MYSAP Inland
Midline Nutrition Survey
Kale, Kengtung and Shwebo Townships
May 2019

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1. Background

The Myanmar Sustainable Aquaculture Programme (MYSAP) which is funded by the European Union (EU) and the German Federal Ministry of Economic Development and Cooperation (BMZ), and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has the following objective:

Support the sustainable intensification of the aquaculture sector, thereby realizing its potential for food security, nutrition and sustainable livelihoods.

MYSAP is promoting small-scale freshwater aquaculture and improved human nutrition in five townships in the Shan State and the Sagaing and Mandalay Regions of Myanmar under MYSAP Inland which is being implemented by WorldFish under a GIZ grant agreement. The five MYSAP Inland townships are:

i) Kale (ကလေး - MMR005027) Township, Sagaing Region

ii) Shwebo (ရွှေဘို - MMR005004) Township, Sagaing Region

iii) Kengtung (ကျိုင်းတုံ - MMR016001) Township, Eastern Shan State

iv) Pinlaung (ပင်လောင်း - MMR014009) Township, Southern Shan State

v) Amarapura (အမရပူရ - MMR010006) Township, Mandalay Region

In early 2018, Mekong Economics Limited was contracted under a service agreement with WorldFish to conduct the MYSAP Inland baseline survey after a tendering process. During the baseline survey in May 2018 Mekong Economics Limited collected data on household nutrition via the minimum dietary diversity of women (MDD-W) tool and recall of fish consumption. MYSAP Inland repeated the nutrition survey one year later in May 2019 in Kale and Shwebo Townships in the Sagaing Region and in Kengtung Township, Shan State, following part of the same survey questionnaire applied by Mekong Economics Limited.

The causes of malnutrition are multifactorial; inadequate diet diversity has been identified as one of the contributing factors in Myanmar[1]. Inadequate diet diversity was also observed in the Mekong Economics baseline population MDD-W score of 3.34 (women only), indicative of inadequate micro-nutrient intake in this population. Nationally, the consumption of fish and animal source foods is lowest in the poorest households[2]. MYSAP Inland promotes fish consumption and increased diet diversity with the aim of addressing malnutrition in low income and fish deficient areas. Households are supported in the production of fish and homestead vegetable and fruit gardens delivered simultaneously with basic nutrition promotion and education. The purpose of the midline survey was to monitor diet diversity and fish consumption following one of two MYSAP Inland culture seasons. Dietary intake is influenced and confounded by many factors that were not controlled by MYSAP Inland and as such are a limitation of this survey. Here, while this assessment tracks dietary patterns in the beneficiary population as MYSAP Inland aims to improve dietary intakes through nutrition sensitive approaches, it does not infer causality.

Beneficiaries were/are targeted at the household level where access to/ownership of a fish pond is the entry point for direct small-scale aquaculture (SSA) beneficiaries. Training invitations to the household are not directed to the household head or men, a common pitfall of agriculture extension in Asia and many other regions of the world, where more men than women attend training. Though literature also shows that attendance of women in training does not necessarily mean they benefit. The workload, and time burden of women can actually increase as a result of development interventions with unintended negative

[1] https://www.lift-fund.org/under-nutrition-myanmar-part-2-secondary-analysis-lift-2013-household-survey

[2] So Jung 2018 and Scott 2019 Animal source food consumption in Myanmar (unpublished)

consequences on nutrition.[3] Benefit from the MYSAP Inland can be attained in many ways (knowledge and training, technology transfer, improved production, consumption, income, etc.), while we continue to improve our understanding of "benefit" and intra-household and gender dynamics in the collaborating communities. This survey aims to provide a snapshot into; i) are women benefiting in terms of consuming the fish produced, ii) do they have adequate diet diversity and iii) equality in decision making power over the fish produced and the resulting income?

[3] Malapit (2019) CAB International *Agriculture for Improved Nutrition: Seizing the Momentum: Women in Agriculture and the implications for nutrition* 6, 58 - 65

2. Methodology

Sections of the baseline questionnaire used by Mekong Economics Limited were applied, though the sampling method, the identification of targeted respondents and the classification of low-income households was modified. Additional questions were asked on the consumption of processed fish and gendered decision-making power.

2.1 Sampling method

Mekong Economics Limited applied a quota sampling method, to be reflective of the local population. From a total of 847 baseline survey respondent households 81, representing 9.6% of total respondents, were aquaculture producers (the survey team had difficulty identifying aquaculture famers during the baseline survey, which was conducted to, and before beneficiaries were selected). For the MYSAP Inland mid-line MDD-W survey, a simple random sampling method was used from direct beneficiary households practicing SSA with MYSAP Inland support. At the time of the mid-line survey MYSAP Inland was providing extension and training to a total of 648 direct beneficiary households. Based on the total numbers of beneficiaries, a 5% margin of error, and a 95% confidence level; a sample size of 250 direct beneficiary households (38.6% of the total number) were selected for the 3 Inland townships of Kale, Shwebo and Kengtung for face to face individual interviews.

2.2 Identification of targeted respondents

The Mekong Economic Limited baseline survey included both men and women as respondents, with women being 58% of the total respondent number. Of these, 35% were women of reproductive age (between ages 15-49 years of age). For the mid-line MDD-W survey all (100%) of interviewed respondents were women of reproductive age.

2.3 Identification of low-income households

Mekong Economics Limited used the definition of poverty and poverty line defined by the Millennium Development Goals[4], of US$ 1.25 per day per person, though Mekong Economics Limited assumed that the monthly average income was from 2 working adults per household. This resulted in the low-income household threshold being less than MMK 3,717 per day[5] or less than MMK 111,510 per month.

For this mid-line survey, low-income households were identified as households with an average income of less than US$ 1.25 per day every household member, which factors in the number of children per household when identifying low-income households. MYSAP Inland farmer profile data details the number of people (adults and children) per household and this was used to calculate the average number of people per household per township; which was in turn used to identify low income households.

2.4 Interview technique and survey tools

Both male and female enumerators conducted face to face individual interviews at locations convenient to the respondents; for some interviews, a women's family or husband were/was present during the interview and this survey did not intervene or control for these dynamics. Respondents were informed of the purpose of the MYSAP Inland survey and could decline to participate or omit questions at their preference.

[4] https://www.mdgmonitor.org/mdg-1-eradicate-poverty-hunger/

[5] 2 people x US$ 1.25 x MMK 1,486.8 per US$ 1.

Individual questionnaires were used to gather quantitative information at the midpoint after one of the two culture seasons of the MYSAP Inland and included;

- Individual socioeconomic data and household income
- 24 hour dietary recall used to apply the MDD-W tool
- Seven day recall of frequency of fish and fish-based product consumption
- Additional decision-making questions on the use of the fish and income from fish produced.

2.5 Minimum dietary diversity for women (MDD-W)

Minimum dietary diversity (score of ≥5 out of 10) is a simple proxy to reflect micro-nutrient adequacy in women of reproductive age. The reference text below was used to guide this MDD-W survey:

  - FAO and FHI 360. 2016. *Minimum Dietary Diversity for Women: A Guide for Measurement*. Rome: FAO.

While 22 different food groups are cited in the above USAID/FAO MDD-W reference for MDD-W the recommended methodology uses an aggregated list of the 10 following food groups (see **Annex 1**) for examples of food in each subgroup) which have a strong correlation with micro-nutrient sufficiency.

  - Grains, white roots and tubers and plantains
  - Pulses (beans, peas and lentils)
  - Nuts and seeds
  - Dairy products
  - Meat, poultry and fish
  - Eggs
  - Dark green leafy vegetables
  - Other vitamin A-rich fruits and vegetables
  - Other vegetables
  - Other fruits.

- Other food categories were not included in the calculation of the total MDD-W score out of ten.

2.6 Enumerator training

All enumerators, who were either MYSAP Inland field staff or field staff of the implementing partners, were given a full one-day training course on the MDD-W by the MYSAP Inland Data Management Officer. The training covered the following topics:

- Operational definition of "women of reproductive age", "dietary diversity" and "minimum dietary diversity for women (MDD-W)"
- Why focus on "dietary diversity for women?"
- Indicators for minimum dietary diversity for women
- Ten food groups that comprise the MDD-W indicator
- Research design
- Sampling method
- Mobile data collection method using KoBo software and android smart mobile phones.

