Fish for Livelihoods
Minimum dietary diversity for women Survey

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Capture fisheries are declining in Myanmar, yet fish makes up 60% of the population's animal-sourced food. To meet the growing demand for fish, aquaculture production is increasing. It is essential that Myanmar develops a sustainable aquaculture industry that minimizes potential environmental impacts and ensures that aquaculture practices are socially acceptable and economically sound. The Fish for Livelihoods (F4L) project, funded by United States Agency for International Development (USAID), aims to increase fish production, labor productivity, food availability, and fish consumption, especially for women and children from vulnerable households. It provides opportunities for entrepreneurial activities in small-scale aquaculture systems and promotes social behavioral change messages that direct home production and market purchases toward nutritious-conscious household decisions.

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1. Introduction

1.1 Background

In October 2019, the United States Agency for International Development (USAID) began the Small-scale Aquaculture Investments for Livelihoods in Myanmar project, or Fish for Livelihoods (F4L), as it is known. The project, which runs until 2024, aims to improve nutrition among the people living in Central and Northern Myanmar by promoting inclusive and sustainable aquaculture growth that focuses on small-scale farmers. WorldFish is leading the activity alongside several implementing partners, including the International Water Management Institute, BRAC, PACT, Karuna Mission Social Solidarity, and the Myanmar Fisheries Federation. The project aims to provide a means of ensuring improved availability of diverse, safe, and affordable nutrient-rich foods, especially for women and young children from poor and vulnerable households.

F4L has three components: (1) increase small-scale aquaculture production, (2) implement the use of market system approaches, and (3) improve nutrition and water, sanitation, and hygiene (WASH) practices.

The third component focuses specifically on improving nutrition and adopting effective WASH practices among participants through four main approaches: (1) integrating large fish and small indigenous species (SIS) of fish in homestead ponds, (2) starting vegetable and fruit production along pond embankments, (3) using WASH hardware, such as water filters, improved latrines and handwashing containers, and (4) conducting behavior change communication activities focused on messages that facilitate positive nutrition and WASH practices.

The project focuses on five inland states and regions in Central and Northern Myanmar: Mandalay, Magway, and Sagaing in the Central Dry Zone, and both Shan and Kachin in the North. Figure 1 shows the selected regions of the project's intervention in Myanmar.

These areas present challenges for aquaculture development and livelihood opportunities. However, aquaculture growth can play an important role in changing this scenario by increasing production and income opportunities.

Figure 1. The project's zone of intervention.

1.2 Objectives of the study

1. To determine the proportion of female participants consuming at least five food groups over a 24-hour period.
2. To determine the frequency of consumption of fish and fish-based processed products (FBPPs) among respondents over a 7-day period.
3. To determine who decides to harvest fish and to manage income among the respondents' households.

2. Methodology

2.1. Sampling method

A total of 1162 beneficiary households are participating in the project. Using systematic random sampling, 349 households were selected for the survey from the following 15 townships: Khin U, Madaya, Salin, Ngape, Pekon, Pin Laung, Pindaya, Tachileik, Taunggyi, Mogaung, Momauk, Myitkyina, Bhamo, Mansi, and Waingmaw. The survey has a 5% margin of error, a 90% rate of response, and a 95% confidence level.

2.2. Identifying respondents

From these households, we selected 349 female respondents aged 15 to 49 years old to participate in the survey.

2.3. Interview technique and survey tool

The survey used a 24-hour dietary recall and a 7-day recall on the consumption of fish and fish-based processed products (FBPPs). The survey accessed the minimum dietary diversity for women of reproductive age (MDD-W). This is a score out of 10 that is used as a proxy indicator to reflect micronutrient adequacy in women reproductive age (15–49 years old).

There are 22 different food groups cited in the Minimum Dietary Diversity for Women: A Guide for Measurement report, which was published by the Food and Agriculture Organization and FHI in 2016. However, the recommended methodology for this survey uses an aggregated list of the 10 following food groups (Annex 1), which have a strong correlation to micronutrient sufficiency:
1. grains, white roots and tubers, and plantains
2. pulses (beans, peas, and lentils)
3. nuts and seeds
4. dairy products
5. meat, poultry, and fish
6. eggs
7. dark green leafy vegetables
8. other vitamin A-rich fruits and vegetables
9. other vegetables
10. other fruits

Other food categories were not included in calculating the total MDD-W.

