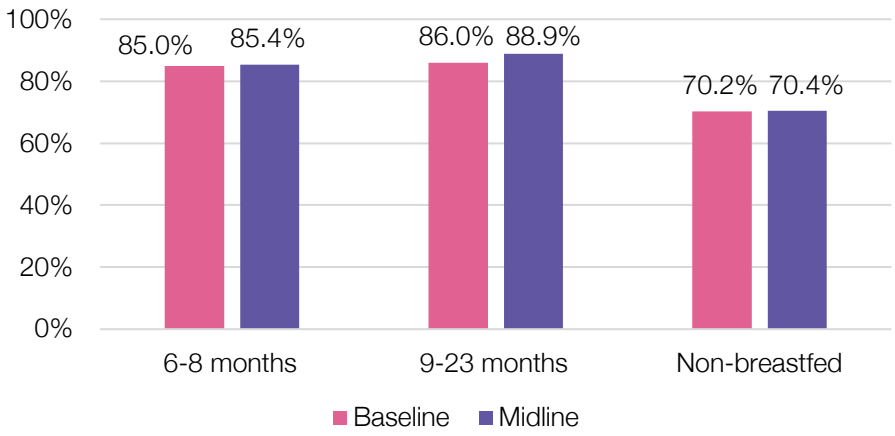
The midline survey included all of the questions cited in the WHO guidance. The main questions relate to the 'number of times' that certain liquids, breastmilk, solids and semi-solids, were consumed in a 24-hour period. As with the MDD-C, the nutrition group was compared to the control group for the MMF. There was no significant difference among the proportion of breastfed children between 6-8 months that met the MMF, between the nutrition and control group. In addition, there was no significant difference among the proportion of breastfed children between 9-23 months that met the MMF, between the nutrition and control group. The proportion of non-breastfed children that met the MMF also does not differ significantly between the nutrition and control group (Chart 32).

Chart 32: MMF in nutrition and control group



When comparing the midline to the baseline, there were no significant differences among breastfed children between 6-8 months, among breastfed children between 9-23 months, or among non-breastfed children (Chart 33).

Chart 33: MMF for children 6-8 and 9-23 months and non-breastfed, baseline and midline



3.13. Minimum Acceptable Diet

The MAD is defined by the WHO as the proportion of children between 6–23 months of age who receive a minimum acceptable diet and is a composite index consisting of i) Minimum dietary diversity for children (MDD-C) and ii) minimum meal frequency (MMF). Breastfed children meet this indicator when they have a positive score for both components.

For non-breastfed children, the MAD is defined by children between 6-23 months of age who received at least 2 milk feedings and had at least the MDD not including milk feeds and the minimum meal frequency during the previous day. As with the MDD-C and MMF, the nutrition group was compared to the control group for the MAD (Chart 34).

Chart 34: MAD children 6-23 months, nutrition vs control group

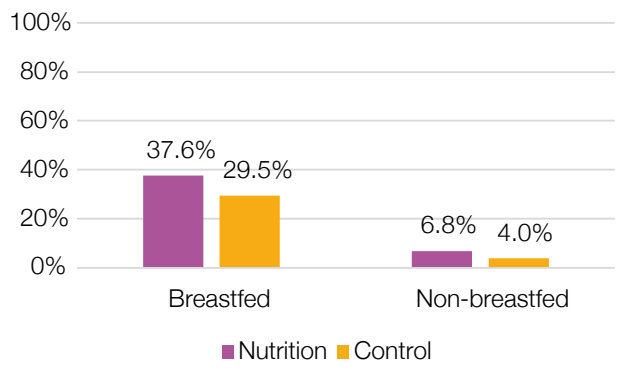
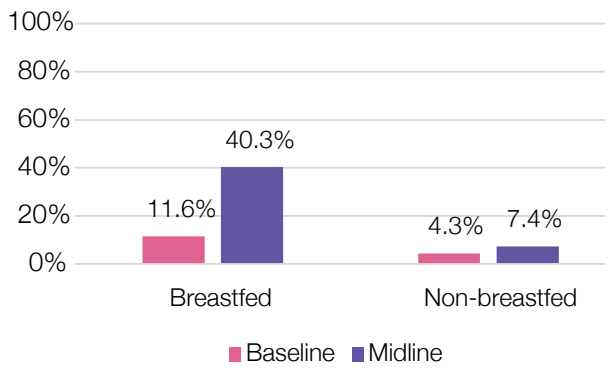


Chart 35: MAD children 6-23 months, baseline vs midline



There was no significant difference in the proportion of breastfed children that met the MAD between the nutrition and control group. In addition, there was no significant difference in the proportion of non-breastfed children that met the MAD between the nutrition and control group. It can be noted that the percentage of non-breastfed children who met the MAD is much lower than for breastfed children. The MAD for non-breastfed children is shown to be hard to attain.

When comparing the proportion of breastfed children that met the MAD between midline and baseline (Chart 35), there was a significant difference between both groups; the proportion of breastfed children that met this requirement was significantly higher in the midline compared to the baseline.[108] However, there is no significant difference in the proportions of non-breastfed children that met the MAD between midline and baseline.

3.14. Minimum Dietary Diversity for Women

The Minimum Dietary Diversity for Women (MDD-W) is a 24-hour recall of consumption of 14 food groups, which are grouped into 10 categories. The questions were asked to WRA only because they are typically the ones in the household who know what food is prepared and consumed by the household. Of the 1,005 women in the midline, 986 (98.1%) were WRA. Chart 36 shows the distribution of WRA, who have consumed various food groups in the last 24 hours.

Chart 36: Consumption of food groups by women of reproductive age

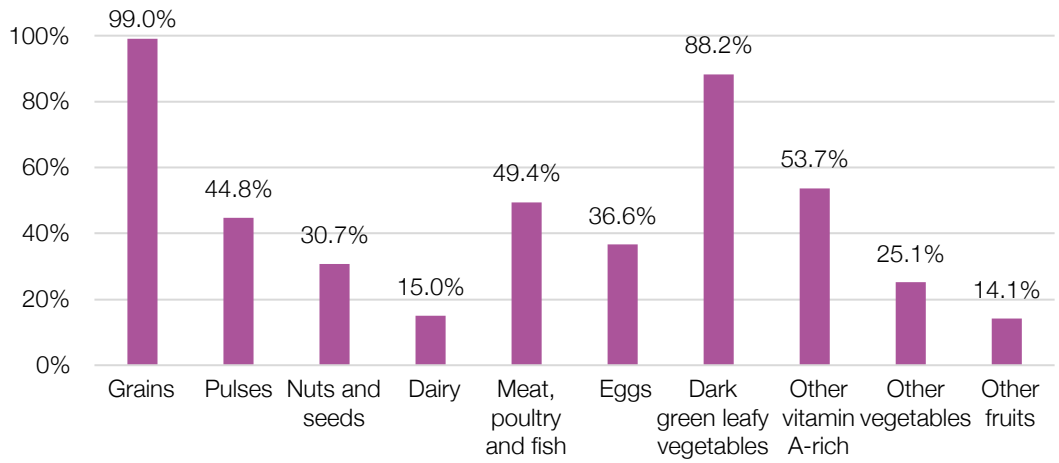
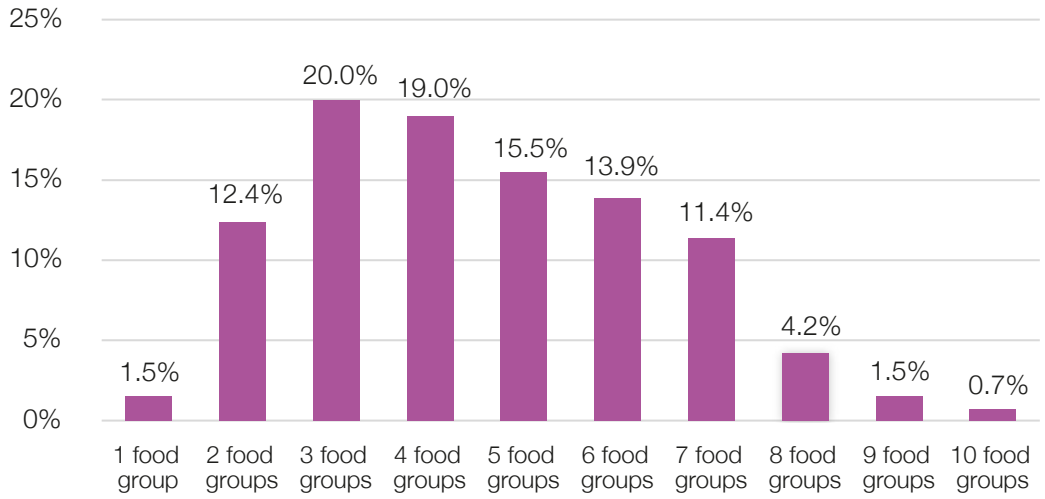


Chart 37 shows the number of food groups that were consumed by WRA in the last 24 hours. As can be seen, almost 50% of WRA have consumed food from five or more food groups.

[108] X^2 (1, N = 295) = 31.33, $p < .001$

Chart 37: Proportion of WRA who have eaten a certain number of food groups in the past 24 hours



The average number of food groups consumed by WRA was significantly higher in the midline (4.69) compared to the control group (4.43).[109] Table 12 shows the average number of food groups that were consumed by WRA, per group. The average number of food groups consumed was significantly different between the groups.[110] Results showed that the average number of food groups consumed was significantly higher in the S&L group compared to every other group.[111] In addition, the farmer group consumes significantly more food groups compared to the control group.[112]

Table 12: Average number of food groups consumed by WRA, per group

Group	Average no. of food groups
Nutrition group	4.51
Savings & loans group	5.46
Farmer group	4.85
Multiple groups	4.47
Total midline	4.69
Control group	4.43

Chart 38 shows the distribution of WRA who met the MDD-W requirement of consumption of minimum five food groups, per group. The distribution of WRA meeting this requirement was significantly different between groups.[113] As can be seen, the percentage of WRA that met the

[109] Welch's $F(1,984) = 4.74$, $p = .030$.
[110] Welch's $F(4,981) = 5.33$, $p < .001$.
[111] LSD post-hoc test compared to the nutrition group ($p < .001$), the farmers group ($p = .040$), multiple groups ($p < .001$), and control group ($p < .001$)
[112] LSD post-hoc test ($p = .043$).
[113] X^2 (4, N = 986) = 12.19, $p = .016$.

MDD-W requirement was higher in the S&L group than in the other groups.

Chart 38: MDD-W for women per group

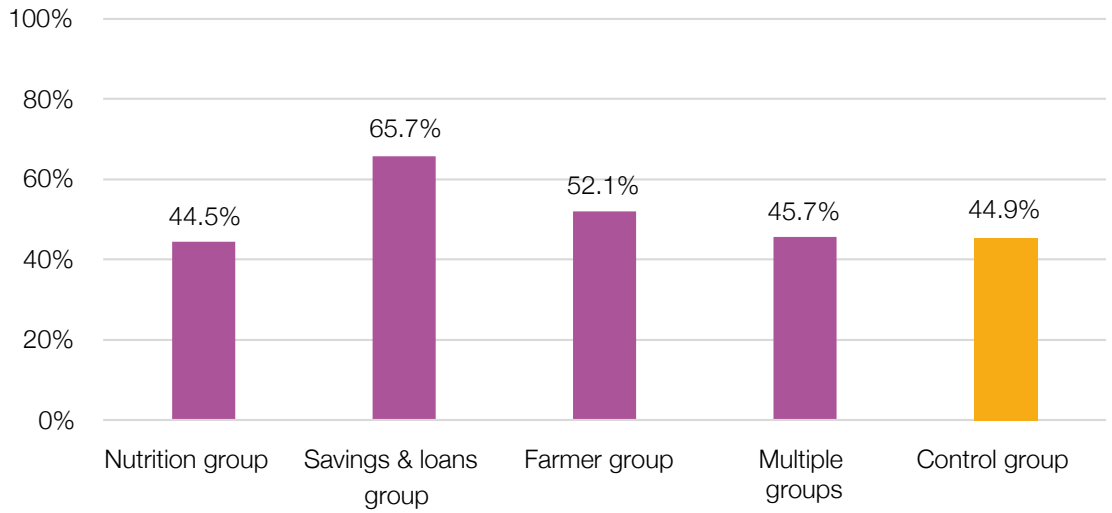
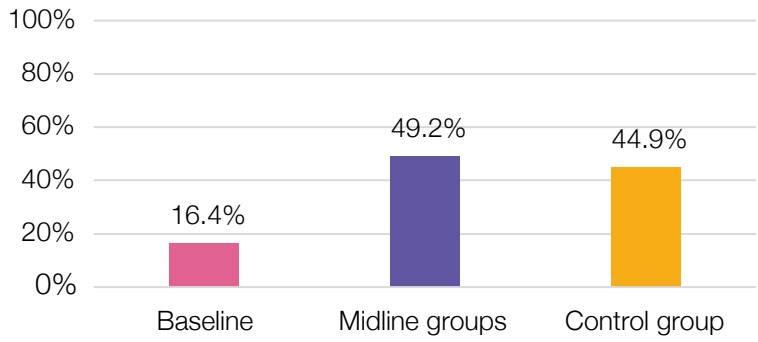


Chart 39 shows the distribution of WRA who met the MDD-W requirements in the baseline, midline groups and control group. There was a significant difference in the distribution between baseline and midline,[114] but not between the midline and the control group.

Chart 39: MDD-W, baseline, midline and control



3.15. Food Consumption Score

The Food Consumption Score (FCS) aggregates household-level data on the diversity and frequency of food groups consumed over the previous seven days, which is then weighted according to the relative nutritional value of the consumed food groups. For instance, food groups containing nutritionally dense foods, such as animal products, are given greater weight than those containing less nutritionally dense foods, such as tubers. The FCS is a proxy indicator of household caloric availability. Table 13 shows the eight food groups and their weight based on nutritional value, and Chart 40 demonstrates, how many days per week each food group was consumed by midline respondents.