A total of 23 people participated in the training for the mid-line survey, including 17 from implementing partner organizations, being 2 Ar Yone Oo staff, 7 BRAC Myanmar staff and 8 Malteser International staff, plus 6 MYSAP Inland staff; 12 of the 23 enumerators were women (52.2%).

2.5 Data collection

Data collection for the survey, using the questionnaire given at **Annex 2**, was conducted in Kale, Shwebo and Kengtung townships between 07-08 May 2019, 13-17 May 2019, and, 21-22 May 2019 respectively. Data collected was entered directly onto android smart mobile phones into open-source KoBo software downloaded from the KoBo Toolbox website (https://www.kobotoolbox.org/) by the Data Management Officer. Each evening, when enumerators had internet access, the field data was uploaded from their smart phones. The Data Management Officer checked and cleaned each day's data and stored the full data set securely each night.

Table 1. Beneficiary survey numbers per MYSAP Inland township

Sample size	Kale	Shwebo	Kengtung	Total
Total number of beneficiary households	151	256	241	648
Number of respondents (sample size)	58	99	93	250
Number of wards[6] (sampled)	1	3		4
Numbers of village tracts[7] (sampled)	4	12	8	24
Number of villages[8] (sampled)	8	15	17	40

Table 2. Data collection

	Kale	Shwebo	Kengtung
Date of data collection (start)	07 May	13 May	21 May
Date of data collection (end)	08 May	17 May	22 May
Number of enumerators (implementing partner)	2	8	7
Number of enumerators (MYSAP Inland)	0	1	1
Number of supervisors	1	1	1
Language used in data collection	Myanmar *	Myanmar	Myanmar *

*Local languages and dialects were used where required including Arka, Lahu and Shan.

[6] Ward is the region in the relevant township boundary.

[7] Village tract is a collection of villages.

[8] Village is not included in the estate within township boundary.

3. Respondent profile

Table 3. Respondent profile as percentage of 250 total respondents

	Kale	Shwebo	Kengtung	Total
Respondents who are women of reproductive age*	100%	100%	100%	100%
Respondents with non-formal education including illiterate**	2%	5%	44%	19%
Respondents with primary education (G1-G5)	21%	44%	26%	32%
Respondents with secondary education (G6-G11)	66%	39%	29%	42%
Respondents with higher education (graduated)	12%	11%	1%	8%
Respondents who are married	90%	71%	88%	82%
Respondents who are unmarried	10%	29%	12%	18%
Respondents with children under 5	53%	36%	44%	43%
Respondent from low income HH***	66%	55%	87%	69%

* Women of reproductive age = 15 to 49, with a mean age of 33.9 years
** Illiterate = People who cannot read, write and calculate
*** Low income households (< US$ 1.25 {MMK 1,937.5} per day per household member)

69% of households were low income (poor and vulnerable) households defined as living on less than US$1.25 a day per person within the household (source: https://www.mdgmonitor.org). 87% of MYSAP Inland households in Kengtung were below the poverty line. As seen in **Table 3**, the percentage of low income households in Kengtung Township was significantly more than other townships.

Seasonality

Local food supply and consumption is seasonally affected, thus this survey represents a snapshot of consumption patterns in the dry season of May 2019. Some farmers had limited/no water supply at this time, impacting crop propagation and many streams that would have been used for irrigation and capture fisheries had dried up in April. Egg consumption may also be lower due to chicken deaths in the hot season. Fish consumption was also affected, some areas still have access to waterways for capture fisheries, though many did not as the local stream was dry. Some farmers, remote from irrigation canals, had harvested their fish ponds as these had dried up, or were drying up.

4. Results

4.1 Minimum Dietary Diversity for Women

A minimum dietary diversity (score of ≥5) was achieved by 65% of respondents and the highest was in Kengtung (71%) compared to Kale (53%). Forty-seven percent of respondents in Kale scored less than five, compared with the total mean of 35% indicating inadequate micro-nutrient intake for those women. The average MDD-W score of low-income households was 4.9 and non-low-income households 5.1.

Table 4. Mean MDD-W score and percentage of respondents achieving ≥ 5 food groups

	Kale	Shwebo	Kengtung	Mean of Townships
Mean minimum dietary diversity of women (MDD-W) score /10	4.7	5.0	5.2	5.0
Total who consumed < 5 food groups	47%	34%	29%	35%
Total who consumed ≥ 5 food groups	53%	66%	71%	65%

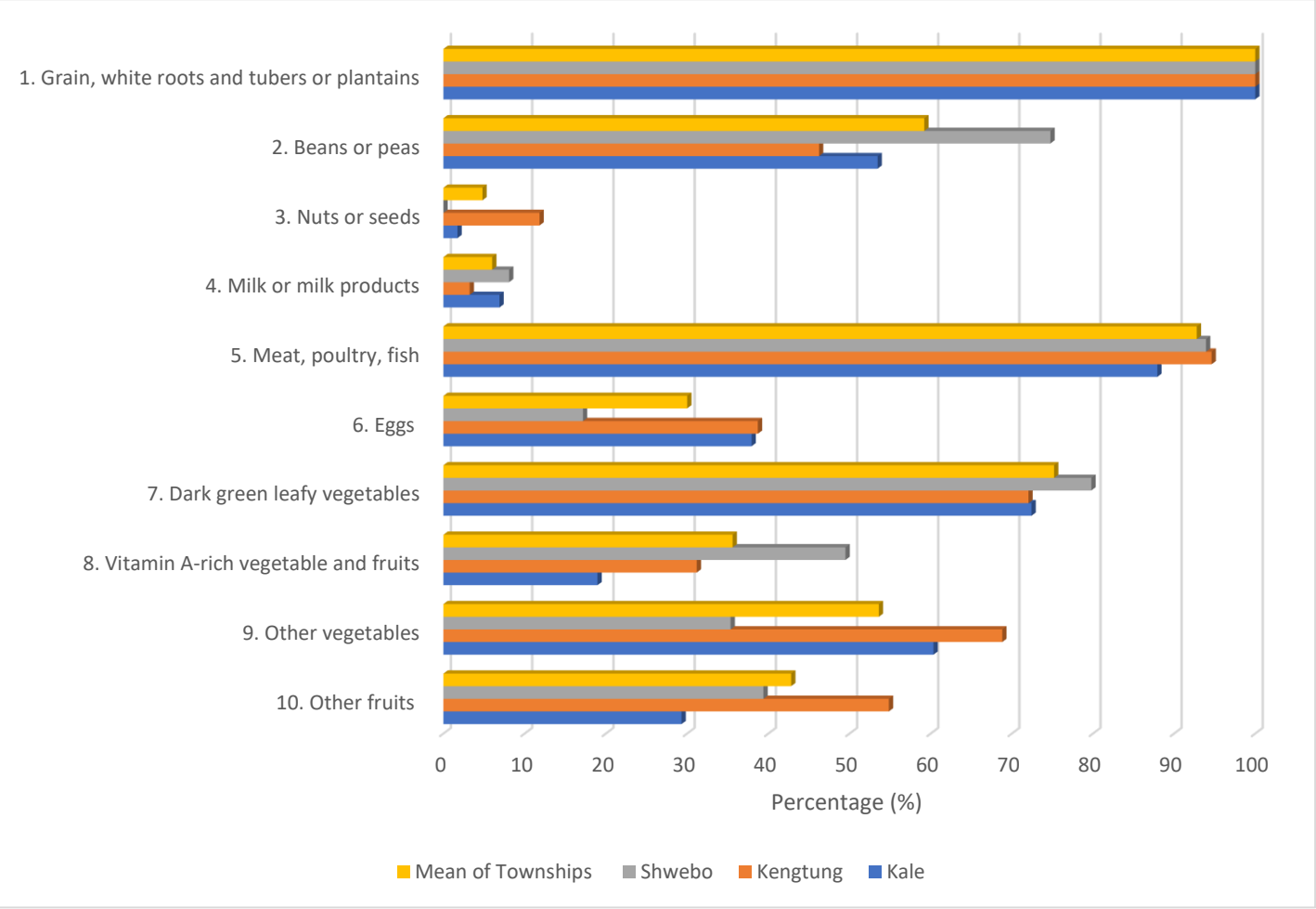

Figure 1. Consumption per MDD-W food group per township

Table 5. Fourteen food groups: presents further disaggregation of the MDD-W food groups; distinguishing fish from other animal meats