2.4. Enumerator training

All enumerators for the survey were field staff from implementing partners. They were all given a full day of online training on how to survey the field level by WorldFish's monitoring and evaluation coordinator. The training covered the following topics:
- operational definitions of "women of reproductive age," "dietary diversity" and "minimum dietary diversity for women MDD-W"
- reasons for focusing on the dietary diversity of women
- indicators for MDD-W
- 10 food groups that comprise the MDD-W indicator
- research design

- sampling method
- mobile data collection method using KoBo software and Android mobile phones.

A total of 30 people participated in the online training for the survey, including 29 from implementing partners: eight from PACT Myanmar, eight from BRAC Myanmar, five from Myanmar Fisheries Federation (MFF) Kachin, two from MFF Pindaya, three from Karuna Mission Social Solidarity (KMSS)_Pekon, three from Karuna Mission Social Solidarity (KMSS) Kengtung and one from WorldFish.

2.5. Data collection

The survey was conducted from May 3 to 11, 2021, in the townships of Myitkyina and Bhamo and from May 5 to 11, 2021, in the townships of Ngape, Salin, Taunggyi, Pekon, Pinlaung, and Pindaya. Whenever possible, the enumerators conducted face-to-face interviews. When this was not possible, because of restrictions imposed by local authorities, phone interviews were used. Collected data was entered directly into Android mobile phones with the open-source software KoBo (https://www.kobotoolbox.org/).

When enumerators had internet access, the data was uploaded from their smartphones to the server in the evening. The exceptions were in Ngape and Salin, where internet connectivity was poor. In those townships, data was collected on paper and then transferred using a data encoder to the Kobo software the next day. The majority of the interviews were done in Burmese, while the rest were done in local languages, Asho for Ngape, Kayan and Akha for Pinlaung, Shan for Tachileik, and Kachin for Waingmaw.

3. Profile of respondents

3.1. Age and educational attainment

The highest share of respondents are between the ages of 45 and 49 years followed by those between 30 to 34 and the smallest share is between 15 and 19 (Figure 2). The mean age of respondents is 34 years.
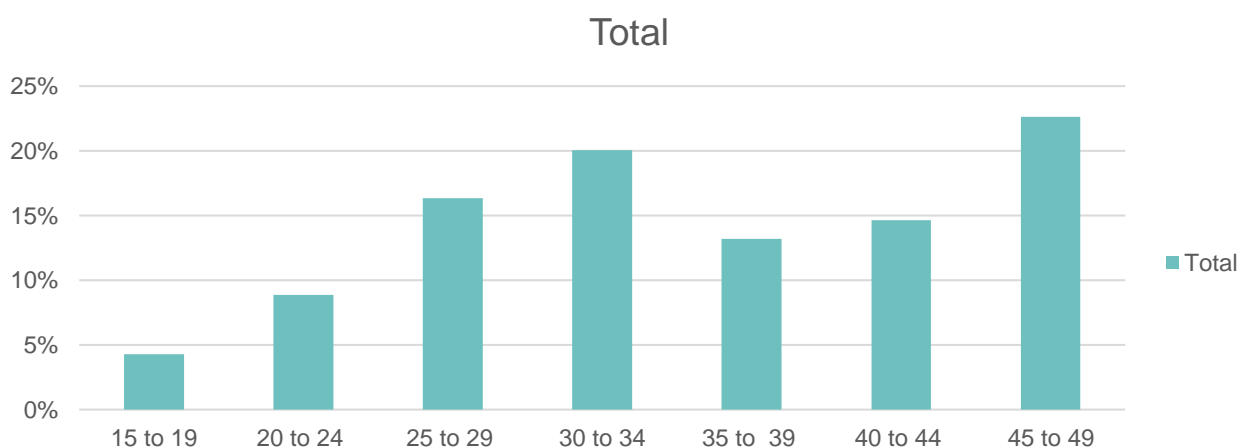
Figure 2. Age of respondents.

Of the 15 townships surveyed, Myitkyina, Bhamo, and Mogaung have the highest percentage of respondents who received a diploma, while Ngape and Pindaya have a larger percentage who only received primary education. In Myitkyina, all the respondents hold a postgraduate diploma. Conversely, 20% of the respondents in Tachileik and 8% in Pekon are illiterate (Table 1).