[114] X^2 (1, N = 750) = 73.76, $p < .001$

Table 13: Food groups for calculating FCS

Food items	Food groups	Weight
Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals	Cereals and tubers	2
Cassava, potatoes and sweet potatoes		
Beans, peas, groundnuts and cashew nuts	Pulses	3
Vegetables and leaves	Vegetables	1
Fruits	Fruit	1
Beef, goat, poultry, pork, eggs and fish	Meat and fish	4
Milk, yogurt and other dairy	Milk	4
Sugar and sugar products	Sugar	0.5
Oils, fats and butter	Oil	0.5

Chart 40: Proportion of respondents that eat various food groups between 1 and 7 days per week

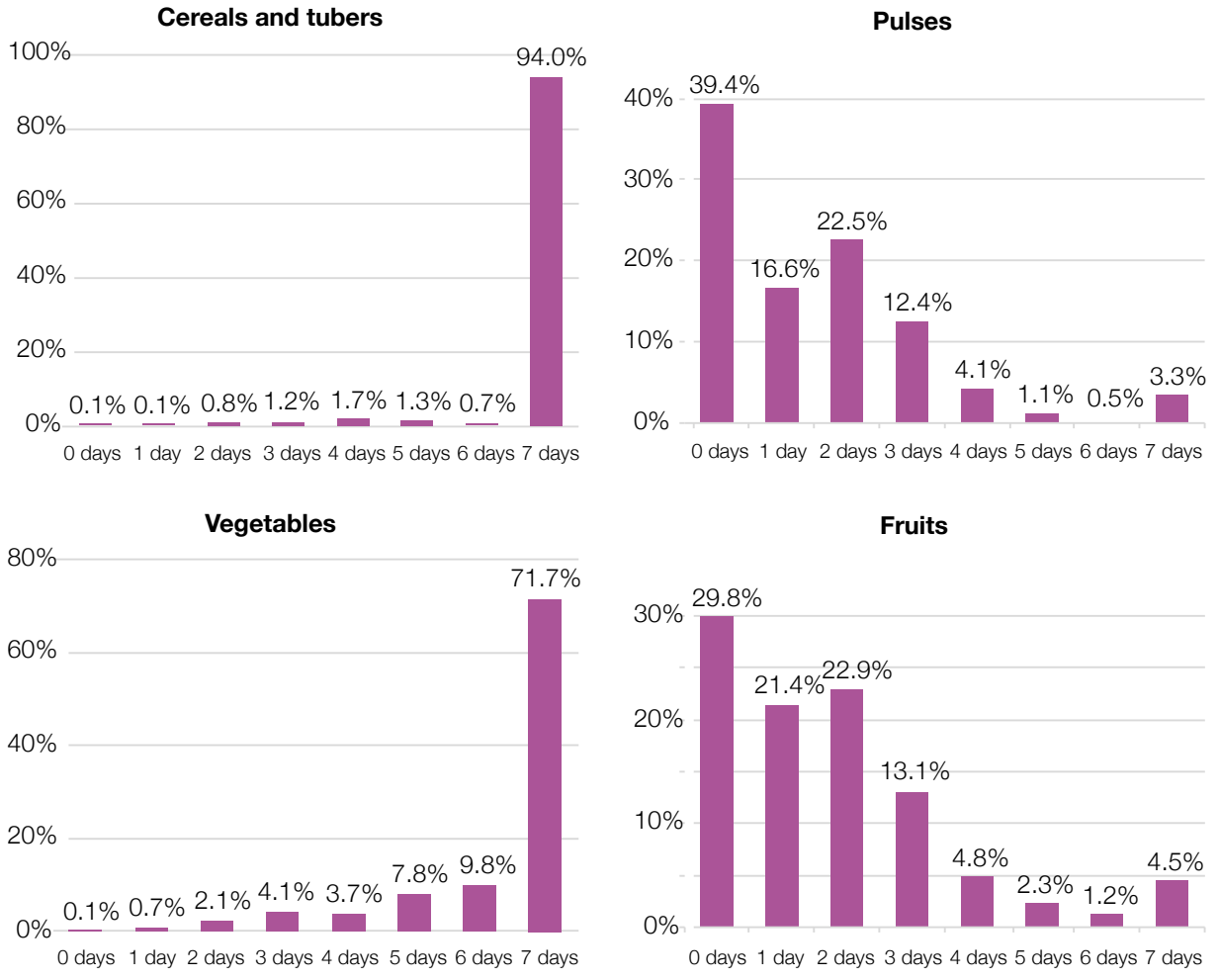


Table 14 shows the average FCS per group and the average total for all midline groups without the control group. The average FCS among midline respondents was significantly higher than among respondents from the control group.[115] The average FCS per group was significantly different between the groups.[116] Results showed that the average FCS was significantly lower in the nutrition group compared to the S&L group,[117] compared to the farmer group[118] and to respondents that are part of multiple groups.[119] In addition, the average FCS in the control group was significantly lower compared to the S&L group,[120] compared to the farmer group[121] and to respondents that are part of multiple groups.[122] When comparing the average amount of days that the most important FCS food groups are consumed, results show that cereals and tubers were consumed on 6.81 days among midline respondents, and 6.55 days among the control group. This difference was significant.[123] Pulses (also referred to as legumes in this report) were consumed on 1.47 days among midline respondents, and 1.67 days among the control group. This difference was significant.[124] Meat and fish were consumed on 3.93 days among midline respondents, and 3.27 days among the control group. This difference was significant.[125]

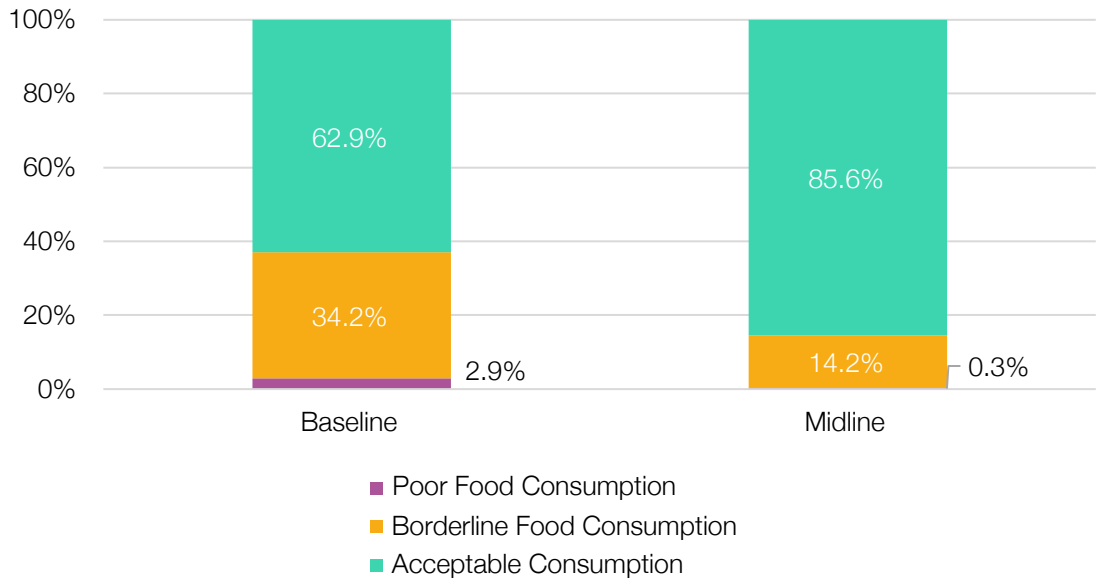
[115] Welch's $F(1,1487) = 25.30$, $p < .001$.
[116] Welch's $F(4,1484) = 10.16$, $p < .001$.
[117] LSD post-hoc test ($p = .021$).
[118] LSD post-hoc test ($p = .034$).
[119] LSD post-hoc test ($p < .001$).
[120] LSD post-hoc test ($p = .002$).
[121] LSD post-hoc test ($p = .002$).
[122] LSD post-hoc test ($p < .001$).
[123] Welch's $F(1,1253.35) = 21.21$, $p < .001$.
[124] Welch's $F(1,1487) = 5.07$, $p = .025$
[125] Welch's $F(1,148) = 28.40$, $p < .001$

Table 14: Average FCS per group

Group	Average food consumption score
Nutrition group	49.13
Savings & loans group	53.44
Farmer group	52.80
Multiple groups	55.44
Total midline	52.95
Control group	48.64

In the baseline, questions about household food consumption were only asked to women, and not to men. The average FCS among the baseline respondents was 43.79, while the average FCS among midline respondents was 52.95. When comparing the baseline FCS with the midline, midline respondents scored significantly higher on the FCS compared to the baseline respondents.[126] The FCS can be classified as poor, when lower than 21, borderline when between 21.5 and 35, and acceptable when above 35. Chart 41 shows the distribution of this classification for baseline and midline respondents. The distribution of food consumption classification was significantly different between baseline and midline.[127] As can be seen, the proportion of households with an acceptable food consumption score was higher in the midline, compared to the baseline.

Chart 41: FCS thresholds for baseline and midline



[126] $F(1,986) = 55.10$, $p < .001$.
[127] X^2 (2, N = 988) = 63.82, $p < .001$.

3.16. Food Insecurity Experience Scale

The FIES is a metric of severity of food insecurity at the household or individual level that relies on people's direct yes/no responses to eight brief questions regarding their access to adequate food in the past 12 months. The FIES is one of two indicators used for measuring progress toward achieving one of the Sustainable Development Goals (SDGs), Goal 2.1, which relates to ending hunger and ensuring food access. The eight questions that are asked in the FIES can be seen in Table 15.

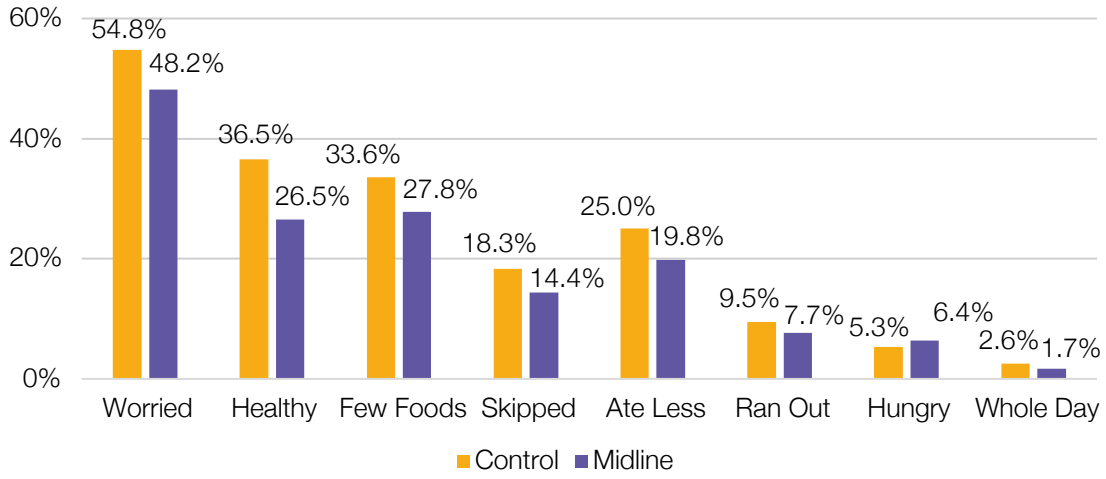
Table 15: Questions for FIES score

Worried	During the past 12 months was there a time when…You were worried you would not have enough food to eat?
Healthy	During the past 12 months was there a time when…You were unable to eat healthy and nutritious food?
Few Foods	During the past 12 months was there a time when…You ate only a few kinds of foods? (1-3 foods)
Skipped	During the past 12 months was there a time when…You had to skip a meal?
Ate Less	During the past 12 months was there a time when…You ate less than you thought you should?
Ran Out	During the past 12 months was there a time when…Your household ran out of food?
Hungry	In which months were you hungry but did not eat? (select multiple)
Whole Day	During the past 12 months was there a time when…You went without eating for a whole day?

The proportion of respondents answering 'yes' to each question for midline and control group can be seen in Chart 42. There was a significant difference in the distribution of positive answers between the midline and control group for the following items: Worried,[128] Healthy,[129] Few Foods,[130] Skipped,[131] and Ate Less.[132] There was no significant difference in distribution for the items Ran Out, Hungry, and Whole Day.

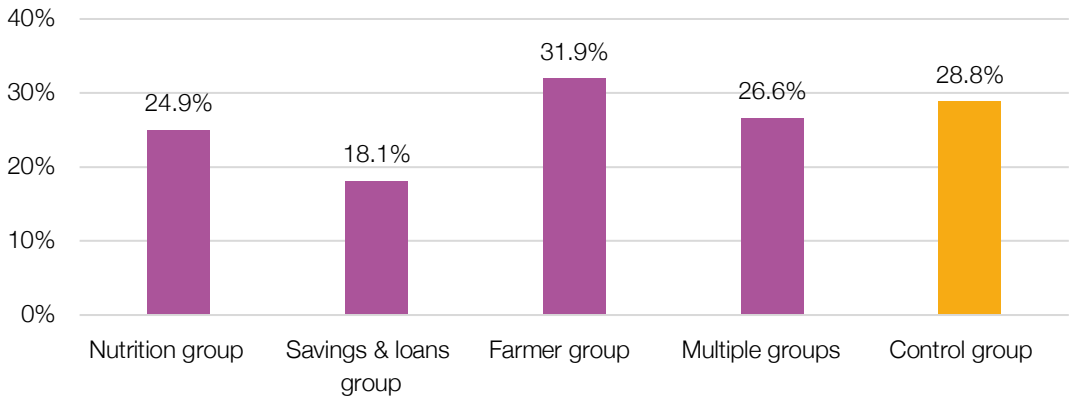
[128] X^2 (1, N = 1472) = 6.31, p = .012
[129] X^2 (1, N = 1428) = 16.56, p < .001
[130] X^2 (1, N = 1451) = 5.78, p = .017
[131] X^2 (1, N = 1472) = 4.17, p = .041
[132] X^2 (1, N = 1474) = 5.84, p = .016

Chart 42: FIES per item, midline vs control group



Among the midline respondents, 25.9% experienced moderate to severe food insecurity as opposed to 28.8% in the control group. However, there was no significant difference in the distribution of answers between both groups. Chart 43 shows the proportion of respondents that experienced moderate to severe food insecurity per group. There was no significant difference in the distribution of respondents experiencing moderate to severe food insecurity between the groups.