Food group	Kale		Shwebo		Kengtung	
	Percent	Rank	Percent	Rank	Percent	Rank
Grain	100%	1	100%	1	100%	1
Dark green leafy vegetables	72%	2	80%	2	72%	2
Fish or seafood	69%	3	74%	4	70%	3
Other vegetables	60%	4	35%	8	68%	4
Beans or peas	53%	5	75%	3	46%	7
Meat or poultry	41%	6	36%	7	65%	5
Eggs	38%	7	17%	10	39%	8
White roots and tubers or plantains	36%	8	11%	12	14%	11
Other fruits	29%	9	39%	6	55%	6
Vegetables or roots that are yellow or orange colored inside	14%	10	12%	11	27%	9
Meat made from animal organs	10%	11	27%	9	19%	10
Milk or milk products	7%	12	8%	13	3%	14
Dark yellow or orange inside Fruit	5%	13	44%	5	12%	12
Nuts or seeds	2%	14	0%	14	12%	13

Being the staple food of the Myanmar diet, rice dominates the consumption contribution to group 1 and was consumed by all respondents in the 24 hour recall period.

Ninety-three percent of respondents had consumed at least one type of animal meat in the previous 24 hours, indicating low prevalence of vegetarian dietary patterns. Animal meats were also the most frequently consumed protein foods (albeit not quantified) over legumes, eggs, nuts and seeds.

Variation in consumption of food groups was seen between townships, likely related to local food supply and cultural preferences. This was seen in the fruit and vegetable groups, in Shwebo Group 2. Beans or peas and Group 8. Vitamin A-rich vegetables and fruit were the highest, though other fruits (Group 10) and vegetables (Group 9) were lower in Shwebo.

Group 8 - orange vegetables and fruits, are a target group for vitamin A. **Table 5** disaggregates the consumption between orange flesh fruit and vegetables, which demonstrates further variation between regions; in Shwebo 44% consumed orange fruit, such as mango, where as in Kengtung 27% of respondents had eaten orange vegetables. Dark leafy green vegetables were highly and widely consumed, 75% across all areas.

Milk and milk products were infrequently consumed being 6% in total. These products are not widely locally produced and are costly in Myanmar. Popular sugar sweetened “juice-milk” drinks were not included in this category due to their high sugar content and low nutritional value.

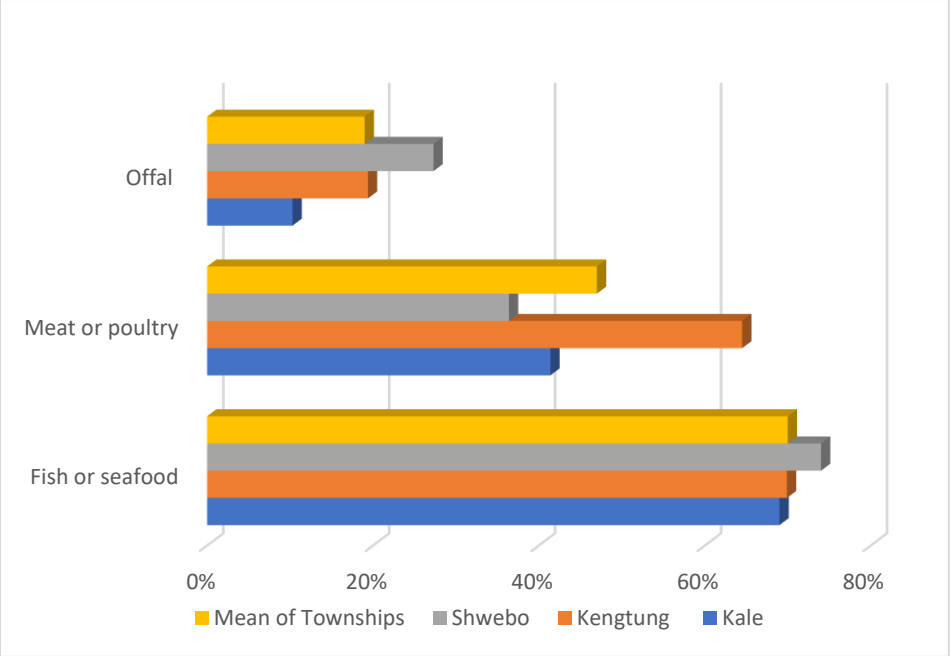

Figure 2. Disaggregation of MDD-W Group 5 - Animal meats

Disaggregating animal meat consumption demonstrates fish and seafood was the most consumed animal protein source and consumption was relatively even across the townships. Meat or poultry consumption in Kengtung was higher than Shwebo and Kale townships.

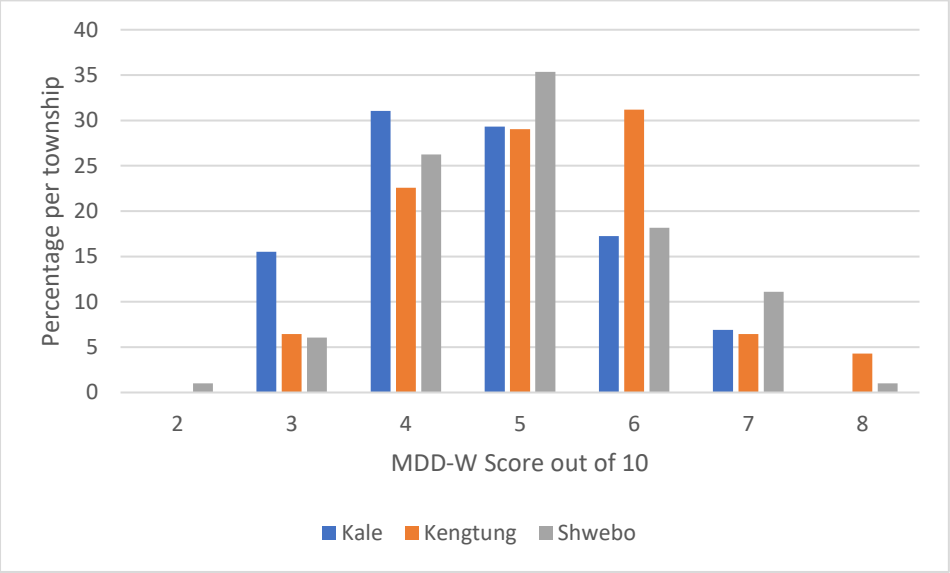

Figure 3. Distribution of MDD-W scores

One respondent in Shwebo scored a MDD-W of only two. Kale had the lowest mean MDD-W score of 4.7 and also the most number of MDD-W scores below 5, compared with Kengtung with the highest mean and the number of respondents achieving > 5 food groups.

4.2 Fish consumption

In addition to fish and seafood consumption assessed in the 24-hour recall for the MDD-W, fish consumption was also assessed for the prior seven days (inclusive of the 24 hours covered by the MDD-W

recall). Fish consumption was measured by the number of respondents that had eaten fish in the seven days before the interview, and for how many meals.

Table 6. Fish frequency consumption in the past seven days

	Kale	Shwebo	Kengtung	Mean of townships
Percentage of respondents eating fish in the past 7 days *	72%	96%	94%	90%
Average number of meals eaten containing fish	2.3	6.3	8.0	6.0

* Fish consumption included fish products such as dried fish

Ninety percent of all respondents had consumed fish and fish based products in the previous week. Shwebo had the most respondents (96%) who had consumed fish within the previous week, while Kengtung the highest number of meals, being an average of eight meals containing fish within that seven days. Respondents in Kale were the lowest consumers of fish in the past seven days (72%) and with the lowest mean of 2.3 meals. Similar results were found for of low-income households where 91% had eaten fish in the last week, with a mean of 5.9 meals.