Township	Illiterate	Non Formal education	Primary education	Secondary education	Higher education	Diploma
Bhamo	0	0	0	0	33.3%	66.7%
Khin-U	0	0	45%	28%	10%	17%
Madaya	0	0	28.3%	23%	23.3%	25%
Mansi	0	0	0	100%	0	0
Mogaung	0	0	0	33%	0	66.7%
Momauk	0	0	0	0	50%	50%
Myitkyina	0	0	0	0	0	100%
Ngape	0	0	60%	30%	0%	10%
Pekon	8%	0	16%	20%	40%	16%
Pin Laung	0	0	50%	0	50%	0
Pindaya	0	0	78.9%	11%	5.3%	5.3%
Salin	0	12.5%	50%	16%	13%	9%
Tachileik	20%	0	28%	12%	28%	12%
Taunggyi	0	15%	33%	43%	5%	3%
Waingmaw	0	0	0	40%	53.3%	6.7%
Total	**2%**	**4.6%**	**36%**	**25%**	**17%**	**15%**

Table 1. Education level of respondents.

3.2. Marital status

Figure 3 shows that about 80% of the respondents are married and 20% are single (never married). It is noteworthy that all the respondents in Mansi and Mogaung are married, while 67% in Myitkyina and 50% of Momauk are single.
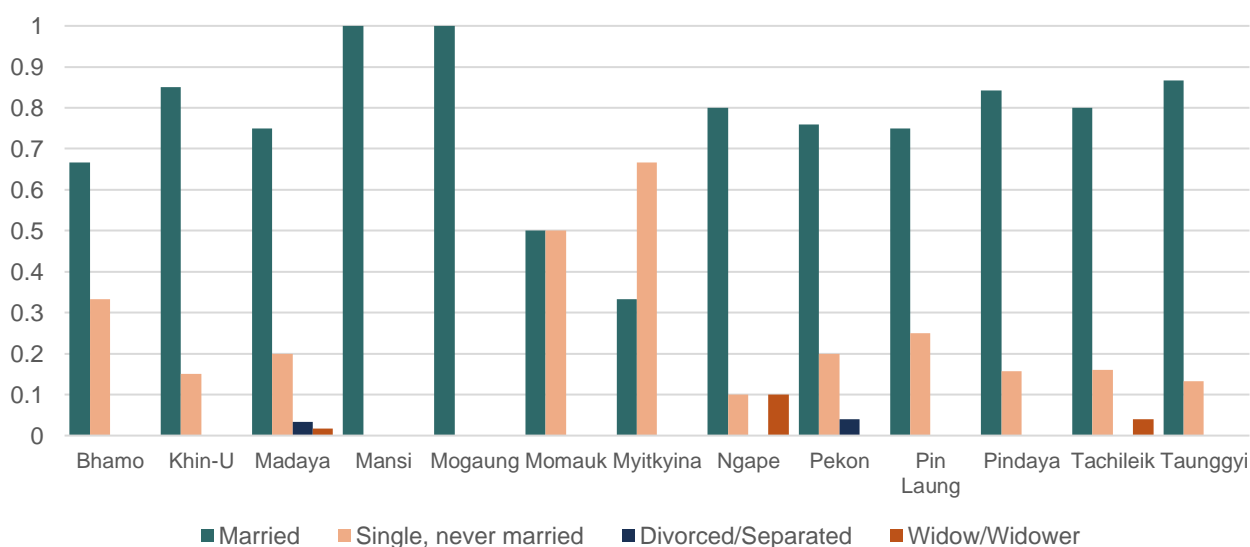
Figure 3. Marital status of respondents.

3.3. Status of stocking fish fingerlings and harvesting fish

F4L promotes using integrated farming systems. This approach provides income and ensures the availability of diverse food for consumption among women of reproductive age. This includes fish, which is an important source of protein and micronutrients.

When culturing fish, stocking and harvesting are important. Unfortunately, during the survey period, not all respondent households had harvested fish that were stocked during the first production cycle. This was due to a variety of reasons, including fish being too small for sale as well as low market prices.

According to Table 2, although 97% of the farmers in the 15 townships had stocked fish fingerlings in their homestead ponds, only 82% were able to harvest them. In 11 townships, all the farmers had stocked their ponds at the beginning of the production cycle. Of these townships, only farmers Bhamo, Khin-U, Mansi, Momauk, and Ngape had completely harvested the fish from their ponds.

Farmers in Pekon and Pinlaung were very low in both stocking and harvesting. In Pekon, 84% of the farmers had stocked fish yet only 52% had harvested, while in Pinlaung 75% had stocked fish and only 50% had harvested. This was even worse in Mogaung, where only 33% of the farmers had harvested their fish, even though all of them had stocked their ponds. It is assumed that the rest of the farmers harvested their ponds after May when the data for the survey was collected.