Chart 43: Proportion of respondents experiencing moderate to severe food insecurity per group



The proportion of respondents that experienced severe food insecurity in the preceding 12 months was very low per group; 2.3% in the nutrition group, 1.4% in the S&L group, 1.6% in the farmer group, 1.6% among respondents that were part of multiple groups, and 2.6% in the control group. There was no significant difference in the distribution of respondents experiencing severe food insecurity between the groups. In addition, there was no significant difference between the control group and the midline groups (1.7%).

3.17. Household decision-making

NGO partners layered on HHDM content to established community groups through the screening of a TOMAK nutrition and HHDM film and through the implementation of HHDM modules during group meetings. In FGD groups, a number of observations were shared in terms of gender equality and decision-making. In most S&L groups, women and men participated equally (active participation for all members is a prerequisite) and they were seen to have the same roles and responsibilities in the group. Respondents reported that decisions were made through agreement at family level. If they took out a loan from the group, both husband and wife (if available in the household) were supposed to agree first.

In farmer and nutrition groups, the roles and responsibilities of women and men still hinged more on their traditional roles. "Light" agricultural work was considered more appropriate for women, while heavy field work and taking care of livestock was generally considered part of men's role (though women were also responsible for fetching wood and water and carrying it over considerable distances). Women were also often responsible for selling vegetables.

> ***"When returning from the farm, only women do the household work while the men sit."***
>
> Female farmer group, Mercy Corps area

Men were seen by several respondents (male and female) as the ones who take care of the food production, who are the decision-makers, and who earn the income. Women could decide on day-to-day expenses, but men had the final say on large expenses. This view was not shared by all though: there were a few women groups who felt themselves equal to men and expressed clearly that "*women can do what men can do*".

> ***"Men are more active in doing heavier jobs, and they work much harder than women."***
>
> Male farmer group, CRS area

Women were seen as responsible for the household, food preparation and (child) care tasks. A number of respondents report that the wife has to prepare coffee and meals for the husband when he gets up, then do the household work, followed by going to the field to support agricultural work. The part of her day that was not mentioned, is after the work in the field, when she has to finish off the household work, cooking for the household and taking care of the children. Male respondents admitted to not working in the evening, but they still believed that their total workload is heavier than women's. Overall, women reported that men were not very active in making sure healthy food is prepared, but they do find it important that all family members consume sufficient nutritious food.

In the midline survey, questions were asked to address the TOMAK MELP indicators:

- Proportion of WRA that report having greater decision-making power on household food production, consumption and related household expenditure;
- Proportion of WRA and men reporting male engagement in household nutrition decisions has improved; and
- Proportion of WRA reporting satisfaction with their role in household nutrition decision-making has increased.

Specifically, the questions asked who normally makes certain decisions, the extent to which the respondent provided input into certain decisions, and how satisfied the respondent was with their role in decision-making on certain topics. The question, "Who normally takes decisions about what the household eats", was asked to all respondents in the midline. The answers to this question for

WRA and men can be seen in Chart 44 and Chart 45. As can be seen, the proportion of respondents that answered that either the woman or both the woman and man take these decisions was high among both WRA and men, with a very low percentage reporting that men take these decisions alone.

Chart 44: Perception of WRA on who takes decisions about what the household eats

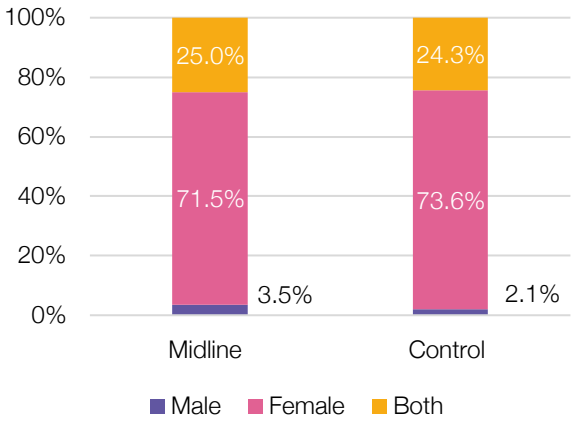
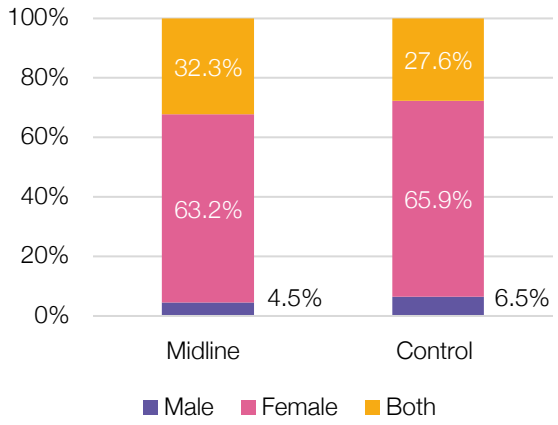
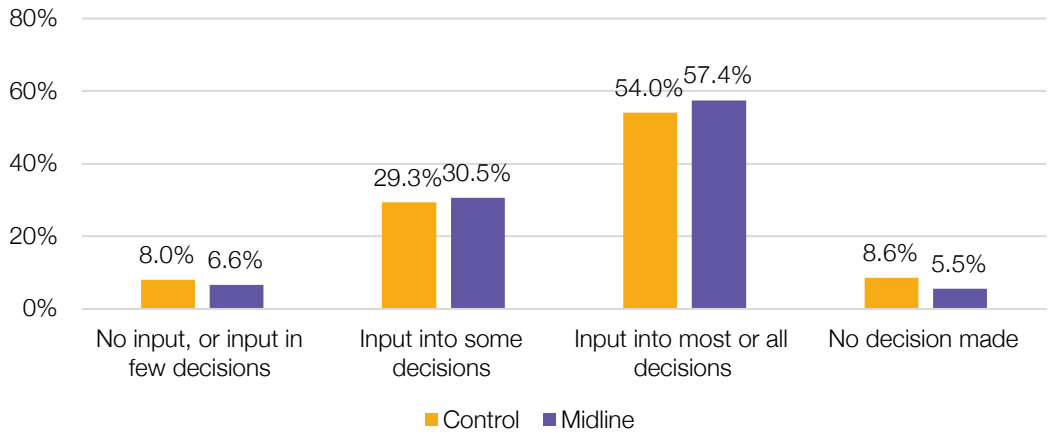


Chart 45: Perception of men on who takes decisions about what the household eats



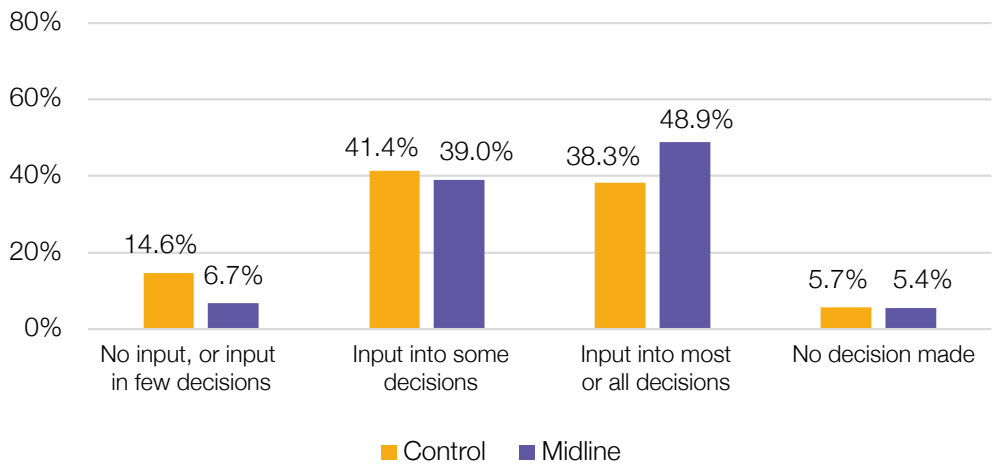
The question "How much input do you have in making decisions about what the household eats?" was also asked to all respondents in the midline. The answers to this question for WRA and men in the control and midline groups can be seen in Chart 46 and Chart 47. There was no significant difference in the distribution of the answers that WRA gave between the midline and control group, but there was a significant difference in the distribution of the answers that men gave between midline and control.[133] The proportion of men reporting that they did not have any input in decisions about what the household eats was higher in the control group (compared to the midline), and the proportion of men reporting that they have input into most or all decisions was higher in the midline (compared to the control group). The vast majority (95.7%) of WRA reported being satisfied or very satisfied with their role in decisions regarding household nutrition, as opposed to 93.7% in the control group; this difference was not significant.

Chart 46: Perception of WRA on their input on decisions about what the household eats



[133] X^2 (3, N = 484) = 10.04, p = .018

Chart 47: Perception of men on their input on decision about what the household eats



A further question was asked about who normally takes decisions about buying protein-rich foods such as eggs, fish, tofu, beans. Chart 48 and Chart 49 show the answers to this question for WRA and men. There was a significant difference in the distribution of answers for men,[134] but not for WRA. The results show that according to WRA, these decisions are predominantly taken by women. The proportion of WRA that answer that the man takes these decisions was under 4%. Men also reported more frequently that the woman makes decisions about this subject, than the man.

Chart 48: Perception of WRA on who takes decisions about buying protein-rich foods

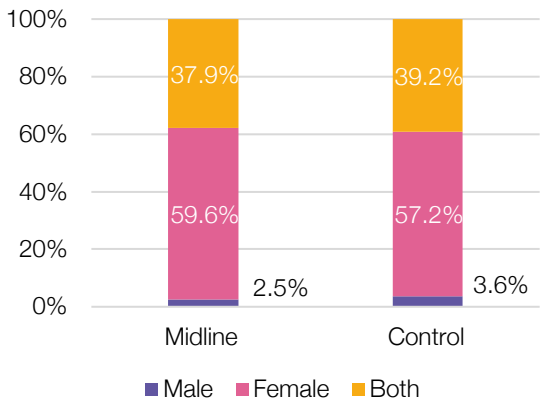
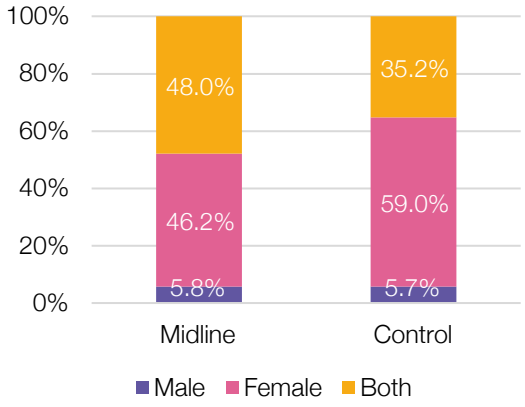


Chart 49: Perception of men on who takes decisions about buying protein-rich foods



In terms of satisfaction levels regarding decision-making about buying protein-rich foods, 96.3% of WRA in the midline reported being satisfied or very satisfied, compared to 93.2% in the control group; this difference was significant.[135] There was also a significant difference among men.[136] The proportion of men reporting that they are very satisfied with their decision-making role regarding this subject, was higher in the midline compared to the control group.

[134] X^2 (6, N = 484) = 22.89, p = .001.
[135] X^2 (1, N = 986) = 4.64, p = .031.
[136] X^2 (3, N = 484) = 15.08, p = .002.

Other questions were asked about food crop farming. The first question regarding this subject was whether the respondent had participated in food crop farming in the past 12 months. Almost all midline (93.6%) and control group (95.0%) respondents said they had participated in food crop farming.

The next question was "who normally decides which crops should be grown for food?". Chart 50 and Chart 51 show the distribution of answers to this question per midline and control group. When comparing both charts, the proportion of men responding that the woman makes these decisions appears very low overall, and much lower than WRA reporting that the woman makes these decisions. Only a small proportion of men report that the woman makes these decisions.

Chart 50: Perception of WRA on who takes decisions about food crop farming

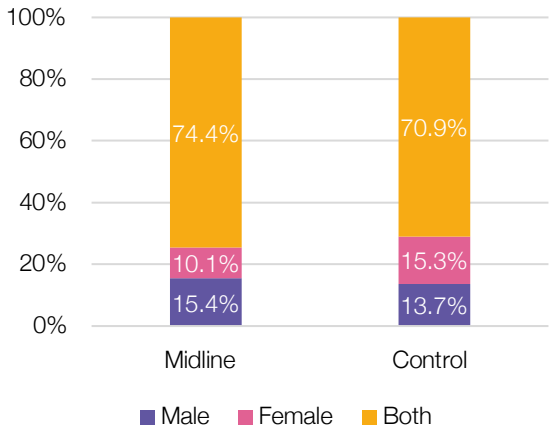
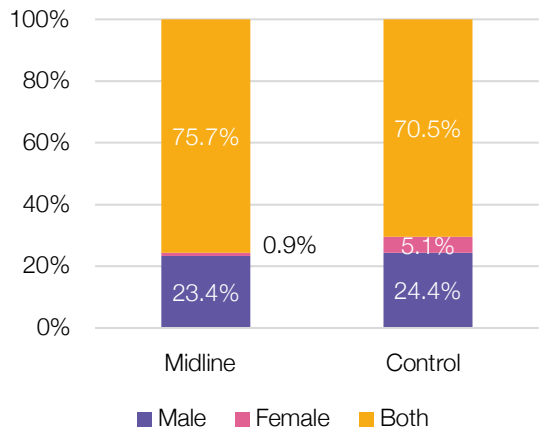


Chart 51: Perception of men on who takes decisions about food crop farming



Another question regarding household decision-making was about the raising of livestock. Of the respondents, 92.2% of WRA and 93% of men participate in raising livestock. The question about who normally makes decisions with regard to which animals should be raised, was asked to all respondents who participate in raising livestock. The distribution of answers to this question can be seen in Chart 52 for WRA and Chart 53 for men. It can be seen that the perception of women making decisions was lower among men than among WRA.