Table 7. Fish species: percentage consumption of those that had consumed fish

	Kale	Shwebo	Kengtung	Mean of townships
Rohu - *Labeo rohita*	45%	19%	20%	26%
Mrigal - *Cirrhinus cirrhosus*	9%	53%	4%	24%
Common carp - *Cyprinus carpio*	38%	11%	53%	33%
Grass carp - *Ctenopharyngodon idella*	3%	2%	-	2%
Catla - *Gibelion catla*	-	11%	3%	6%
Tilapia – *Oreochromis* sp.	-	68%	70%	53%
Striped river catfish - *Pangasianodon hypophthalmus*	-	7%	3%	4%
Pacu - *Colossoma macropomum*	-	7%	-	3%
Climbing perch – *Anabas testudineus*	-	2%	-	1%
Bronze featherback - *Notopterus notopterus*	-	12%	-	5%
Burmese flying barb - *Esomus danrica*	-	2%	10%	4%
Burmese barb - *Esomus ahli*	-		8%	1%
Indian glassy fish - *Parambassis ranga*	-	8%	-	4%
Silver carp - *Hypophthalmichthys molitrix*	2%	-	1%	1%
Silver barb - *Barbonymus gonionotus*	12%	-	1%	3%
Striped snakehead - *Channa striata*	3%	14%	26%	16%
Three spot gourami - *Trichopodus trichopterus*	3%	-	-	1%
Spotted barb - *Barbodes binotatus*	5%	31%	16%	20%
Malabar loach - *Lepidocephalus thermalis*	3%	9%	3%	6%
Mola/mola carplet - *Amblypharyngodon mola*	3%	2%	29%	12%
Gangetic scissortail rasbora - *Rasbora rasbora*	16%	1%	-	4%

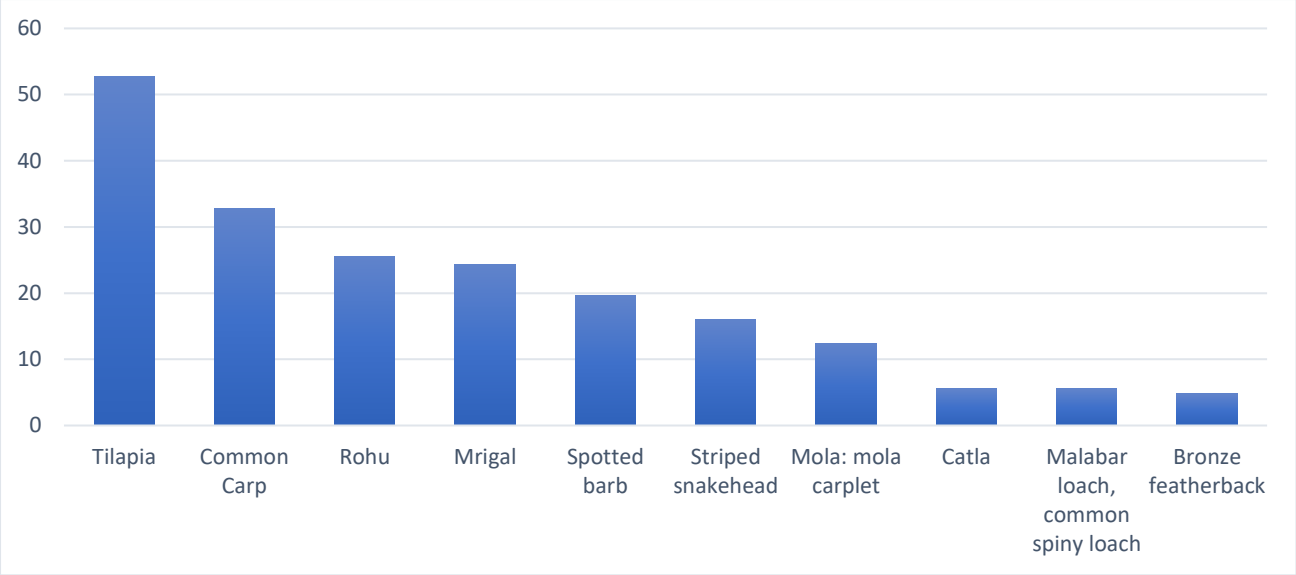

Figure 4. Most frequently consumed fish species in MYSAP Inland townships

A total of 26 different fish species had been consumed with variations seen across the townships. The top four most frequently reported were all cultured species being tilapia (53%), common carp (33%), rohu (26%), and mrigal (24%). Tilapia was the most popular consumed cultured fish in both Kengtung and Shwebo, though no respondents reported eating tilapia in Kale. This is probably related to lower local cultured production in Kale. Wild captured species were ranked lower in the fish species consumption table, with spotted barb (20%), striped snakehead (16%), mola (12%), malabar loach (6%) and bronze featherback (5%) the most consumed wild fish species. Mola was abundant in the local streams in Kengtung as reported by respondents and as noted by its high consumption in Kengtung only. Generally there is lower availability of captured fish in the dry season, which is an important time for harvesting ponds as water levels decline, thus the proportion of consumption between culture and capture fish is seasonally affected.

4.3 Small indigenous fish species (SIS)

Consumption of nutrient-rich fish was measured by the number of meals in the past seven days that contained whole fish (including eyes, head and bones). Typically, only small indigenous fish species (SIS) are eaten whole, with/without the head on, and including the bones and eyes.

Table 8. Small indigenous fish species (SIS) consumption frequency in the last seven days

	Kale	Shwebo	Kengtung	Mean of townships
SIS eaten in the past 7 days	31%	49%	52%	46%
Average number of meals with SIS within past 7 days	0.6	1.6	1.9	1.5

Nearly half of the households (46%) had eaten small indigenous (fish) species in the previous week. Across all respondents, the mean number of meals containing SIS in the previous week was 1.5 meals. Forty-four percent of low-income households had consumed SIS in the past week, with an average of 1.3 meals compared to 1.8 meals with SIS in the last week for non-low-income households. Like other wild fish species, SIS availability is also seasonally affected and SIS are in short supply in the dry season, though some areas still had a reasonable supply as was seen in the higher consumption in Kengtung in particular.

MYSAP Inland targets SIS consumption in its nutrition messaging, and in particular eating SIS whole as the heads, eyes and bones are rich in micro-nutrients. Respondents were also asked how they consumed the SIS to assess current SIS consumption practices.

Table 9. SIS consumption habits

	Kale	Shwebo	Kengtung	Mean of townships
Among SIS consumers, - SIS were eaten whole (including eyes, bones, and head)	71%	79%	98%	86%
Among SIS consumers – SIS heads removed, but bones eaten	22%	13%	-	7%
Among SIS consumers – SIS head and bones removed	6%	8%	2%	7%
Only bones removed	6%	-	-	1%

Among SIS consumers, 86% of the respondents reported they consumed SIS whole including the eyes, bones and head. This reflects positively in behaviors for increased micro-nutrient intake from eating SIS whole.

4.4 Processed fish based products

Fish based products also contribute an important part of the Myanmar diet and consumption of these products was also assessed in the seven day recall.

Table 10. Frequency of consumption of processed fish based products in the past seven days

	Kale	Shwebo	Kengtung	Mean of townships
Average number of meals containing fish based products	2.4	5.2	2.0	3.4
Percentage of HHs consuming processed fish products	62%	82%	46%	64%

Table 11. Type of processed fish based products (of those consuming fish based products)

	Kale	Shwebo	Kengtung	Mean of townships
Fish paste	97.2%	32.1%	58.1%	53.8%
Fish paste + dried fish	2.8%	19.8%	9.3%	13.1%
Dried fish	-	21.0%	18.6%	15.6%
Dried prawn	-	8.6%	7.0%	6.3%
Salted fish	-	7.4%	2.3%	4.4%
Fish paste + dried prawn	-	11.1%	9.3%	5.6%

Overall 64% of total respondents had consumed fish based products in the past seven days including; fish paste, dried fish, dried prawns and salted fish. Fish paste was the main fish product consumed with 54% of respondents having eaten fish paste in the past week. Many households were eating fish paste made from SIS (as reported by local fish paste producers). Large variations were seen in preference for fish based products between the townships. Fish paste was the most popular in Kale though very little dried fish was consumed, in contrast to Shwebo and Kengtung.