Township	Did your household stock fingerlings in the previous year?	If yes, has your household harvested fingerlings?
Bhamo	100%	100%
Khin-U	100%	100%
Madaya	100%	85%
Mansi	100%	100%
Mogaung	100%	33%
Momauk	100%	100%
Myitkyina	100%	50%
Ngape	100%	100%
Pekon	84%	52%
Pin Laung	75%	50%
Pindaya	100%	42%
Salin	100%	98.2%
Tachileik	100%	88%
Taunggyi	90%	66.7%
Waingmaw	93%	93%
Total	**96.6%**	**81.7%**

Table 2. Stocking and harvesting status.

4. Survey results

4.1.24-hour food recall

Dietary score of women of reproductive age

Overall, 73% of the respondents achieved an MDD-W score of at least five food groups (Table 3). All the respondents from Mansi, Momauk, Myitkyina, and Waingmaw achieved a score of five, while only 44% from Pekon managed to do so. Figures 04 to 13 show the food groups that were consumed by respondents in each township.

Townships	MDD-W score /10	Total who consumed < 5 food groups	Total who consumed ≥ 5 food groups
Bhamo	5.7	33%	67%
Khin-U	4.9	40%	60%
Madaya	5.9	12%	88%
Mansi	6.0	0%	100%
Mogaung	6.3	33%	67%
Momauk	5.5	0%	100%
Myitkyina	8.0	0%	100%
Ngape	4.7	50%	50%
Pekon	4.2	56%	44%
Pin Laung	4.0	50%	50%
Pindaya	5.1	42%	58%
Salin	5.2	32%	68%
Tachileik	6.2	12%	88%
Taunggyi	5.4	17%	83%
Waingmaw	6.7	0%	100%
All townships	5.4	27%	73%

Table 3. Mean MDD-W score and percentage of respondents achieving at least five food groups.

As grains, white roots, and tubers or plantains are considered staple foods in Myanmar, Food Group 1 is the most widely consumed group in the country (Figure 4). All the respondents from the 15 townships had consumed items from this group, except for those from Khin-U and Pekon, where at least 10% did not eat any.
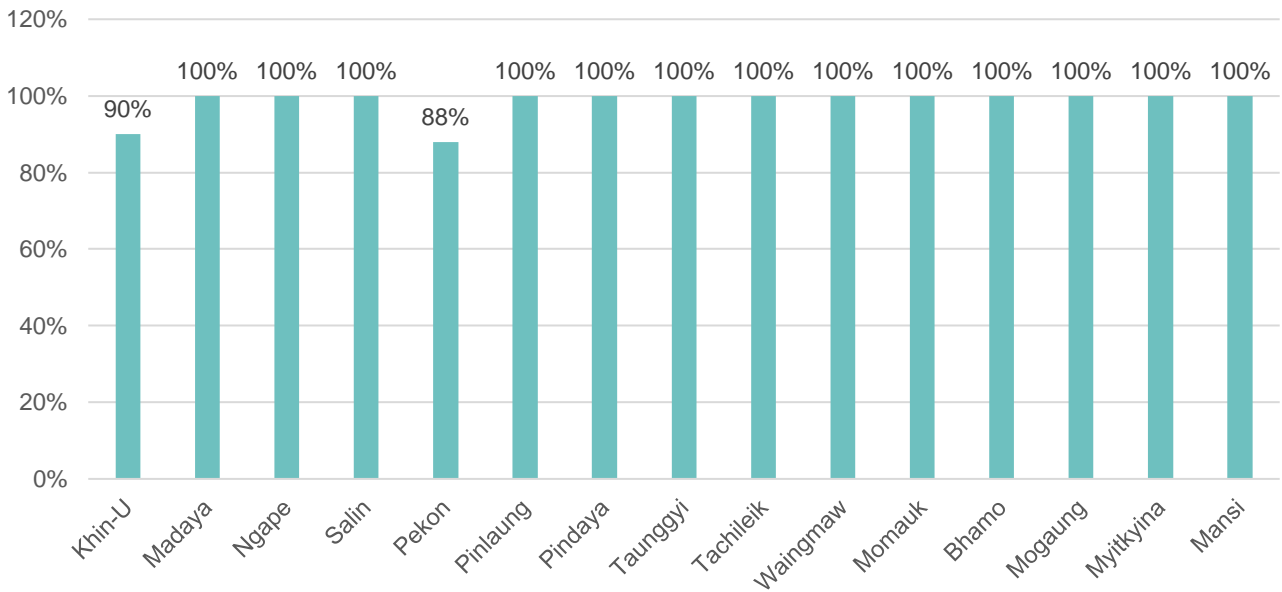
Figure 4. Percentage of women consuming items from Food Group 1 (grains, white roots and tubers or plantains).