Chart 52: Perception of WRA on who takes decisions about raising livestock

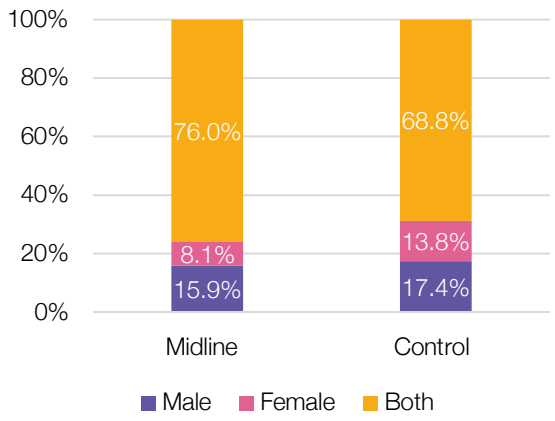
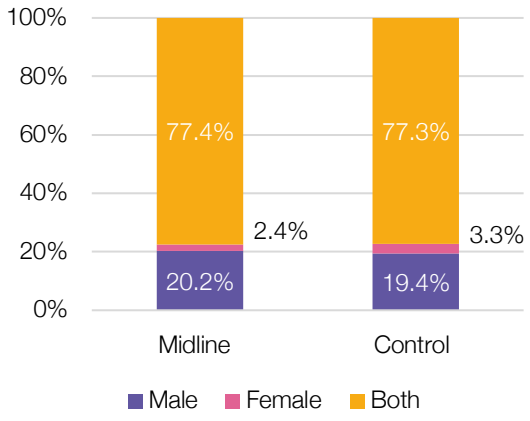


Chart 53: Perception of men on who takes decisions about raising livestock



The proportion of WRA and men who reported being satisfied or very satisfied with decision-making over raising livestock was higher in the midline than the control group (WRA: 95.2% midline vs 93% control; men: 98.1 midline vs 95.9% control).

A further question was asked about household decision-making regarding large purchases over $30. The answers to this question can be seen in Chart 54 for WRA and in Chart 55 for men. There was a significant difference in the distribution of answers given by WRA[137] and by men.[138] The proportion of WRA reporting that the woman normally takes decisions about large purchases was higher in the control group than the midline group. The proportion of men reporting that the woman normally takes decisions about large purchases was higher in the control group than among respondents from the midline group. Higher levels of shared decision-making were reported by both women and men in the midline group compared to the control group.

Chart 54: Perception of WRA on who takes decisions about large purchases (over $30)

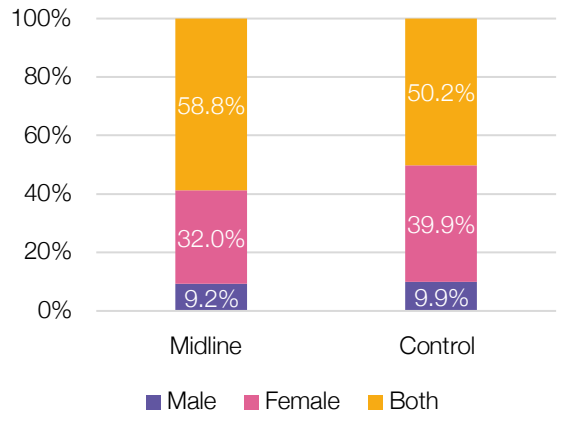
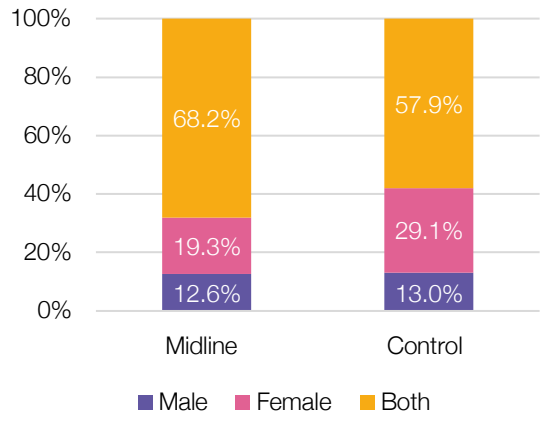


Chart 55: Perception of men on who takes decisions about large purchases (over $30)



The proportion of WRA and men that reporting being dissatisfied with their role in making decisions about large purchases is around 5% in both the midline and control group. In addition, the proportion of respondents that were satisfied or very satisfied with their decision-making role in this matter was higher in the midline compared to the control group for both WRA and men (WRA: 89.7 midline vs 88.2 control; men: 91.9% midline vs 89.2% control). Both WRA and men were more likely to be very satisfied in the midline than the control group.

3.18. Access to finance

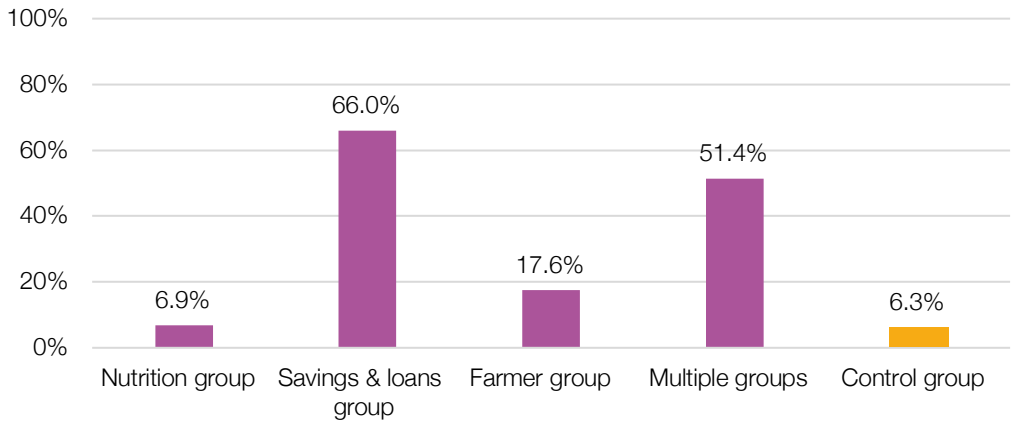
In the FGDs, most S&L group members were very positive about their ability to deposit and borrow money. It serves a dire need for access to finance. It is very difficult for them to access a bank, since they do not have the necessary documents, and the process takes a long time. Also, banks are often not in their vicinity and as a result they have to spend time and money on transport to visit them. Money lenders will charge them as much as 10-15% in interest, whereas the group charges 2-5% for members, sometimes a bit more for non-members. Banks also charge high interest as farmers are perceived as high-risk clients, and one group reported about community members who had to sell their houses and land in order to repay their debt.

[137] X^2 8, N = 986) = 16.29, p = .038.
[138] X^2 (8, N = 484) = 18.87, p = .004.

All S&L groups have their own rules related to borrowing and lending money, including deposit amounts (varying between $5-25 per person per week), regularity of deposits, and guarantees needed for various loans. Some groups ask for a guarantee for each loan and some ask for guarantees depending on the size of the loan. In general, the duration of a loan is three months. Some groups only lend to members, while others also lend to non-members but at a higher interest rate, and with higher collateral. The income from interest is always shared and the rules were generally well-known to all respondents.

The first question that was asked about finance in the midline survey, was whether the respondent received any financial training in the last 12 months. Among midline respondents, 35.4% reported that they received financial training, as opposed to 6.3% in the control group. This difference was significant.[139] Chart 56 shows the proportion of respondents who received financial training, per group. The distribution of respondents who received financial training was significantly different per group.[140] As can be seen (and was to be expected), more respondents from the S&L group, as well as respondents that were part of multiple groups received financial training compared to the other groups.

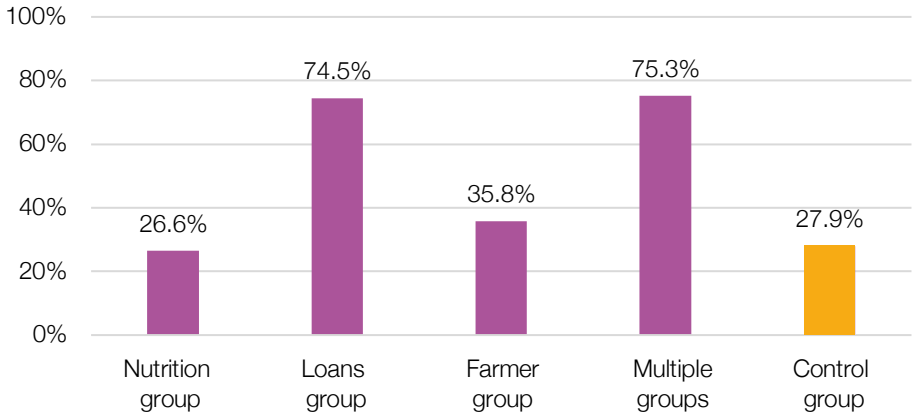
Chart 56: Proportion of respondents who received financial training in the last 12 months



A further question was asked to determine whether the respondent had borrowed any money in the last 12 months. In total, 54.0% of the midline respondents took out a loan in the last year, as opposed to 27.9% in the control group. This difference was significant.[141] The distribution of respondents who took out a loan in the last year per group, can be seen in Chart 57. The distribution of respondents who took out a loan was significantly different per group.[142] As can be seen, more respondents from the S&L group as well as among respondents that were part of multiple groups, borrowed money in the last year, compared to the other groups.

[139] X^2 (1, N = 1489) = 190.12, $p < .001$
[140] X^2 (4, N = 1489) = 428.07, $p < .001$
[141] X^2 (1, N = 1489) = 104.60, $p < .001$.
[142] X^2 (4, N = 1489) = 254.58, $p < .001$.

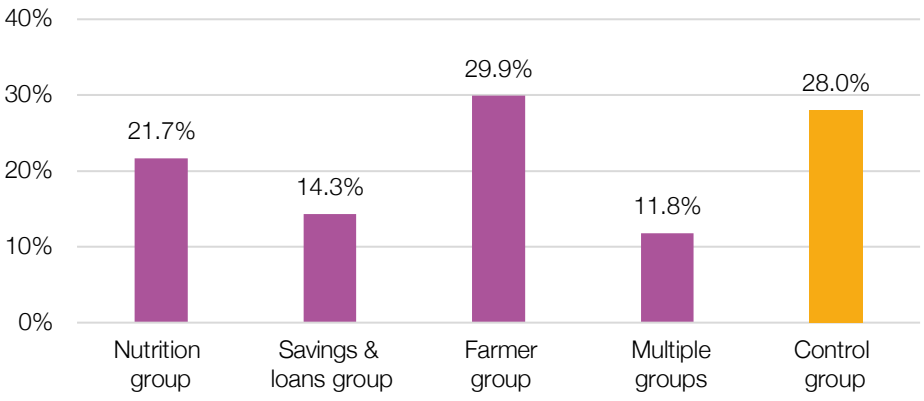
Chart 57: Proportion of respondents per group who borrowed money from various sources in the past 12 months



The midline survey also asked whether respondents who took out a loan had been unable to make a loan repayment at the required time during the last 12 months. In the FGDs, respondents shared that social pressure from the group often helped the timely repayment of the loans. Nonetheless, some of the groups reportedly struggle with members who cannot pay back on time or not at all. This is less of a problem in the groups where (small) collateral is required no matter the size of the loan. Four groups also have a social goal, where they specifically collect a weekly sum of money or share proceedings of their group with those in their community who face problems.

The distribution of respondents who took out a loan the last 12 months and had been unable to make a loan repayment, can be seen in Chart 58. Among midline respondents with a loan, 16.6% had been unable to make a loan repayment at the required time, as opposed to 28.0% in the baseline. This difference is significant.[143] The distribution of respondents who were unable to make a loan repayment is significantly different per group.[144] As can be seen, the proportion of respondents that were unable to make a loan repayment is lower in the S&L group as well as among respondents from multiple groups, compared to the other groups.

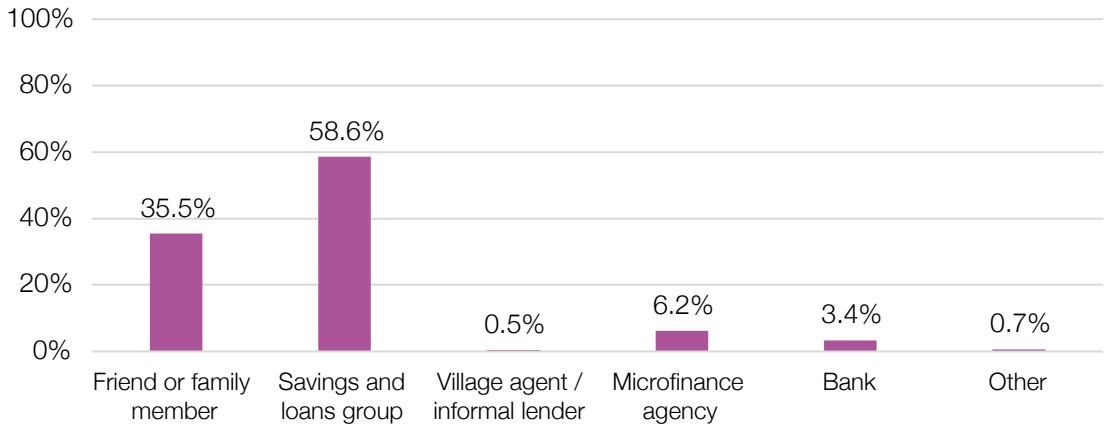
Chart 58: Proportion of respondents per group who had been unable to repay a loan in the past 12 months



[143] X^2 ((1, N = 611) = 11.00, p = .001.
[144] X^2 (4, N = 611) = 21.92, p < .001.