4.5 Source of fish consumed

Respondents were asked where the fish they consumed was sourced. From **Table 12** below it is evident that fish were obtained from multiple sources.

Table 12. Source of fish consumed

	Kale	Shwebo	Kengtung	Mean of townships
Market	7%	50%	10%	24%
Capture	3%	3%	18%	9%
Pond	59%	42%	76%	59%
Mobile vendor	22%	45%	34%	36%
Gift received from others	16%	13%	26%	18%

The majority of respondents reported that fish consumed were from their own pond (59%), while some bought from mobile vendors[9] (36%) and fish were given to them by others (18%) who either cultured or caught the fish. Sixty-one percent of respondents from low-income household sourced fish for consumption from their own ponds. In Shwebo, half of the respondents consumed fish that was sourced from the market. In Kengtung, a larger portion (76%) sourced fish from the respondent's own pond.

4.6 Use of cultured fish and decision making control

To gain insights into gendered dimensions of MYSAP Inland benefits and decision-making control; three survey questions were added to the MDD-W survey.

1. What did you do with the fish from your pond? (post-harvest)
2. Who decides what to do with the fish harvested?
3. Who decides how the money from the sale of fish is spent?

Table 13. Use of production from the fish pond (respondents could provide multiple answers)

	Kale	Shwebo	Kengtung	Overall
Sold	33%	93%	69%	70%
Consumed by household	36%	95%	99%	83%
Gifted to others	97%	81%	82%	85%
Both sold and consumed	57%	1%	1%	14%

The majority of households culturing fish sold, ate and gave some fish away to others. More people would likely have selected "both sold and consumed", but for the question order, as most people had already selected "sell it" and "eat it" before reaching "both sold and consumed". This answer format will be amended for future surveys. The 'gifting' of fish was highlighted by an average of 18% of respondents reporting that fish consumed in the past week had been given to them. Though this was particularly seen from what the respondents did with their cultured fish production, where >80% of all respondents and an average of 85% from all areas reported that they had given fish away. While the distribution of fish sold/consumed/gifted was not quantified, it highlights that cultured fish also passes into the community via informal social economies.

[9] Some mobile vendors used motorbikes and many venders sold in the villages on foot.

An important element of understanding gender dynamics was also explored through who has access to and control over resources. This was surveyed through two questions; Decision making control over the harvested fish (whether to sell, consume, gift) and control over the income from fish sold.

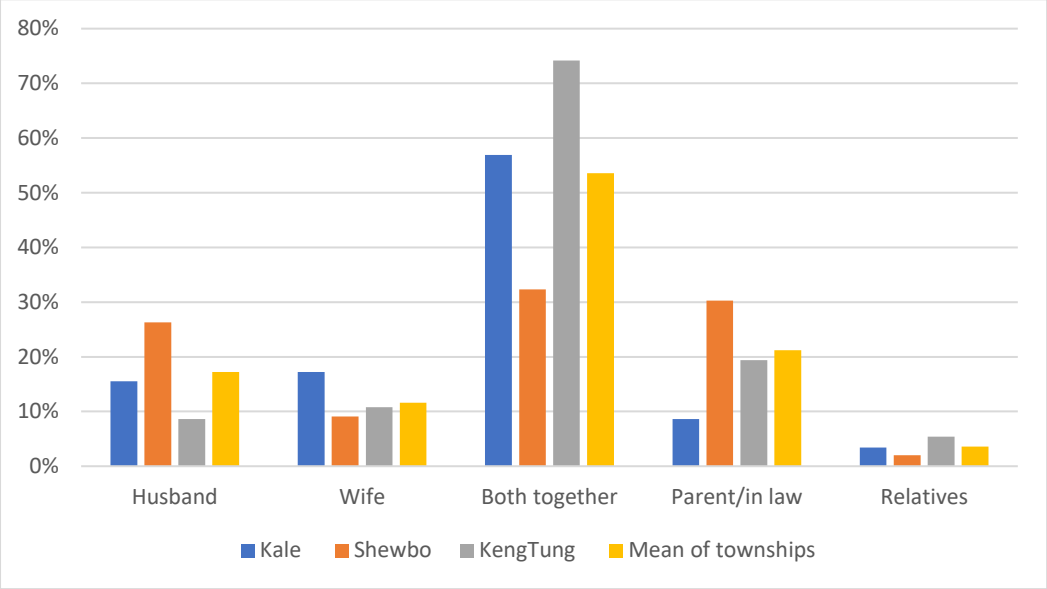

Figure 5. Household member with decision making control over what to do with the fish

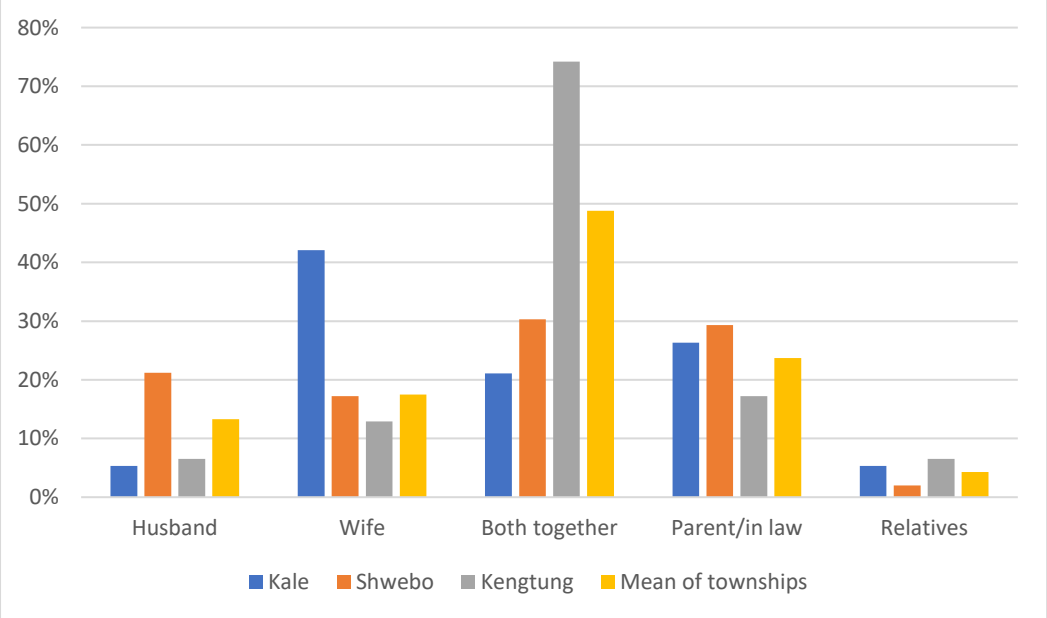

Figure 6. Household member with decision making control over the income from fish

As all the survey respondents were women, the findings reflect their views only and do not necessarily reflect that of all household members. The results varied across the townships of differing geography, ethnicity and religion. In Shwebo, a spread of decision making control was seen for the fish and money by the husband, both husband and wife together and the parents/in law, though it was lowest for wives. Conversely in Kengtung 74% of husband and wives jointly decided how the fish and the money from fish sales were used, whereas in Kale 57% of husbands and wives jointly decided on fish use, while 42% of women alone decided how the income from fish was used which was the highest of the three townships. In Kengtung and Kale, women had more decision making control over the use of income from the fish than men, but not in Shwebo. Parents/in laws had the most influence in Shwebo, this could also interplay with women having the lowest decision making there, though this requires further research. Overall these differences in findings highlights intra-household dynamics extend beyond the husband and wife, are

geographically and ethnically varied and we must not assume gender dimensions can be generalized. We acknowledge this survey structure has defined a household as a heterosexual couple and a detailed gender analysis would also further investigation of different household structures.