Most of the women in Myitkyina, Mogaung, Mansi, Madaya, and Salin had consumed either beans or peas before the interview, with percentages ranging from 67% to 100% (Figure 5). In Myitkyina and Mansi, all the respondents had consumed these foods, while in Taunggyi, Pinlaung, Pekon, and Waingmaw less than 30% had done so. For Pekon, a similar pattern was observed as that for Food Group 2, as the township had had the lowest percentage of respondents eating from this food group.
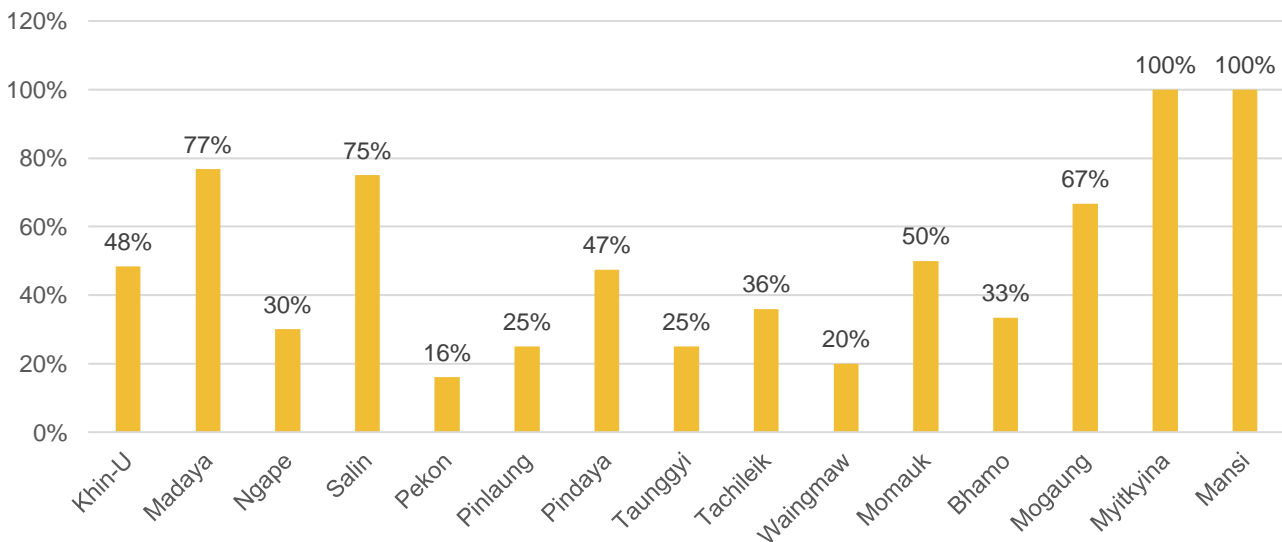
Figure 5. Percentage of women consuming items from Food Group 2 (beans and peas).

Regarding Food Group 3, only respondents from seven townships had consumed nuts and seeds (Figure 6): Waingmaw, Myitkyina, Pindaya, Pekon, Madaya, Tachileik, and Salin had consumed nuts and seeds. Those in the other eight townships did not.