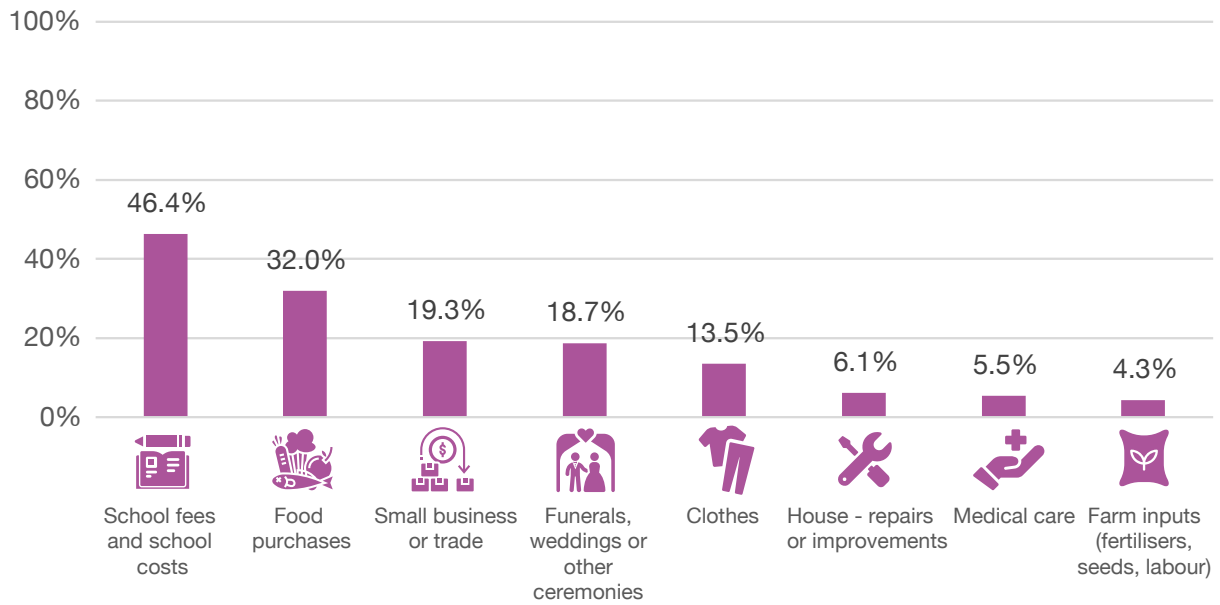
Chart 59 shows the distribution of different loan sources for respondents who took out a loan in the last 12 months. As can be seen, most respondents borrowed money from an S&L group or from a friend or family member. Among the respondents who took out a loan, 94.4% knew how much money they borrowed.

Chart 59: Loan sources for respondents



In total, 347 respondents were part of an S&L group, with 40.6% of these respondents being a part of only the S&L group. The majority (59.4%) of these respondents are part of an S&L group, but also participated in one or more of the other groups. Among S&L group members, respondents were asked how they used the money that they borrowed from their S&L group. Chart 60 shows that the money borrowed from S&L groups was mostly spent on school fees and other school-related costs and on food purchases. Other possible responses that are not depicted in the chart were 'Livestock', 'Land – buying or leasing', 'Transport (buying a bicycle, motorbike, car)' and 'Didn't spend the money', but fewer than 3% of respondents chose any one of these options.

Chart 60: Purposes for which money borrowed from S&L groups was used

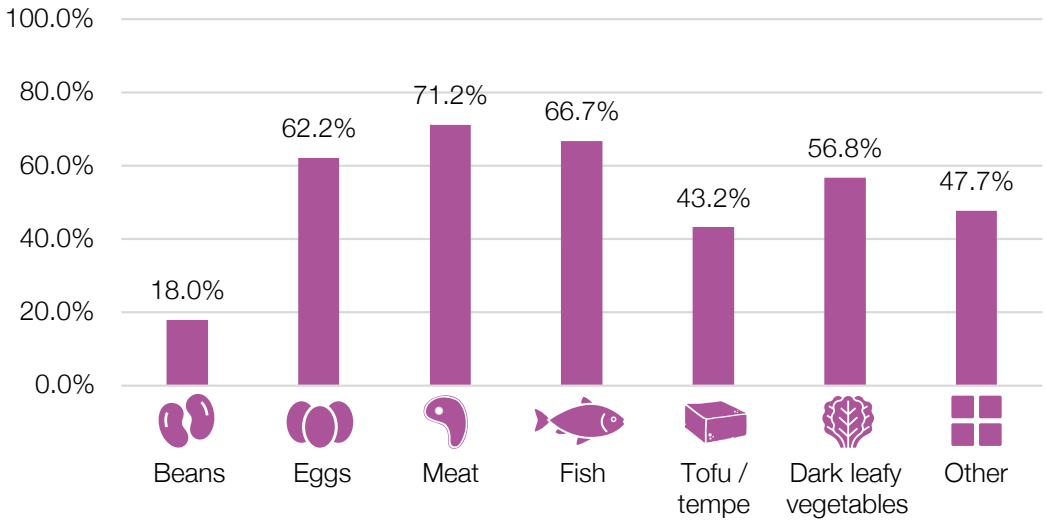


These findings tally with what was found in the FGDs. S&L members reported that they borrow money for various purposes. Most frequently mentioned, in fact by almost all, was tuition or other education related expenses for their children. This was seen as most important by men as well as women. A large number of people borrowed money to buy food, and some used it for emergency needs. In two groups buying a house was mentioned. Two groups had participated in a sanitation program and had borrowed money to build a toilet. The money was also borrowed for productive purposes such as starting a business (selling certain products, a kiosk or a shop), and buying a bicycle or motorbike. In farmer groups, seeds were procured, and four groups had bought a water pump for their collective work. The members seemed largely free in choosing what they wanted to do with the money.

Members shared that they appreciated the access to credit, as it enabled them to produce more and hence have more food available and for selling. They also found that the training made them more aware of their own household finance management, resulting in lower expenses and a focus on necessary expenditure with more emphasis on healthy food. Furthermore, numerous respondents had come to understand that they could make their money work for them.

Respondents who borrowed money from an S&L group and used this money for food purchases were then asked what types of food were bought. The answers to this question can be seen in Chart 61. Food types that were bought most often were meat, eggs and fish. In the FGDs, these food items were described by respondents as often unaffordable, especially meat.

Chart 61: Types of food that were bought with loans from S&L groups



Several questions were asked about savings. According to FGD respondents, their savings cannot be deposited at the bank, since (apart from the constraint of distance to the bank), the amounts that people can deposit are too small to be of interest for the bank. Earning interest by simultaneously allowing other members to invest is seen as a good mechanism by S&L group members. The shared responsibility amongst group members and the guarantee that is sometimes asked provides an additional feeling of security.

The survey also asked whether the respondents made any savings in the last 12 months. Among midline respondents, 83.4% had made savings, as opposed to 64.4% in the control group. This difference was significant.[145] Chart 62 shows the distribution of respondents who made savings, per

[145] X^2 (1, N = 1489) = 70.11, $p < .001$.

group. The distribution of respondents who made savings was significantly different per group.[146] As can be seen, the proportion of respondents that made savings was higher in the S&L group as well as in the group with respondents from multiple groups, compared to the other groups, as this is a requirement of participating in an S&L group.

Chart 62: Proportion of respondents per group, who had made savings in the past 12 months

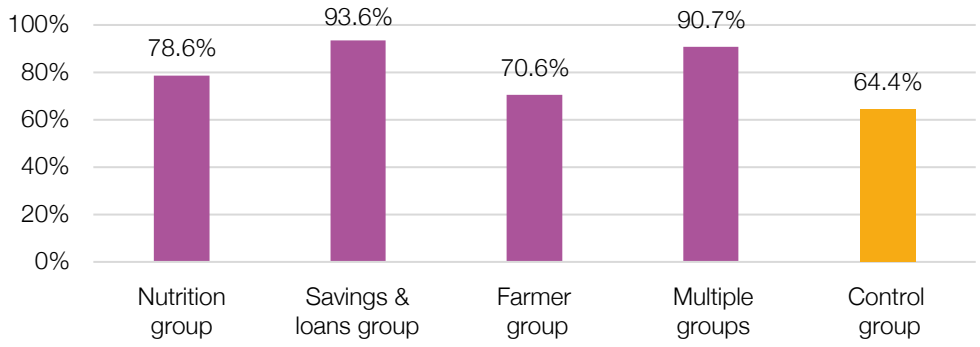
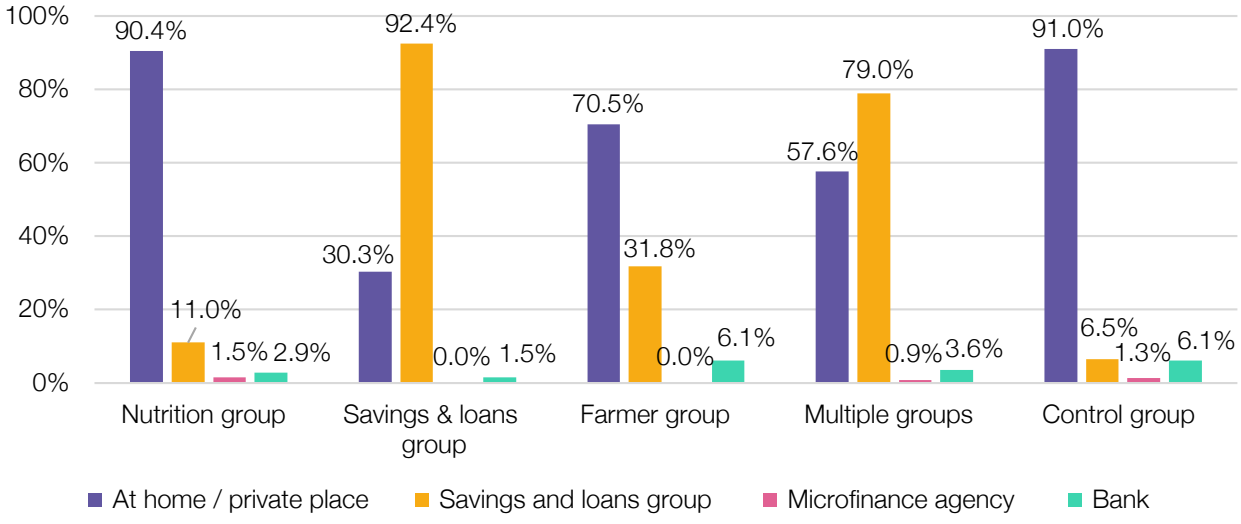


Chart 63 shows the distribution of where respondents keep their savings, per group. The distribution of respondents who kept their savings at home or in a private place, was significantly different between groups.[147] Most respondents from the nutrition group, farmer group, and control group kept their savings at home. There was also a significant difference in the distribution of respondents who kept their savings at an S&L group.[148] As expected, respondents who were part of an S&L group or were part of multiple groups kept their savings mostly at S&L groups as opposed to the other groups. There was no significant difference in the distribution of respondents who kept their savings at a microfinance agency or at the bank, between the groups.

Chart 63: Location where respondents per group kept their savings



[146] X^2 (4, N = 1489) = 102.55, < .001
[147] X^2 (4, N = 1101) = 256.26, < .001
[148] X^2 (4, N = 1101) = 586.20, < .001

3.19. Challenges for and feedback from beneficiaries

A few overall challenges were observed by respondents in FGDs.

Transport was a real problem, mostly for women but for men as well. Challenges accessing transport hampers community members' ability to profitably sell their produce, to go to the bank, to buy food (such as meat and eggs) and to go to the health facility.

Most feedback on the implementing NGOs was very positive, with only two groups out of 51 expressing negative feedback.[149] Some respondents voiced their remaining needs, most of which were related to agriculture, like provision of good quality seed, help with irrigated water or making water available in any way, providing pigs and chickens, and setting up aquaculture. In the area of S&L, a few groups found that they could do with more training on administration, management and bookkeeping.

[149] One group in the World Vision area reported that the NGO visited their community only rarely, sometimes once every three months. Another group in the Mercy Corps area said that the NGO had left and that the seeds that they had been promised several times had not materialised.

4. Conclusion

4.1. Summary of findings and discussion

The summary of key findings section and discussion is organised by TOMAK's key evaluation questions and indicators that relate to Component 1: Food Security and Nutrition**. Overall, this midline demonstrates that TOMAK has significantly influenced improvements across target households on access and consumption of nutritious foods, access to financial services and increased joint household decision-making on production and nutrition topics.** There are a few indicators such as child nutrition where the results do not show significant improvement. These findings are discussed below.

4.2. Overall demographics and income

Respondent and household demographics

The total number of midline respondents was 1,489. Respondents were part of nutrition groups, S&L groups, farmer groups, multiple groups or the control group. Every group had male and female participants, with exception of the nutrition group, where all respondents were female. The average age of respondents in the nutrition group was lower than in the other groups, which is likely due to the sampling criteria specifically targeting WRA with children 6-23 months. The baseline consisted of 240 respondents. Respondents from the midline were younger compared to baseline respondents. In the baseline, 99.2% of household heads were male (vs. 94.1% in the midline). The midline contained more households with a female head compared to the baseline.

Wealth and poverty index

The average wealth index value for the midline is 0.07 and for the control group 0.11. There was no significant difference between these values. The proportion of households that were among the poorest quintile was lower in the control group than in the midline. In addition, the proportion of households in the 2nd, 3rd, and 4th quintile was higher than in the midline and the proportion of households in the wealthiest quintile was lower than in the midline. However, the distribution of midline and control group was not statistically different. Therefore, it can be concluded that there was no difference in wealth distribution between midline and control group. The questions and score weightings for the Poverty Probability Index used in the baseline are outdated and a different tool was used at midline. Therefore, it is not possible to compare across baseline and midline. It is also not possible to make conclusions on the lack of difference in wealth between midline and control.