5. Conclusions

The purpose of this survey was to assess diet diversity and fish consumption by women of reproductive age who were MYSAP Inland direct beneficiary household members, after support during one of two planned culture seasons. The findings represent a snapshot of dietary intake during the dry season, at one time point in the year only, though provides important insight into consumption and behaviors of MYSAP Inland supported direct beneficiary household members.

The findings show women of reproductive age within the beneficiary households were regularly consuming fish, and fish was the dominant animal source food. Importantly this also extended to women in low income households. The acceptability and preference for fish consumption was demonstrated in the frequency of its consumption across all three MYSAP Inland townships. Where SIS was most available in Kengtung, preference to consume was also demonstrated in these findings.

Improving diet diversity remains a key priority, in Kale in particular where 47% of respondents did not reach minimum diet diversity. As 90% of respondents were consumers of the animal meat groups, the main opportunity to increase diversity in scores through MYSAP Inland interventions will be through promotion of increased production and consumption of orange fleshed and other fruits and vegetables. While increasing fish consumption will have minimal impact on the total diet diversity scores, the promotion of fish remains of importance. One limitation of the survey and MDD-W tool was that consumption was not quantified. Small numbers of individual diet assessments (conducted by a dietitian during field visits) indicate that while fish is frequently consumed, portion sizes of fish and animal foods are often small and individuals would benefit from increasing the portion size of fish consumed.

The informal economy, such as the gifting and receiving of fish was highlighted in both the source of fish consumed and what respondents did with their fish. This is an important finding when reviewing cost-benefit ratios as social benefits and spill-overs be often be missed if only monetary benefits are evaluated. Though not assessed, this may also be an important source of fish and nutrition for neighboring people without a pond.

Women self-reported access to and control over the (fish) resource either as individuals or in joint decision making with their partner, differences in this dynamic were seen between townships. Parents/in law play also play an important role in intra-household dynamics, though this has not been explored in depth and conclusions on intra-household and equity dimensions are not assumed from this short survey.

Recommendations and ways forward

- MYSAP Inland will continue to provide vegetables seeds to beneficiary households, emphasizing a diversity of colors and orange sweet potato and pumpkin (where its growth is possible) with the simultaneous messaging on the importance of increased diet diversity.
- In the 2019/20 culture season MYSAP Inland will stock all demonstration farmer ponds and provide training for the polyculture of SIS, including promoting partial harvesting with a gill net by women.
- Promote frequent and adequate portions of fish consumption – this is also targeted in the new SIS partial harvest leaflet which includes nutrition promotion and recommended portions of SIS.
- The importance of parents/in laws and mothers in law was highlighted in the MYSAP Inland nutrition barrier analysis survey (Rizaldo, Weatherson, and Griffiths 2019) and in the decision making questions from this basic survey. Moving forward it is important that MYSAP Inland consider the whole household structure and intra-household dynamics and acknowledge the influencing behaviors of these actors.
    - In the second year production cycle, MYSAP Inland has instructed its implementing partners (IP's) not to automatically invite male households heads to attend training and if more than one person per household attends any training session, then at least one from the household should be female. The IP's have also been instructed to encourage sharing of the knowledge and opportunities from SSA within the household.
- Wherever possible the MYSAP Inland and WorldFish will continue to triangulate and add data to build up an understanding of gender dimensions in MYSAP Inland target areas.
- A target of 40% women farmers was set and achieved for Lessons Learned Workshops conducted in Shwebo, Kengtung and Kale Townships conducted on 26 August, 19-20 September and 24 September 2019 respectively.
- A target of 80% women has been set for MYSAP Inland preservation training courses planned in the three townships in October and November 2019.

Annex 1. Data tables for MYSAP Inland midline nutrition survey

Table 14. MDD-W Food sub-groups

Food sub-groups	Example
Grain	Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
Vegetables or roots that are yellow or orange colored inside	Pumpkin, carrots, squash or sweet potatoes
White roots and tubers or plantains	White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro
Dark green leafy vegetables	Chinese cabbage, romaine, Bibb lettuce, bean leaves and pumpkin leaves
Fruits that are dark yellow or orange inside	Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato
Other fruits	Unripe mango and papaya, white/cream-fleshed bananas
Other vegetables	Fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
Meat made from animal organs	Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
Other types of meat or poultry	Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
Eggs	Eggs from poultry or any other bird
Fish or seafood	Fresh or dried fish, shellfish or seafood
Beans or peas	Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
Nuts or seeds	Any tree nut, groundnut/peanut, or certain seeds or nut/seed "butters" or pastes
Milk or milk products	Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
Insects or other small protein food	Insects, insect larvae/grubs, insect eggs and land and sea snails
Red palm oil	Red palm oil
Oils and fats	Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
Savory and fried snacks	Crisps and chips, fried dough, other fried snacks
Sweets	Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
Sugar-sweetened beverages	Sweetened fruit juices and "juice drinks", soft drinks/fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks
Condiments and seasoning	Ingredients used in small quantities for flavor, such as chilies, spices, herbs, fish powder, tomato paste, flavor
Other beverages and foods	Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar

MDDW results disaggregated per time point per all food categories.

Table 15. All food groups - Kale

Food sub-group	Wake up	Morning	Mid-day	Afternoon	Evening	Night
Grain	7.3	77.6	94.8	8.6	96.6	1.7
Vegetables or roots (yellow or orange colored inside)			3.4	1.7	12.1	
White roots and tubers or plantains	2.4	5.2	17.2	1.7	17.2	
Dark green leafy vegetables	4.9	8.6	62.1	1.7	58.6	
Fruits that are dark yellow or orange inside			1.7	1.7	3.4	
Other fruits			17.2		17.2	1.7
Other vegetables	2.4	3.4	37.9	1.7	44.8	
Meat made from animal organs	2.4	1.7	5.2	1.7	5.2	
Other types of meat or poultry	2.4	13.8	20.7		22.4	
Eggs		8.6	20.7	5.2	13.8	
Fish or seafood		5.2	44.8	5.2	51.7	
Beans or peas		6.9	27.6	5.2	31.0	1.7
Nuts or seeds			1.7			
Milk or milk products		5.2			1.7	
Insects or other small protein food						
Red palm oil						
Oils and fats	2.4	10.3	6.9	1.7	8.6	1.7
Savory and fried snacks		1.7				
Sweets	2.4	20.7	1.7	17.2		3.4
Sugar-sweetened beverages	4.9	34.5	3.4	20.7		3.4
Condiments and seasoning		34.5	70.7		74.1	1.7
Other beverages and foods		13.8	3.4	5.2	5.2	
Other		1.7		1.7		
Nothing	87.8	8.6	3.4	63.8	1.7	93.1

Table 16. All food groups - Shwebo

Food sub-groups	Wake up	Morning	Mid-day	Afternoon	Evening	Night
Grain	12.1	79.8	85.9	37.4	79.8	14.1
Vegetables or roots (yellow or orange colored inside)		1.0	4.0	2.0	5.1	2.0
White roots and tubers or plantains			6.1	2.0	6.1	
Dark green leafy vegetables	2.0	11.1	66.7	14.1	48.5	4.0
Fruits that are dark yellow or orange inside		4.0	11.1	28.3	12.1	7.1
Other fruits		7.1	6.1	20.2	10.1	4.0
Other vegetables		7.1	23.2	9.1	18.2	1.0
Meat made from animal organs	1.0	4.0	17.2	4.0	12.1	3.0
Other types of meat or poultry		5.1	15.2	7.1	24.2	2.0
Eggs	1.0	6.1	6.1	4.0	10.1	
Fish or seafood	1.0	21.2	52.5	12.1	45.5	3.0
Beans or peas	2.0	23.2	49.5	18.2	38.4	7.1
Nuts or seeds						
Milk or milk products	1.0	4.0		2.0	1.0	2.0
Insects or other small protein food						
Red palm oil						
Oils and fats	1.0	4.0	5.1	1.0	4.0	
Savory and fried snacks		21.2	5.1	3.0	5.1	1.0