Of those who had eaten from this food group, Waingmaw had the highest consumption percentage, at 40%, while the rest of the six townships averaged less than 22%. At just 4%, Tachileik was the lowest of the seven townships.
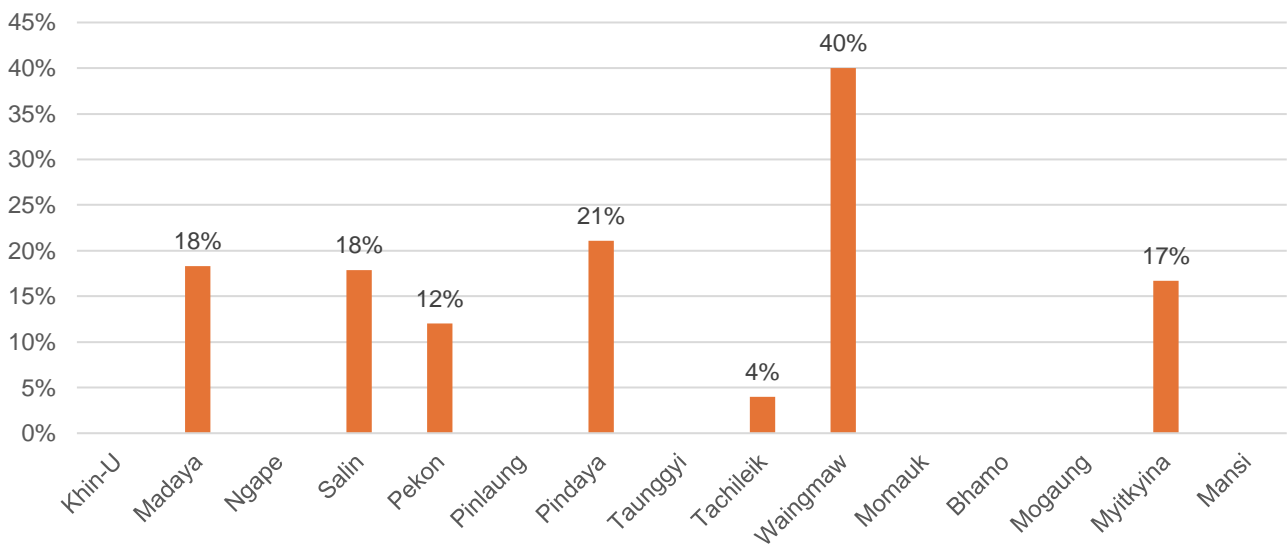
Figure 6. Percentage of women consuming items from Food Group 3 (nuts and seeds).

For Food Group 4, respondents from only seven townships had consumed milk or milk products (Figure 7): Myitkyina, Mogaung, Waingmaw, Tachileik, Madaya, Khin-U, and Salin.
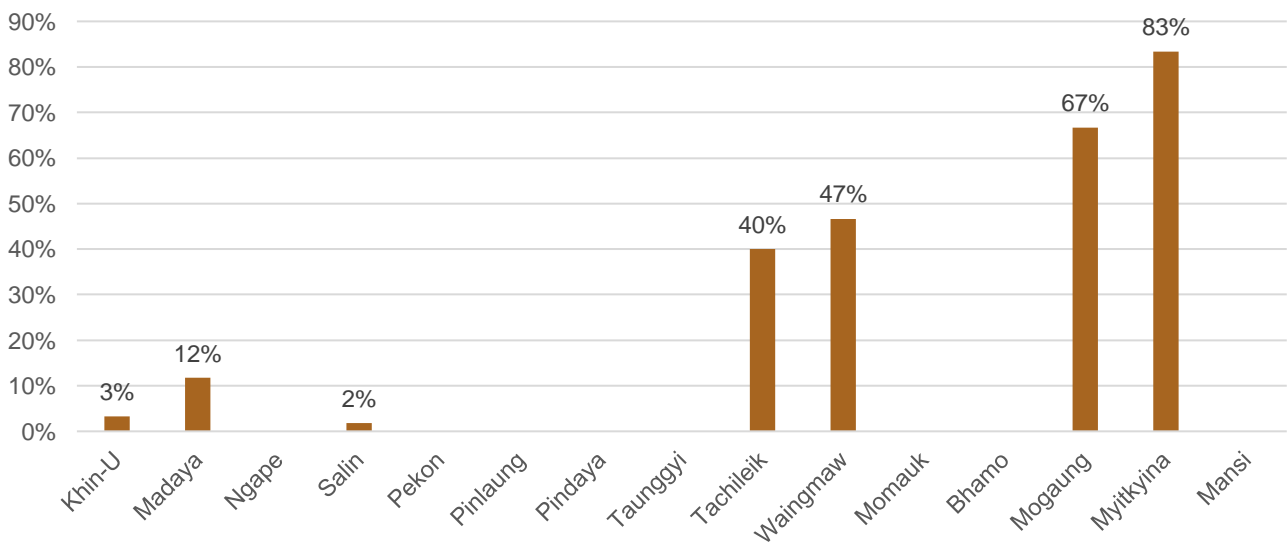
Figure 7. Percentage of women consuming items from Food Group 4 (milk or milk products).