Washington Group disability questions

The Washington Group Short Set questions (WG-SS) on disability were asked to the midline respondents and consists of six questions about experiencing difficulty with seeing, hearing, walking, remembering, self-care, and communicating. Respondents answered indicating whether they had no difficulty, some difficulty, a lot of difficulty or were not able to do it at all. Of the midline respondents 15.6% experienced difficulty seeing, 2.9% experienced difficulty hearing, 10% experienced difficulty walking, 9.5% experienced difficulty remembering, 1.6% experienced difficulty with self-care, and 0.9% experienced difficulty with communicating. Based on these answers, four disability identifiers were calculated:

- Disability 1: At least one domain/question was coded some difficulty or a lot of difficulty or cannot do at all
- Disability 2: At least two domains/questions were coded some difficulty or any one domain/question was coded a lot of difficulty or cannot do at all
- Disability 3: Any one domain/question was coded a lot of difficulty or cannot do at all
- Disability 4: Any one domain was coded cannot do at all

The disability identifiers define disability in different ways. When using Disability 1 (the least restrictive threshold for identifying disability), 28.1% of midline respondents were identified as having a disability. When defined using Disability 2, 10.3% were identified, and when defined as Disability 3 (a more conservative threshold), 1.6% of respondents were identified as having a disability. There were no respondents indicating that they "cannot do at all" for any of the six questions. Therefore, Disability 4 was not calculated.

Discussion

The WG-SS questions were not asked at baseline and therefore cannot be compared at midline. However, according to the 2016 Timor-Leste Demographic and Health Survey (DHS), 18.7% of the population aged 15 years and over were reported to have some level of difficulty in at least one domain. The midline result was considerably higher (28.1%), however it should be noted that direct comparisons cannot be made considering the differing age ranges in both surveys (e.g. only WRA included in the TOMAK survey). The most commonly reported area in which people have difficulty is seeing, with 10% of the population aged 5+ years reported to have some level of difficulty in the DHS and 15.6% of the midline respondents reporting some level of difficulty. Again, this result is not directly comparable with the midline including older respondents that may be more likely to have some level of seeing impairment. Nonetheless, these results indicate that TOMAK is engaging people with disabilities in community groups.

Income sources

Midline respondents had higher average income sources than the control group respondents. Most midline respondents received income from the sale of crops (64.8%) or livestock (63.9%) and these income sources accounted for almost 50% of midline respondents' biggest income sources. On average, households in the midline received income from 2.48 different income sources. Households that were part of multiple groups (e.g. S&L and farmer, or farmer and nutrition) had a significantly higher average number of income sources compared to the S&L group, compared to the farmers group, and compared to the control group. These households that participated in more than one group type also have significantly higher average income than the control group.

Discussion

TOMAK's key community level approaches focused on increasing access to financial services and diversification of production mainly for household consumption. While there was not a targeted effort to diversify incomes sources, results reveal that midline households had higher average income sources than the control group. Income sources then increased further with participation in multiple groups. Given that there were no significant differences in the wealth and poverty index values between midline and control, it is not possible to state that having a higher number of income sources is linked to increased wealth. However, across the various outcomes measured in this study, midline households have overall higher dietary diversity, production, and sales from agriculture.

4.3. Key Evaluation Question 1: To what extent has TOMAK contributed to households having year-round access to sufficient and nutritious food?

Crop production

Households in the midline produced a significantly higher quantity and number of food groups compared to the control group. In addition, households from the farmer group produced significantly more crops per household compared to the S&L group, compared to the respondents from multiple groups, and compared to the control group. Respondents who were part of multiple groups produced significantly more crops per household compared to the control group.

Furthermore, the average number of food groups produced per household was significantly higher in the farmer group compared to every other group. The proportion of households that produce carbohydrates, vegetables and fruits, was higher in the baseline compared to the midline. The majority of FGD respondents shared the view that their production of crops has increased, leading to more income as well as more nutritious food on the table.

Of the midline households, 66.4% produced DGLV (vs. 48.4% in the control group), 67.4% produced Vitamin A rich foods (vs. 62.2% in the control group), and 52.7% produced legumes (vs. 61.9% in the control group). Households in the midline produced significantly more DGLV and Vitamin A rich foods compared to the baseline, but households in the baseline and control produced significantly more legumes.

The highest proportion of DGLV produced is in the farmer group. There was no significant difference in the distribution of production for Vitamin A rich foods between the groups (although the lowest percentage was in the control group).

Discussion

Households in the midline produced a significantly higher quantity and number of food groups compared to the control group, demonstrating that TOMAK's focus on crop diversification to improve the household's access to a nutritious diet has made progress. This is also supported by the finding that the average number of food groups produced per household was significantly higher in the farmer group compared to every other group. This is consistent with the interventions about crop diversity that have been specifically targeted at this group.

Significantly more households in the midline produce DGLV and Vitamin A rich foods compared to the control group, but significantly more households in the control group produced legumes. While the implementing partners had a strong focus on legumes (as well as DGLV and Vitamin A rich foods) in their farmer group activities, there could be other factors at play. These include:

- a focus on diverse crop production could result in less of a focus on legumes
- shorter cropping cycle for DGLV
- technical aspects of legume production (intercropping)

While TOMAK groups focused on diverse production, the control group may have focused more on the production of legumes. It cannot be assumed that households in the control group increased their production of legumes. A decrease of legume production in the midline groups seems more plausible due to crop diversification.

Results showed that the average number of food groups consumed was significantly higher in the

S&L group than in any other group aligning with the result that most respondents utilise loans for food purchases (and education expenses). This suggests that their improved access to money is linked to improved dietary diversity. In addition, the farmer group consumes significantly more food groups compared to the control group. This might suggest that respondents from the farmer group have easier access to food, either through consuming what they grow and/or by increased access to money through the sale of crops. However, there is potential to explore these connections further in future in order to establish if they are accurate.

Crop sales

The average number of crops sold, and the average number of food groups sold was significantly higher in the midline, compared to the control group. When comparing all groups, results show that households in the control group sold significantly fewer crops per household compared to the farmers group and compared to respondents that participated in multiple groups. In addition, the average number of food groups sold per household was significantly higher in the farmer group compared to the S&L group, compared to households that were part of multiple groups, and compared to the control group. Also, there were more households in the baseline (compared to the midline) that sold carbohydrates and fruits, but there were more households in the midline (compared to the baseline) that sold legumes and vegetables.

Discussion

The highest number of crops sold and crop types sold are in the farmer group when compared across other community groups and the control group. This result is to be expected given the focus on crop diversification and the promotion of improved agriculture techniques to boost production. Results also demonstrate that members of other groups are also applying production practices that are promoted to a lesser extent since their sales are also higher than the control group. TOMAK's approach had a strong focus on the production and consumption of nutritious foods that are less accessible and consumed less (e.g. legumes, Vitamin A rich foods). There has been less of a focus on the production of carbohydrates and fruit, which could be one potential reason for more baseline households selling fruits and carbohydrates, and more midline households selling legumes and vegetables.

Crop storage

Midline results show that white rice and red rice are stored for the longest period of time at six months compared to other crops (e.g. peanuts, mung beans). In terms of using improved storage methods (based on technologies promoted by partners), utilisation of the preferred method for maize was significantly higher in the midline than control group. Utilisation of the preferred method for red rice was higher in the control group than in the midline. There was no significant difference between midline and control for storage of the other crops. In terms of preferred duration, there was a significant difference in the distribution of food storage for the preferred duration for maize, for cowpea, and for red rice. The proportion of midline respondents storing these crops for the preferred duration, was higher in the midline compared to the control group. For the other crops, there was no significant difference.

Discussion

The storage results from this survey should be interpreted with care. Enumerators were not trained to specifically observe each storage technology to cross-check responses or ensure that there was no confusion between food storage and seed storage (despite probing specifically on food storage methods). NGO partners focused on grain storage and promoted drums/silos, jerrycans and sack storage techniques for maize and rice. Despite the limitations of the survey, the results

show higher rates of improved storage for maize between midline and control. These results provide an opportunity to deepen interventions that focus on storage techniques, especially for legumes to contribute to access and stability of food throughout the year. Current storage rates show that they are below potential (black beans currently stored at 3.16 months versus six months) and this is an area to further build off partner experiences promoting specific storage technologies, community willingness to pay for improved storage technology, and long-term use for food storage.

Livestock assets and animals

Of respondents in the baseline, 99.6% raised animals compared with 98.5% in the midline and 97.7% in the control group. There was no significant difference in the proportion of households raising animals between baseline and midline, nor between midline and control group. In addition, there was no significant difference in the distribution of households raising animals between the midline groups.

The proportion of households that own pigs, goats, fish, cows, and dogs was higher in the midline compared to the baseline. For chickens and ducks, there was no difference between baseline and midline. The average number of animal species in the household was significantly higher in the midline, compared to the control group.

Pigs, goats, sheep, cows and buffalo were raised predominately to sell or for cultural ceremonies. Chickens, dogs, and ducks were predominately raised to eat and sell, and fish were mainly raised to eat. The reasons for raising various livestock were consistent across baseline, midline and the control group.

Discussion

TOMAK has supported MAF's national chicken vaccination program to support disease control and integrate the promotion of the nutrition benefits of chicken meat and eggs, but overall, TOMAK Component 1 approaches did not focus on increasing livestock production. The midline survey results demonstrate that the number of households raising animals has remained largely the same from baseline to midline even though the average number of animal species was higher in the midline compared to the control.

4.4. Key Evaluation Question 2: To what extent has TOMAK contributed to household consumption of more nutritious food?

Nutrition knowledge and attitudes

Calculations of dietary diversity scores in the survey were complemented with nutrition and attitude questions. Overall, more midline respondents gave correct answers to the knowledge questions than control respondents. This is the same for attitude questions. For example, significantly more midline respondents were familiar with the three food groups (75.1%) compared to respondents from the control group (19.7%). Respondents in the nutrition group were more familiar with this concept than any of the other groups. In addition, the proportion of respondents from the control group that had heard of the three food groups was much lower compared to the other groups.

The average number of correct knowledge answers was significantly higher in the midline (5.58) compared to the control group (4.04). Results also showed that on average, respondents from the control group gave significantly fewer correct answers compared to all other group types. Respondents that were part of multiple groups gave a higher number of correct answers compared to the S&L group and the farmer group. Lastly, the nutrition group gave significantly more correct

answers compared to the S&L group and the farmer group.

In terms of nutrition related attitudes:

- 98.2% of midline respondents think it is important for young children to eat protein rich foods.
- 90.3% think that young children should eat protein rich foods two to three times per week.
- 98.0% think it is important for fathers to purchase protein rich foods for their children.
- 96.0% think that pregnant women or young children should get to eat an egg if there is only one egg available.
- 61.1% would prefer to buy a small amount of beans, eggs, or tofu for the family to eat if they had $2 to spare.

The total number of preferred answers was significantly higher in the midline than the control group.

Dietary diversity, food consumption, and food security scores

Minimum Dietary Diversity for Women (MDD-W)

Results show that almost 50% of WRA had consumed food from five or more food groups in the previous 24 hours. The average number of food groups consumed by WRA was significantly higher in the midline (4.69) compared to the control group (4.43). When comparing the midline groups, the average number of food groups consumed was significantly higher in the S&L group compared to every other group.

Among WRA in the midline, 49.2% met the MDD-W requirement as opposed to 16.4% in the baseline. This difference was significant. However, there was no significant difference between the midline and control group (44.9%).

Minimum Dietary Diversity for Children (MDD-C)

Just over a third (34.7%) of children in the nutrition group met the MDD-C, compared to 28.0% in the control group, but this difference was not significant. Significantly more children from the midline groups met the MDD-C (35.8%), compared to the baseline (10.8%). In addition, the proportion of breastfed children that met the MDD-C was higher in the midline groups (44.4%) compared to the control group (32.9%). The difference among non-breastfed children between the midline groups and control group was not significant.

Minimum Meal Frequency for Children (MMF)

There was no significant difference among the proportion of breastfed children between 6-8 months that met the MMF, between the nutrition and control group. In addition, there was no significant difference among the proportion of breastfed children between 9-23 months that met the MMF, between the nutrition and control group. The proportion of non-breastfed children that met the MMF did not differ significantly between the nutrition and control group. In addition, there were no significant differences among breastfed children between 6-8 months, among breastfed children between 9-23 months, or among non-breastfed children between the midline and the baseline.

Minimum Acceptable Diet (MAD)

The proportion of breastfed children that met the MAD was significantly higher in the midline (40.3%) compared to the baseline (11.6%). However there was no significant difference in the proportion of

breastfed children that met the MAD between the nutrition and control group. In addition, there was no significant difference in the proportion of non-breastfed children that met the MAD between the nutrition and control group. It can be noted that the percentage of non-breastfed children who met the MAD was much lower than for breastfed children. There is was no significant difference in the proportions of non-breastfed children that met the MAD between midline and baseline.

Food Consumption Score (FCS)

The average FCS among midline respondents (52.95) was significantly higher than among respondents from the control group (48.64). In addition, the midline respondents scored significantly higher on the FCS compared to the baseline respondents (43.79). The proportion of households with an acceptable food consumption score was higher in the midline (85.6%), compared to the baseline (62.9%). When comparing across group types, the average FCS was significantly lower for:

- the nutrition group compared to the S&L group, farmer group and to respondents that are part of multiple groups.
- the control group compared to the S&L group, farmer group and to respondents that are part of multiple groups (but not significantly lower than the nutrition group).

The midline respondents also scored significantly higher on the FCS compared to the baseline respondents (43.79). Lastly, the proportion of households with an acceptable food consumption score was higher in the midline (85.6%), compared to the baseline (62.9%).

Discussion

The Component 1 midline demonstrates that overall TOMAK has contributed to increased consumption of nutritious food at the household level. The MDD-W scores for WRA and the FCS were significantly higher in the midline than the baseline and control group. There was also significant change across child nutrition indicators from baseline to midline, although the differences between midline and control were minimal. Furthermore, the midline results show that using community groups as a forum to promote increased consumption is working.

While the higher MDD-W and FCS scores between baseline and midline and between midline and control are important findings, it is also key to note the differences in scores across group types. These scores are the highest in the S&L groups and the lowest in the nutrition groups when comparing across the three group types. This highlights a strong rationale for layering and integration of agriculture, nutrition and financial services components together to improve food consumption at the household level.