Food sub-groups	Wake up	Morning	Mid-day	Afternoon	Evening	Night
Sweets	2.0	4.0	2.0	6.1	2.0	4.0
Sugar-sweetened beverages	4.0	37.4	1.0	13.1	4.0	8.1
Condiments and seasoning		6.1	15.2	5.1	13.1	1.0
Other beverages and foods	6.1	10.1	9.1	11.1	10.1	7.1
Other	1.0	3.0	6.1	4.0	5.1	2.0
Nothing	84.8	8.1	11.1	23.2	10.1	66.7

Table 17. All food groups - Kengtung

Food sub-groups	Wake up	Morning	Mid-day	Afternoon	Evening	Night
Grain	14.0	94.6	75.3	31.2	69.9	17.2
Vegetables or roots (yellow or orange colored inside)		17.2	15.1	3.2	16.1	4.3
White roots and tubers or plantains	1.1	5.4	2.2	5.4	4.3	1.1
Dark green leafy vegetables	2.2	46.2	37.6	7.5	26.9	5.4
Fruits that are dark yellow or orange inside		2.2	4.3	5.4	2.2	
Other fruits	4.3	16.1	26.9	28.0	7.5	4.3
Other vegetables	5.4	43.0	33.3	16.1	26.9	8.6
Meat made from animal organs	2.2	6.5	7.5	3.2	6.5	2.2
Other types of meat or poultry	1.1	39.8	33.3	7.5	30.1	9.7
Eggs	1.1	22.6	8.6	10.8	12.9	5.4
Fish or seafood	4.3	51.6	35.5	8.6	38.7	4.3
Beans or peas	1.1	31.2	26.9	8.6	12.9	2.2
Nuts or seeds		3.2	4.3		3.2	3.2
Milk or milk products	3.2					
Insects or other small protein food		1.1		1.1	1.1	
Red palm oil						
Oils and fats		45.2	29.0	11.8	32.3	7.5
Savory and fried snacks	1.1	2.2	2.2	2.2		
Sweets	5.4	4.3	1.1	2.2	1.1	2.2
Sugar-sweetened beverages	12.9	11.8	11.8	15.1	2.2	3.2
Condiments and seasoning	4.3	81.7	68.8	25.8	59.1	15.1
Other beverages and foods	4.3	2.2	2.2	1.1		1.1
Other	1.1					
Nothing	74.2	1.1	20.4	39.8	26.9	73.1

Table 18. MDD-W Ten food groups, percentage of respondents consumption and ranking of consumption per food group

Food groups	Kale		Shwebo		Kengtung	
	Percent	Rank	Percent	Rank	Percent	Rank
Food group 01: Grain, White roots and tubers or plantains	100.0	1	100.0	1	100.0	1
Food group 02: Beans or peas	53.4	5	74.7	4	46.2	6
Food group 03: Nuts or seeds	1.7	10	0.0	10	11.8	9
Food group 04: Milk or milk products	6.9	9	8.1	9	3.2	10
Food group 05: Meat, poultry, fish	87.9	2	93.9	2	94.6	2
Food group 06: Eggs	37.9	6	17.2	8	38.7	7
Food group 07: Dark green leafy vegetables	72.4	3	79.8	3	72.0	3
Food group 08: Vitamin A-rich vegetable and fruits	19.0	8	49.5	5	31.2	8
Food group 09: Other vegetables	60.3	4	35.4	7	68.8	4
Food group 10: Other fruits	29.3	7	39.4	6	54.8	5

Table 19. Food groups ranked from highest to lowest consumption

Food Group	Percent	Rank
Food group 01: Grain, white roots and tubers or plantains	100.0	1
Food group 05: Meat, poultry, fish	92.8	2
Food group 07: Dark green leafy vegetables	75.2	3
Food group 02: Beans or peas	59.2	4
Food group 09: Other vegetables	53.6	5
Food group 10: Other fruits	42.8	6
Food group 08: Vitamin A-rich vegetable and fruits	35.6	7
Food group 06: Eggs	30.0	8
Food group 04: Milk or milk products	6.0	9
Food group 03: Nuts or seeds	4.8	10

Annex 2. MDD-W questionnaire

Q1 Date of interview
Q2 Name of enumerator
Q3 Township
Q4 Village tract
Q5 Village
Q6 Farmer ID
Q7 Name of respondent
Q8 Sex of respondent
Male
Female
Q9 Age of respondent?
Q10 If the current respondent a woman between 15 and 49 years of age? *
Yes
No
Q11 Highest level of Education completed
No formal education
Grade 1
Grade 2
Grade 3
Grade 4
Grade 5
Grade 6
Grade 7
Grade 8
Grade 9
Grade 10
Grade 11
degree/diploma
PhD
Vocational Training
Other
Q12 Marital Status
Single, never married
Married
Widow/Widower
Divorced/Separated
Q13 How many household members are there?
Q14 How many under 5-yeared-old children are there at your home?
Q15 How many monthly household income?
Q16 Was the last 24 hours a good representative of your average daily food consumption?
i.e. if you fasted, or ate an above average amount, maybe due to a festival, this would not be a good representative.
Q17 If no, why? (Festival? other specify)
Yes
No

Q18 Did you have anything to eat or drink when you woke? (24hrs)

Yes

No

Q19 Did you have anything to eat or drink when you woke? If yes, what? Anything else?* (24hrs)

1. Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
2. Any vegetables or roots that are orange coloured inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside
3. Any white roots and tubers or plantains, such as: White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro or any other foods made from white-fleshed roots or tubers, or plantains
4. Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves
5. Any fruits that are dark yellow or orange inside, like: Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato, carrot, pumpkin and deep yellow- or orange-fleshed squash
6. Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas
7. Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
8. Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
9. Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
10. Any eggs: Eggs from poultry or any other bird
11. Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood
12. Any beans or peas, such as: Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
13. Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed “butters” or pastes
14. Any milk or milk products, such as: Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
15. Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails
16. Any red palm oil
17. Any oils and fats: Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
18. Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks
19. Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
20. Any sugar-sweetened beverages, like: Sweetened fruit juices and “juice drinks”, soft drinks/fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks, sweet tea or coffee with sugar
21. Any condiments and seasonings, such as: Ingredients used in small quantities for flavour, such as chilies, spices, herbs, fish powder, tomato paste, flavour cubes or seeds
22. Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar
23. Other (Specify)
24. Nothing

Q20 Other (Specify)

Q21 Did you have anything to eat or drink later in the morning? If yes, what? Anything else?* (24hrs) (5am to 12am)

1. Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
2. Any vegetables or roots that are orange coloured inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside
3. Any white roots and tubers or plantains, such as: White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro or any other foods made from white-fleshed roots or tubers, or plantains
4. Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves
5. Any fruits that are dark yellow or orange inside, like: Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato, carrot, pumpkin and deep yellow- or orange-fleshed squash
6. Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas
7. Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
8. Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
9. Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
10. Any eggs: Eggs from poultry or any other bird
11. Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood
12. Any beans or peas, such as: Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
13. Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed “butters” or pastes
14. Any milk or milk products, such as: Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
15. Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails
16. Any red palm oil
17. Any oils and fats: Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
18. Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks
19. Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
20. Any sugar-sweetened beverages, like: Sweetened fruit juices and “juice drinks”, soft drinks /fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks, sweet tea or coffee with sugar
21. Any condiments and seasonings, such as: Ingredients used in small quantities for flavour, such as chilies, spices, herbs, fish powder, tomato paste, flavour cubes or seeds
22. Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar
23. Other (Specify)
24. Nothing

Q22 Other (Specify)

Q23 Did you have anything to eat or drink at mid-day? If yes, what? Anything else? (24hrs) * If yes, what? Anything else?* (24hrs) (12am)

1. Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
2. Any vegetables or roots that are orange coloured inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside
3. Any white roots and tubers or plantains, such as: White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro or any other foods made from white-fleshed roots or tubers, or plantains
4. Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves
5. Any fruits that are dark yellow or orange inside, like: Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato, carrot, pumpkin and deep yellow- or orange-fleshed squash
6. Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas
7. Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
8. Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
9. Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
10. Any eggs: Eggs from poultry or any other bird
11. Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood
12. Any beans or peas, such as: Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
13. Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed “butters” or pastes
14. Any milk or milk products, such as: Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
15. Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails
16. Any red palm oil
17. Any oils and fats: Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
18. Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks
19. Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
20. Any sugar-sweetened beverages, like: Sweetened fruit juices and “juice drinks”, soft drinks /fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks, sweet tea or coffee with sugar
21. Any condiments and seasonings, such as: Ingredients used in small quantities for flavour, such as chilies, spices, herbs, fish powder, tomato paste, flavour cubes or seeds
22. Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar
23. Other (Specify)
24. Nothing

Q24 Q5. Other (Specify)

Q25 Q6. Did you have anything to eat or drink during the afternoon? If yes, what? Anything else?* (24hrs) (12am to 5pm)

1. Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
2. Any vegetables or roots that are orange coloured inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside
3. Any white roots and tubers or plantains, such as: White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro or any other foods made from white-fleshed roots or tubers, or plantains
4. Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves
5. Any fruits that are dark yellow or orange inside, like: Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato, carrot, pumpkin and deep yellow- or orange-fleshed squash
6. Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas
7. Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
8. Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
9. Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
10. Any eggs: Eggs from poultry or any other bird
11. Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood
12. Any beans or peas, such as: Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
13. Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed “butters” or pastes
14. Any milk or milk products, such as: Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
15. Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails
16. Any red palm oil
17. Any oils and fats: Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
18. Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks
19. Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
20. Any sugar-sweetened beverages, like: Sweetened fruit juices and “juice drinks”, soft drinks /fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks, sweet tea or coffee with sugar
21. Any condiments and seasonings, such as: Ingredients used in small quantities for flavour, such as chilies, spices, herbs, fish powder, tomato paste, flavour cubes or seeds
22. Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar
23. Other (Specify)
24. Nothing

Q26 Q6. Other (Specify)

Q27 Q7. Did you have anything to eat in the evening? If yes, what? Anything else?* (24hrs) (5 pm to 7 pm)

1. Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
2. Any vegetables or roots that are orange coloured inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside
3. Any white roots and tubers or plantains, such as: White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro or any other foods made from white-fleshed roots or tubers, or plantains
4. Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves
5. Any fruits that are dark yellow or orange inside, like: Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato, carrot, pumpkin and deep yellow- or orange-fleshed squash
6. Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas
7. Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
8. Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
9. Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
10. Any eggs: Eggs from poultry or any other bird
11. Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood
12. Any beans or peas, such as: Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
13. Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed “butters” or pastes
14. Any milk or milk products, such as: Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
15. Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails
16. Any red palm oil
17. Any oils and fats: Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
18. Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks
19. Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
20. Any sugar-sweetened beverages, like: Sweetened fruit juices and “juice drinks”, soft drinks/ fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks, sweet tea or coffee with sugar
21. Any condiments and seasonings, such as: Ingredients used in small quantities for flavour, such as chilies, spices, herbs, fish powder, tomato paste, flavour cubes or seeds
22. Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar
23. Other (Specify)
24. Nothing

Q28 Q7. Other (Specify)

Q29 Q8. Did you have anything else to eat or drink in the evening before going to bed or during the night? If yes, what? Anything else?* (24hrs) (7pm to 5 am)

1. Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains
2. Any vegetables or roots that are orange coloured inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside
3. Any white roots and tubers or plantains, such as: White potatoes, white yams, white-fleshed sweet potatoes, manioc/cassava/yucca, cocoyam, taro or any other foods made from white-fleshed roots or tubers, or plantains
4. Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves
5. Any fruits that are dark yellow or orange inside, like: Ripe mango, ripe papaya, ripe, deep yellow-fleshed or orange-fleshed bananas, orange-fleshed sweet potato, carrot, pumpkin and deep yellow- or orange-fleshed squash
6. Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas
7. Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra
8. Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game
9. Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds
10. Any eggs: Eggs from poultry or any other bird
11. Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood
12. Any beans or peas, such as: Mature beans or peas (fresh or dried seed), lentils or bean/ pea products, including hummus, tofu and tempeh
13. Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed “butters” or pastes
14. Any milk or milk products, such as: Milk, cheese, yoghurt or other milk products, but NOT including butter, ice cream, cream or sour cream
15. Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails
16. Any red palm oil
17. Any oils and fats: Oil, fats or butter added to food or used for cooking, including extracted oils from nuts, fruits and seeds, and all animal fat
18. Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks
19. Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream
20. Any sugar-sweetened beverages, like: Sweetened fruit juices and “juice drinks”, soft drinks/ fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks, sweet tea or coffee with sugar
21. Any condiments and seasonings, such as: Ingredients used in small quantities for flavour, such as chilies, spices, herbs, fish powder, tomato paste, flavor cubes or seeds
22. Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar
23. Other (Specify)
24. Nothing

Q30 Other (Specify)

Q31 Q1. In the past 7 days, how many meals containing fish have you consumed?

Q32 Q2. Which of the following species of fish did you consume in the past 7 days?
Rohu/Nga- myit- chin
Mrigal/Nga-gyin
Catla/Nga-thaing-gaung-pwa
Common Carp/Shwe- war-nga- gyin
Grass Carp/Myak -sar- nga -gyin
Silver Carp/Ngwe- yaung- nga- gyin
Big head carp/Gaung -gyi -nga -gyin
Tilapia-mixed
Tilapia-all male
Silver barb/Nga-khone-ma-gyi
Streaked prochilod/Airplane fish/Hilly Hilsa/Lay Yin Pyan Ngar/Taung Paw Nga Tha Lauk
Striped river catfish/Nga-tan
Pacu/Ye- cho-nga-moke
Snakeskin gourami/Belar
Climbing perch/Nga-bye-ma
Giant freshwater prawn/Ye -cho- pazun- htoke- gyi
Striped snakehead/Nga-yant
Intha carp
Asia seabass; baramundi
Zig zag eel/Nga- mway- doe
Bronze featherback/Nga-pe
Banded Gourami/Nga-pyin-tha-let
Three spot gourami
Walking catfish/Nga khu
Tuna fish
Asian swamp eel/Ngar shint
Suckermouth catfish
Spotted barb/Nga-khone-ma
Burmese flying barb/Nga daung zinn
Malabar loach, common spiny loach/Nga tha le htoe
Indian glassy fish/Nga zin zat
Mola: mola carplet/Nga bel phyu
Burmese barb/Nga maw tawt
Carplet barb/Nga pha ma
Dhela/Nga phel oung
Gangetic scissortail rasbora/Nga ye paw
Other (Specify)

Q33 Q2. Other (Specify)
Q3. In the past 7 days, how many meals did you have consumed the whole fish (including eyes, bones etc.)?

Q34 You need to recall the Q 2. (Did you select/choice Nga-khone-ma, Nga daung zinn, Nga tha le htoe, Nga zin zat, Nga bel phyu, Nga maw tawt, Nga pha ma, Nga phel oung, Nga ye paw)

Q35 Q4. In the past 7 days, how many meals did you have where you consumed SIS? (if any)

Q36 Q5. Which of the following criteria did the majority of SIS, consumed in the past 7 days, fit?
- [1] Whole fish (including eyes, bones, and head)
- [2] Fish with bones but head removed
- [3] Head and bones removed
- [4] Other

Q37 Q5. Other (Specify)

Q38 Q6. In the past 7 days, how many meals containing processed fish products have you consumed? (Processed fish means fermented fish, dried fish, fish paste)

Q39 Q7. In what forms of processed fish that they ate?
- Market
- Caught
- Pond
- Vendor
- Gift from Other

Q40 What is the source (market, caught, ponds) of the fish they ate?

Q41 Q8. Please specify the name of market?

Q42 Of the fish harvested from your pond did you?
- Sell it
- Eat it
- Gift it
- Loan it
- Both sold and consumed

Q43 Who decides what to do with the fish harvested (whether to sell it or consume)?
- Husband
- Wife
- Both together
- Parent/in law
- Other

Q44 Other (Specify)

Q45 If sold, who decides what to do with the money from the sale of the fish?
- Husband
- Wife
- Both together
- Parent/In Law
- Other

Q46 Other (Specify)