For food group 5, fifteen townships can be grouped into three. Seven Townships, Myitkyina, Bhamo, Mogaung, Waingmaw, Mansi, Tachileik, and Momauk are in the first group whereby all of the respondents consumed meat/poultry/fish. Five townships, Khin-U, Madaya, Taunggyi, Pekon, and Salin are in the second group whereby the percentage of animal protein eaters falls between 71% and 97%. Three townships, Pindaya, Pinlaung, and Ngape are in the last group whereby between 40% to 63% of respondents consumed animal protein. Of all townships, Ngape consumed the least animal protein.
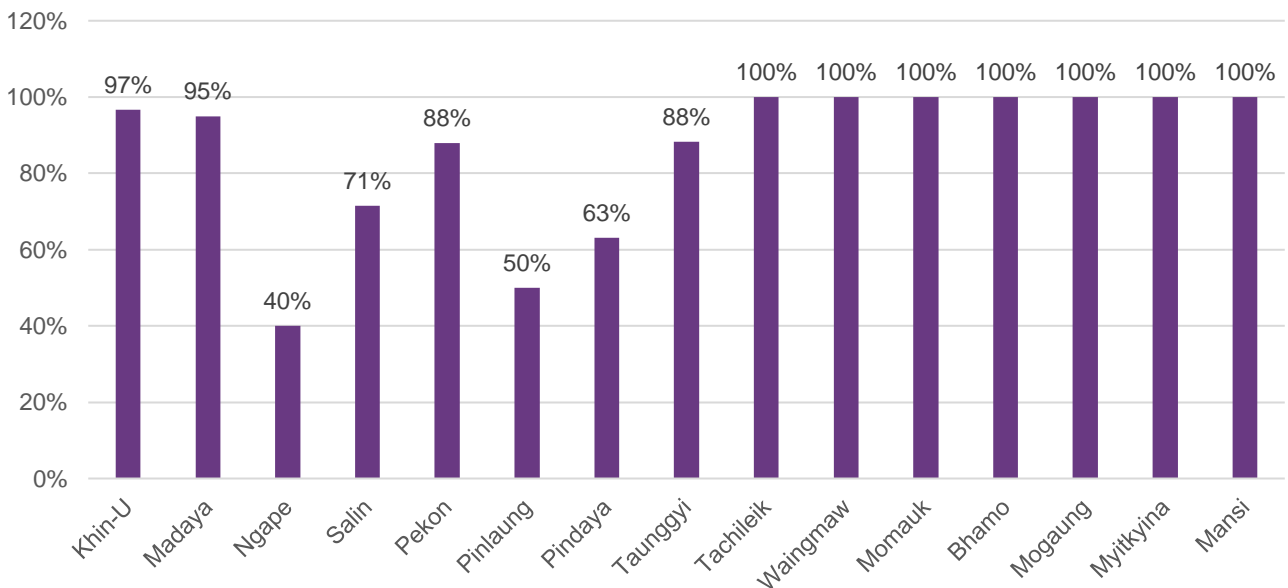
Figure 8. Percentage of women consuming items from Food Group 5 (meat, poultry and fish).

Respondents from 14 of the 15 townships reported including eggs in their diets. The Egg-eating townships can be grouped into four. Two townships, Mansi and Momauk, fall in the first group wherein all respondents consumed eggs. Four townships, Myitkyina, Waingmaw, Taunggyi, and Ngape, are included in the second group wherein a mean of 73% of the respondents' consumed eggs. Two townships, Pindaya and Tachileik, are included in the third group wherein a mean of 52% of the respondents' consumed eggs. The fourth group is made of six townships, Mogaung, Pinlaung, Pekon, Madaya, Khin-U, and Salin. In this group, the mean percentage of respondents who ate eggs was 23%. Particularly, all respondents from Bhamo did not eat eggs.
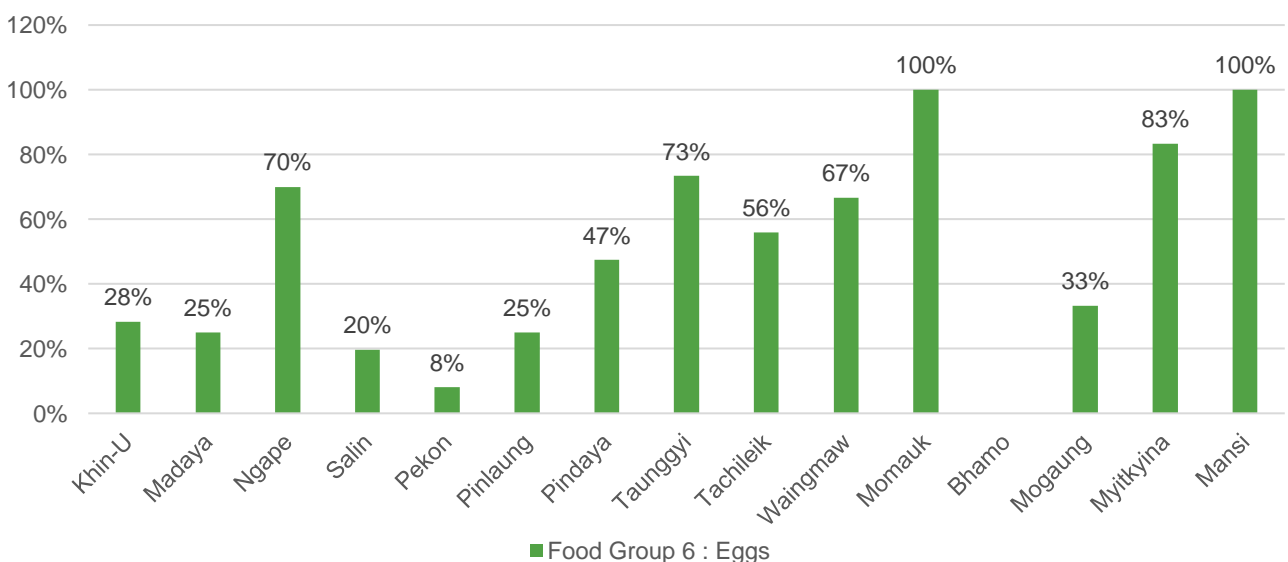
Figure 9. Percentage of women consuming items from Food Group 6 (eggs).