Despite the improved nutrition scores for WRA and members of the household as a whole, changing complementary feeding practices for children six to 23 months remains a major challenge not just for TOMAK, but across government and development partners. The TOMAK MMD-C, MAD, and MMF are overall higher than the national averages and municipal averages in Baucau, Bobonaro and Viqueque.[150] A potential factor for the limited improvement in these indicators is the small sample size for these child nutrition indicators, which were drawn only from nutrition group respondents (specifically WRA with children 6-23 months). In relation to the broader context of child nutrition, there have been significant investments in child nutrition in Timor-Leste. Evidence from this midline furthers the existing argument that there must be a multi-sectoral approach to reducing malnutrition in children. Timor-Leste joined the Scaling Up Nutrition[151] (SUN) movement in late 2020 giving the country more access to technical support on policy frameworks, financial tracking, and resource mobilisation.

Over the course of TOMAK there has been a diverse set of opinions from technical experts involved in the original design of the program and external evaluators on whether a nutrition-sensitive agriculture program should have nutrition-specific groups as a delivery platform and be implementing a curriculum on complementary feeding targeted at mothers and caretakers or tracking uptake in infant and young child feeding practices between baseline and midline. TOMAK acknowledges that the intensity of the nutrition groups could have gone deeper. These results present an important opportunity to take stock of the impact of TOMAK's overall approaches against indicators and what is feasible for an NSA program.

Mothers-in-law were raised multiple times in two nutrition FGDs as barriers to improved feeding practices for young children by mothers. It is interesting to note that the nutrition group respondents were about a decade younger than the other groups including the control group. Mothers may have increased knowledge, yet intra-household dynamics continue to be a challenge in improved feeding practices. This could be especially true for younger mothers who may have fewer resources and less ability to engage with their mother-in-law. TOMAK identified grandmothers as key influencers of household nutrition and as a specific audience in its SBC strategy. This included articulating specific behaviours promoted by TOMAK and partners for grandmothers and the development of SBC products/activities[152] aimed at grandmothers. Further exploration is needed in this area to study the key motivators to grandmothers supporting improved child feeding practices.

As reported under other sections, the nutrition group respondents have the lowest dietary diversity scores compared to S&L and farmer groups. This is likely attributed to greater access – access to savings and access to crops/food. Therefore, it is also likely that children from nutrition group respondents have lower outcomes across these domains (MMD-C, MAD and MFF) than if children were sampled from other groups. Again, a key emerging finding from the midline is that when nutrition is layered on to other group types, there is greater impact. Nutrition discussions were layered on to farmer and S&L groups, but improved production or financial management topics were not layered on to nutrition groups.

Hygiene

The vast majority (97.5%) of midline respondents had access to a handwashing station vs. 70.6% of baseline respondents and 89.3% of respondents in the control group. Midline respondents had significantly more access to a handwashing station compared to the baseline and control group. A majority (93.0%) of midline respondents wash their hands with soap, compared to 61.7% in the baseline and 84.1% in the control group. Significantly more midline respondents wash their hands with soap compared to the baseline and control group.

The midline asked when respondents think it is important to wash their hands. Respondents could select multiple answers. Even with access to handwashing stations, most respondents think it is important to wash their hands primarily before eating food (92.1%). The other five critical handwashing times promoted by TOMAK such as handwashing before feeding children (30.7%) or after disposing of their faeces (35.8%), was fairly low.

Discussion

While midline respondents had more access to handwashing stations and washed their hands

[150] Timor-Leste National Food and Nutrition Survey 2020: The proportion of children 6-23 months who achieved a MMF was 34.5% (33.0-36.0, 95% C.I), and 35.3% (33.8-36.8, 95% C.I) met the MDD. Only 14.3% (13.2-15.4, 95% C.I) in the same age group met the MAD.
[151] https://scalingupnutrition.org/
[152] TOMAK. 2020.Food, Frustrations, and Family Dynamics: Assessing the use of film to promote joint household decision-making

significantly more than the baseline and control groups, it is acknowledged that the midline data was collected following an intense period of handwashing promotion by multiple government and development partners due to COVID-19. TOMAK partners also contributed in this regard through increased focus on handwashing and other COVID-19 prevention practices in their community groups. The positive midline results for hygiene compared to the control group suggest that the TOMAK partners have been very effective in promoting handwashing during their regular activities and specific COVID-19 prevention activities.

Household decision-making

Midline results reveal that 71.5% of WRA perceive that women make the decisions about what the household eats and 63.2% of men also perceive that women make these decisions. Around 25-30% of WRA and men believe that couples share the decision, with only 3.5% of WRA and 4.5% of men perceiving that men alone take decisions about what the household eats. The vast majority (95.7%) of WRA reported being satisfied or very satisfied with their role in decisions regarding this matter, as opposed to 93.7% in the control group; this difference was not significant. For decisions about buying protein-rich foods such as eggs, fish, tofu, beans, both WRA (59.6%) and men (46.2%) reported that these decisions are predominately made by women. A similarly high number of WRA (96.3%) in the midline reported being satisfied or very satisfied with their role in these decisions, compared to 93.2% in the control group; this difference was significant. With regards to raising livestock, 76.0% of WRA and 77.4% of men perceive that women and men share the decisions. Only 9.2% of WRA and 12.6% of men perceive that men make decisions alone about large purchases. Shared decision-making about large purchases was reported by 58.8% of WRA and 68.2% of men. The proportion of both WRA and men that were dissatisfied with their role in making decisions about large purchases was around 5% in both the midline and control group.

Discussion

The midline results for HHDM show that women are more likely to be the primary decision-maker around what the family should eat and what protein-rich foods the household should purchase, compared to decisions about what crops to grow for food and decisions around livestock management, which are more likely to be shared between the couple. These results indicate that women are much more involved in decisions around how to feed the family than men, whereas men have greater involvement in decisions regarding faming (crops and livestock) with these decisions being more likely to be shared between the couple.

Similar results were found in the FGDs. Women were seen as responsible for the household food preparation and (child) care tasks and could decide on day-to-day expenses. Overall, women reported that men are not very active in making sure healthy food is prepared, but that they do find it important that all family members consume sufficient nutritious food. In the farmer and nutrition groups, the roles and responsibilities of women and men still hinged more on their traditional roles. “Light” agricultural work was seen as more suitable for women, while heavy field work and taking care of livestock was perceived as men’s domain (though women were also supposed to fetch wood and water and carry it over considerable distances).

Decisions around large purchases (over $30) were more likely to be shared as a couple or made by the woman than the man. The FGDs found that men usually make decisions on large expenses, which supports the finding of shared decision-making, but does not support the survey finding that a very small percentage of men make such decisions alone. It has been commonly assumed that men are more likely to make decisions around large purchases, so it is very positive result that women are also heavily involved in these decisions.

Levels of satisfaction from both women and men were high across all of these domains with very few respondents reporting to be unsatisfied or feeling neutral in terms of their role in decision-making. The midline compared to the control results showed rather minor differences in terms of level of satisfaction, although higher levels of satisfaction (very satisfied) were generally observed amongst midline respondents. One possible reason for the similar midline and control results is that the concept of satisfaction or thoughts around it are not fully developed unless challenged. In other words, if one simply accepts things the way they are without considering that they could be different, it is quite possible for people to feel satisfied with the arrangement. On the contrary, if one is exposed to thought provoking materials and discussion suggesting that the status quo may be challenged, people's level of satisfaction may waver as they realise things could be different. For this reason, the results around satisfaction amongst the midline respondents are considered positive as the midline couples had been exposed to HHDM topics through community groups and over time have had the opportunity to think about and discuss their roles in decision-making, and as seen in the results, they still feel satisfied with their role in decision-making.

Although the midline results for HHDM cannot be reliably compared to the baseline results, it is encouraging that the midline shows that women are left out of very few decisions, as either the primary decision maker or making decisions together with their husband, as agreed by both WRA and men respondents.

Finance

When comparing access to financial training in the last 12 months, access is significantly higher amongst midline respondents (35.4%) compared to the control group (6.3%). In terms of taking out loans, 54.0% of the midline respondents took out a loan in the last year, as opposed to 27.9% in the control group. This difference was significant. In addition, more respondents from the S&L group and respondents from multiple groups, borrowed money in the last year, compared to the other groups. Among midline respondents who took out a loan, 16.6% had been unable to make a loan repayment at the required time, as opposed to 28.0% in the baseline. This difference was significant. Also, the proportion of respondents that were unable to make a loan repayment was lower in the S&L group as well as among respondents from multiple groups, compared to the other groups.

Money borrowed from S&L groups was mostly spent on school fees and other school-related costs and on food purchases. Food types that were bought most often were meat, eggs and fish. Among midline respondents, 83.4% had made savings, as opposed to 64.4% in the control group. This difference was significant. The proportion of respondents that made savings was higher in the S&L group as well as in the group with respondents from multiple groups, compared to the other groups.

Discussion

There are clear themes that emerge around increased access to finance based on the above results:

- Households in the midline save more than in the control group.
- Households in the midline are better able to repay their loans compared to the control. Over 80% of respondents with loans have been able to meet their loan payments from the midline group and over 85% in the S&L groups.
- Loans in the S&L group were largely taken out for education expenses and food purchases for immediate consumption.

Food types that were bought most often were meat, eggs and fish. In the FGDs, these food items were described as often unaffordable, especially meat. This result also further strengthens the link between improved access to money and higher dietary diversity, as the food items bought from the borrowed money are not easily affordable for most.

Only 4.3% of respondents in the survey stated that they utilise loans for agricultural related inputs. This is an unanticipated result when partners have layered on discussion on improved agriculture techniques into S&L groups or at a minimum have promoted use of loans for agricultural inputs such as seeds, temporary labour, improved technologies (e.g. drip irrigation, grain storage, transport to Dili for collective selling). The survey results contrast with findings from the FGDs covered in previous sections, where respondents stated the specific uses of loans for agricultural inputs such as seeds and water pumps. This connection could be explored further in a more targeted survey.

Another interesting finding was that the average FCS was significantly lower in the nutrition group compared to the S&L group, compared to the farmer group and to respondents that were part of multiple groups. Based on the aforementioned point, it could be argued that access to money and/or increased food production has a stronger influence on a households' dietary diversity than improved nutrition knowledge; improved knowledge does not increase the means to provide a healthy and diverse diet for the household. Again, future studies should be conducted to establish this possible causation.

4.5. TOMAK community level approaches

Complemented by TOMAK led institutional strengthening activities, Component 1 community level interventions were delivered through implementing partners. The institutional strengthening and community level approaches were guided by the TOMAK SBC strategy that identifies audiences and the key practices to promote with each audience by behavioural theme.

While there was some variation across partner approaches and training materials, approaches were aligned across three main community group types: farmer groups, nutrition groups, and S&L groups. Nutrition content was layered on early into the establishment of farmer groups and into S&L groups later on into the establishment process. HHDM content was also layered on to well established farmer, S&L, and nutrition groups to ensure comfortability in discussing household dynamics. Based on this broad implementation modality across partners and community groups, there are key findings that emerge across the three community group types:

- Dietary diversity in WRA is highest in S&L groups, then farmer groups, then multiple groups and lastly nutrition groups.
- FCS score was highest in S&L, multiple groups, then farmer groups and lastly nutrition groups. The average FCS was significantly lower in the nutrition group compared the other groups.
- Nutrition groups had the highest nutrition knowledge. This did not equate to the highest dietary diversity for WRA or FCS for the household.
- Respondents that were part of multiple groups gave significantly more correct answers to nutrition knowledge questions compared to the S&L group and the farmers group.
- Participation in multiple groups was linked to households having a greater number of income sources.
- Ability to repay loans is highest amongst S&L and multiple groups.
- S&L group members mainly took out loans for education expenses and for food purchases (e.g. meat, fish, eggs).
- Higher levels of gender equitable household decision-making is associated with participation in S&L groups.
- Farmer groups produce the highest volume and more diverse crops compared to other groups.
- An overwhelming majority of FGD respondents across group types felt that participation in the group resulted in improvements in their lives including:
  - Access to credit and training in financial management

- Ability to save money
- Collective production and sale
- Higher agriculture production for sale + access to credit
- Improved agriculture practices

The approach of using S&L groups to increase access to financial services at the community level and to layer on additional interventions clearly had a significant impact. This includes positive results across several TOMAK indicators including nutrition, S&L, and HHDM. Farmer groups have also had an impact on increased access and consumption of nutritious foods.

4.6. Sustainability of community groups

Most community group respondents in the FGDs said their situation has improved through participation in one of the community groups and they have enough food for the family now, with sometimes a surplus to sell for a bit of additional income. FGD respondents expected their improved situation to continue after the program has finished. Furthermore, all participants, including those in farmer groups and S&L groups, were trained on nutrition (production and consumption of healthy food), and the respondents reported improved knowledge and behaviour related to nutrition. They were optimistic about continuing this, because they see positive health effects emerging.

Respondents perceived that there is more nutritious food available at household level through access to finance and/or having more nutritious food produced by better agricultural techniques and training. All respondents from farmer and S&L groups reported that even if the NGO that used to work with them no longer supported them, they would continue what they were doing without the help of the NGO – be it actively participating in the S&L groups, using modern agricultural techniques or producing and consuming more healthy food items. This demonstrates positive intention, and exploring how groups might continue in Phase 2 without external support could be investigated.

Investments in productive assets, notably water pumps (purchased by three farmer groups) are concrete benefits in participating in groups where collective purchases are possible. And through participation in financial management training, there is potential for groups to utilise savings for future group and individual purchases.

Among the nutrition groups, the majority reported that they wanted to continue, but not all. Apart from improved nutrition behaviour, which most of them will continue on an individual basis, they perceive little reward form being a member of a group, especially after the NGO has left. A common denominator, such as working the land together, lowering costs or creating a pool of funds, is needed to keep the groups viable in the long run.

4.7. Recommendations/Lessons Learned

NSA is an impactful approach

TOMAK's overarching goal is to ensure that rural households live more prosperous and sustainable lives. This midline report assessed Component 1's progress towards establishing a foundation of food security and good nutrition for targeted rural households; through locally relevant partners triggering household demand for year-round production and utilisation of diverse and sufficient food. Results show that TOMAK has made a positive and significant contribution to increased access and consumption of nutritious foods. Utilising an NSA approach and strengthening the link between agriculture and nutrition to focus on the promotion of nutritious crops that address known nutrient

gaps in Timor-Leste has demonstrated impact for TOMAK.

While substantial areas for further improvement still remain, approaches that show the greatest impact should be continued as a key component of TOMAK's approach in Phase 2. S&L groups demonstrate the highest improvement across key assessment areas in the midline. A key emerging finding from the midline is that when nutrition content is layered on to other group types, there is greater impact. S&L groups are inherently more sustainable by design because group members continue to benefit from group membership beyond the life of a program. The S&L approach differs from a traditional style nutrition group that is established with WRA and focuses on a curriculum. Once the curriculum is completed, members may not have specific reasons to continue to meet formally.

Farmer groups have also shown significant change across key assessment areas, especially production of diverse crops. TOMAK should build off these lessons in Phase 2 and seek to strengthen the linkages across S&L and farmer groups (ensuring all farmer groups have access to S&L) going forward. Agriculture, nutrition and access to financial services are key components in meeting TOMAK's broader outcomes and should be fully integrated going forward. This may result in an approach where there is full integration of group types and there is little to no distinction between groups.

SBC should continue to be an integral part of TOMAK's approach to NSA

An SBC approach was built in early into TOMAK Component 1 based on an acknowledgement that changing behaviours is complex and there are multiple factors that influence daily decisions to test, adopt, and eventually internalise and sustain new or modified behaviours. TOMAK promoted specific individual and group behaviours—among mothers, fathers, caregivers, nutrition and health service providers, farmers, extension workers, and others in an attempt to shift attitudes and norms around those practices and support an enabling environment for positive change.

Midline results show higher levels of NSA knowledge, more positive attitudes, and behaviour change in intervention areas. There is also evidence to show that TOMAK's key messages are consistent and reinforced through multiple platforms (e.g. across community group types and government service providers). A strong SBC approach should continue in Phase 2 and take advantage of opportunities to include monitoring and tracking of uptake across key technical areas, in between larger midline and endline studies.

Household decision-making should continue to be an integral aspect of TOMAK's approach

Changing gendered social norms requires a long-term commitment. The midline demonstrated some level of movement in increased household decision-making between couples on farming, use of household resources, and the prioritisation of nutritious foods. The importance of gender equity and an equitable division of labour should continue to be an essential aspect of TOMAK's approach. This includes the further layering of HHDM modules early on into community groups to promote shared decision-making and male involvement in household nutrition and to encourage reinforcement and support from government service providers (e.g. agriculture extension workers, health providers).

Mainstream disability inclusion and support

Approaches should be adopted that encourage and enable participation of people with disabilities in all activities. TOMAK should continue to support people with disabilities that participate in TOMAK activities to be referred to disability services as needed and explore ways to ensure that the needs of people with disabilities are met in TOMAK activities so that they are able to apply what they learn

through the activities to the same extent as people without disabilities.

Deepen the focus on water conservation and access to water within a broader resilience strategy

Challenges around water access were raised repeatedly in the FGDs as a key barrier to increased and diverse production. TOMAK has supported a variety of agriculture approaches including conservation agriculture (CA) approaches, climate smart agriculture (CSA), water-efficient systems such as drip irrigation, rain water harvesting, and drought resistant seeds. In Phase 2, TOMAK should develop a water access and management strategy for target communities and households that is consistent across components and implementing partners. This should be within the context of a wider resilience strategy as climate change and shocks are likely to also impact nutrition.

Consolidate learnings across TOMAK and partners on storage techniques

Food storage is a key component that contributes to food stability and resilience and one of the four pillars of food security. Midline results show that respondents are practicing food storage and to some extent utilisation of improved techniques. These efforts should be increased in Phase 2 to further influence FIES scores and improve resistance to various climatic shocks, while developing household ability to withstand annual lean seasons. TOMAK partners have worked on storage techniques in Timor-Leste for years and across funding streams. Lessons learned and best practices across TOMAK, implementing partners and other development partners should be carefully considered when designing Phase 2.

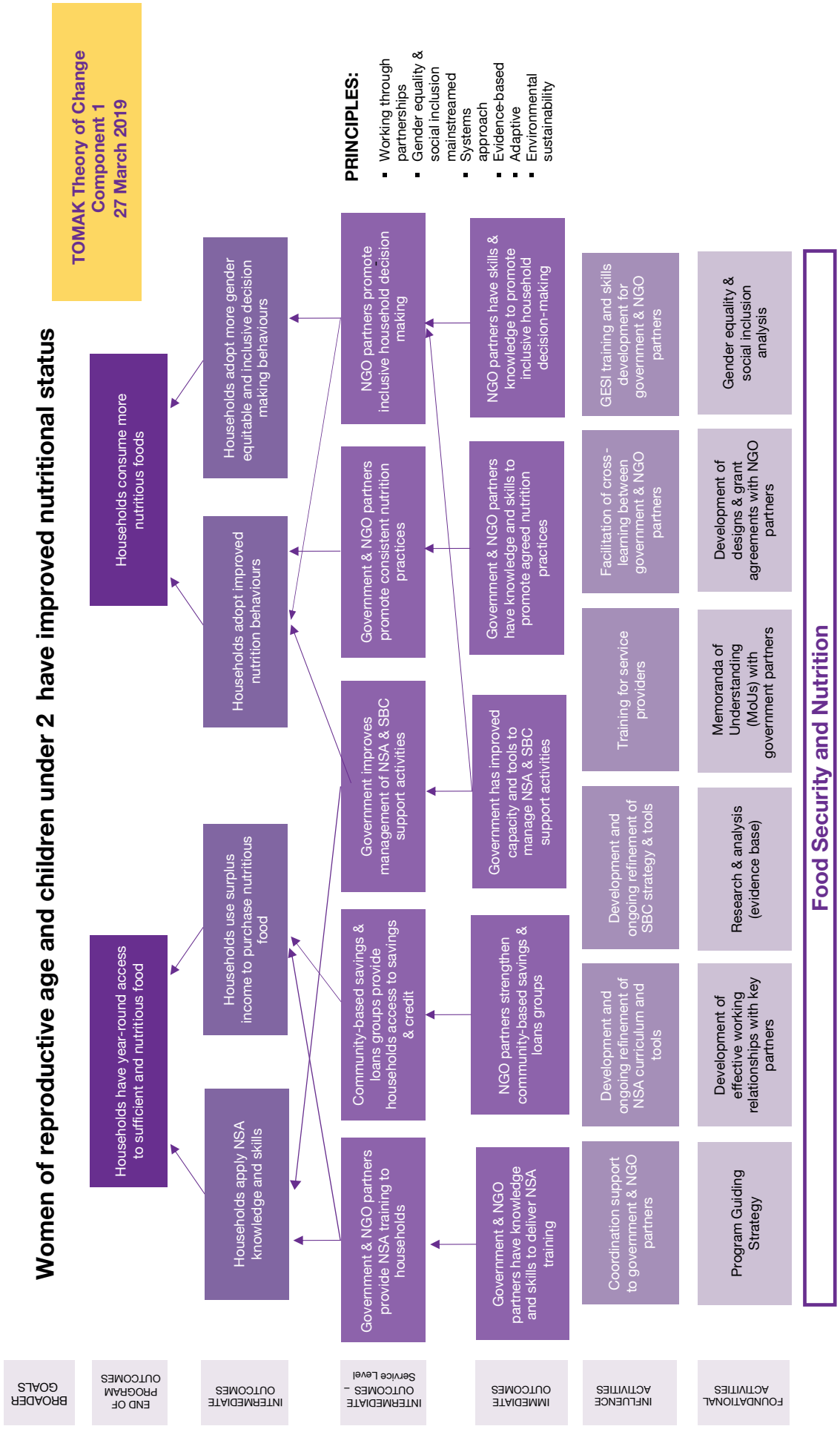
Re-visit how to engage with grandmothers and mothers-in-law as influencers of household nutrition

There is evidence that this audience can positively influence or be barriers to improved nutrition within their households. Grandmothers should remain a key audience to engage to increase the consumption of nutritious food at the household level, and for WRA and young children in particular.

Additional efforts on handwashing during the five critical times are needed

The promotion of handwashing has long been a staple of public health programs and a challenging area for behaviour change. The momentum of handwashing and access to handwashing stations due to the COVID-19 pandemic should be continued with an increased focus on handwashing at the five critical handwashing times.

Annex 1: TOMAK Component 1 Theory of Change



Annex 2: TOMAK indicators and survey modules to measure them

Theory of change box	Indicators	Respondent type	Survey module	Findings
Impact				
Households consume more nutritious foods	Proportion of WRA with improved dietary diversity score (MDD-W)	WRA WRA with child	MDD-W	Midline 49.2% vs. Control 44.9%^{ns} Baseline 16.4% vs. Midline 49.2%* % of WRA that meet the MDD-W requirement is highest in the savings and loans groups
	Proportion of children between 6-23 months of age with improved minimum acceptable diet (MAD) score	WRA with child	MAD, MDD-C, MMF	MDD-C Nutrition 34.7% vs. Control 28.0%^{ns} Baseline 10.8% vs. Midline 35.8%* Breastfed: Midline 44.4% vs. Control 32.9%* Non-breastfed: Midline 23.1% vs. Control 18.7%^{ns} MMF Breastfed 6-8 months: Nutrition 76.9% vs. Control 89.1%^{ns} Breastfed 9-23 months: Nutrition 89.6% vs. Control 81.7%^{ns} Non-breastfed 6-8 months: Nutrition 68.5% vs. Control 53.3%^{ns}. Breastfed 6-8 months: Baseline 85.0% vs. Midline 85.4%^{ns} Breastfed 9-23 months: Baseline 86.0% vs. Midline 88.9%^{ns} Non-breastfed 6-8 months: Baseline 70.2% vs. Midline 70.4%^{ns} MAD Breastfed: Nutrition 37.6% vs. Control 29.5%^{ns} Non-breastfed: Nutrition 6.8% vs. Control 4.0%^{ns} Breastfed: Baseline 11.6% vs. Midline 40.3%* Non-breastfed: Baseline 4.3% vs. Midline 7.4%^{ns}

Theory of change box	Indicators	Respondent type	Survey module	Findings
Households have year-round access to sufficient and nutritious food	Proportion of households with improved year-round food security	Men WRA WRA with child	FIES	Moderate to severe food insecurity: Midline 25.9% vs. Control 28.8%^{ns} No significant difference between the midline groups Severe food insecurity: Midline 1.7% vs. Control 2.6%^{ns} No significant difference between the midline groups
	Proportion of households with improved food consumption score (FCS)	Men WRA WRA with child	FCS	Average FCS Midline 52.95 vs. Control 48.64* Baseline 43.79 vs. Midline 52.95*
Outcome				
Households apply NSA knowledge and skills	Proportion of households producing nutritious food	Men WRA WRA with child	Nutrition knowledge Crops	Crops Average no. of crops: Midline 11.47 vs. Control 9.41* Average no. of food groups: Midline 3.54 vs. Control 3.34* Carbohydrates: Baseline 99.6% vs. Midline 92.5%* Legumes: Baseline 28.8% vs. Midline 83.8%* Vegetables: Baseline 92.9% vs. Midline 81.4%* Fruits: Baseline 86.7% vs. Midline 72.1%* DGLV: Midline 66.4% vs. Control 48.4%* Vit. A-rich food: Midline 67.4% vs. Control 62.2%* Legumes: Midline 52.7 % vs. Control 61.9%*
Households use surplus income to purchase nutritious good	Proportion of households reporting purchase of identified nutritious foods	Men WRA WRA with child	FCS source	Average no. of days consumed Cereals and tubers: Midline 6.81 vs Control 6.55* Pulses: Midline 1.47 vs. Control 1.67* Meat and fish: Midline 3.93 vs Control 3.27*
	Proportion of farmers reporting increase in savings and loans	Men WRA WRA with child	Finance	Loans Midline 54.0% vs. Control 27.9%* Savings Midline 83.4% vs. Control 64.4%*

Theory of change box	Indicators	Respondent type	Survey module	Findings
Households adopt more gender equitable and inclusive decision-making behaviours	Proportion of WRA that report having greater decision-making power and satisfaction in regard to household decision making, especially household food production, consumption and related expenditure	Men WRA WRA with child	Household-decision making	<u>Food consumption:</u> No difference compared to control Satisfaction: Midline 95.7% vs. Control 93.7%^{ns} <u>Food production:</u> No difference compared to control <u>Satisfaction:</u> Food crop: Midline 94.7% vs. 93.5%^{ns} Cash crop: Midline 94.7% vs. Control 94.7%^{ns} <u>Large purchases:</u> No difference compared to control Satisfaction: Midline 89.6% vs. 88.2%^{ns}
	Proportion of WRA and men reporting male engagement in household nutrition decisions has improved	Men WRA WRA with child	Household-decision making	No difference compared to control
	Proportion of WRA reporting satisfaction with their role in household nutrition decision-making has increased	Men WRA WRA with child	Household-decision making	Satisfaction with decision-making on buying protein-rich food: Midline 96.3% vs. Control 93.2%*
Households adopt improved nutrition behaviours	Proportion of households where knowledge and attitudes (especially of men) towards specific nutritious foods has improved	Men WRA WRA with child	Nutrition knowledge Nutrition attitudes	<u>Nutrition Knowledge:</u> Average no. of correct answers: Midline 5.58 vs. Control 4.04* Control group gave significantly less correct answers compared to all other groups. <u>Nutrition Attitudes:</u> Average no. of preferred answers: Midline 4.43 vs. Control 4.19*
Households receive nutrition messages	Households receive messages on nutrition through local networks/ groups that are consistent with key TOMAK nutrition messaging	FGD participants (women & older women)	Nutrition knowledge Nutrition attitudes	Almost all FGD respondents from the various groups were able to rightly share the nutrition messages that they had received as part of the nutrition training, and some provided examples on their changed nutrition behaviour.

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