Regarding Food Group 7, all the respondents from Myitkyina, Bhamo, Momauk, and Taunggyi had consumed dark green leafy vegetables (Figure 10), while Ngape, Waingmaw, Mogaung, and Pindaya averaged 81%. No respondents from Mansi had done so.
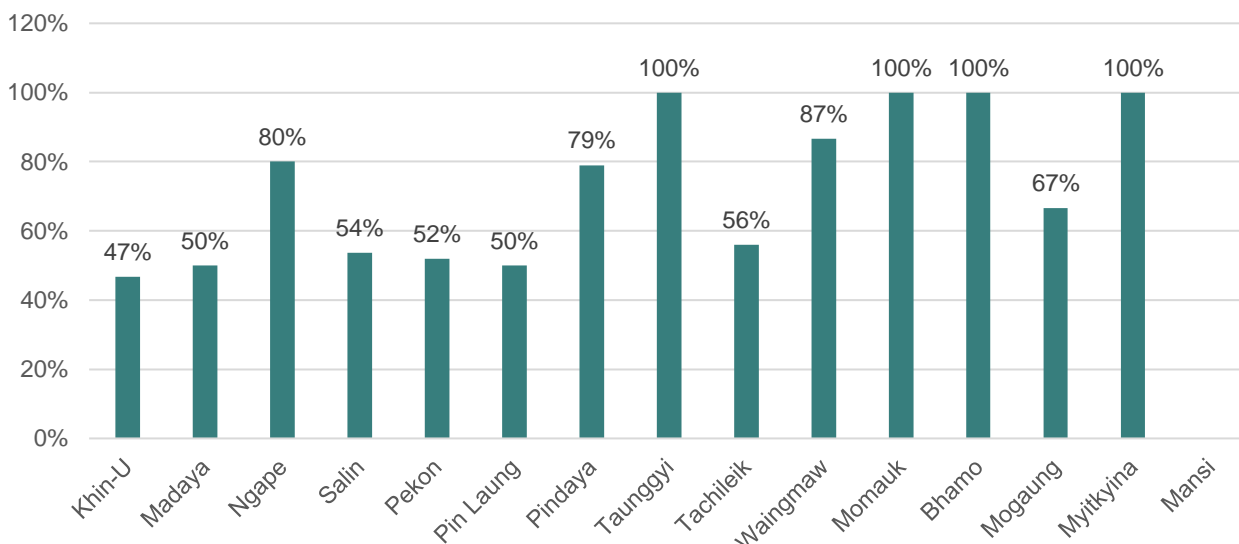
Figure 10. Percentage of women consuming items from Food Group 7 (dark green leafy vegetables).

For Food Group 8, all the respondents in Myitkyina, Bhamo, and Mogaung had consumed vitamin A-rich vegetables and fruits (Figure 11), while none had done so from Momauk and Mansi. The rest of the townships ranged from as low as 10% to as high as 96%.
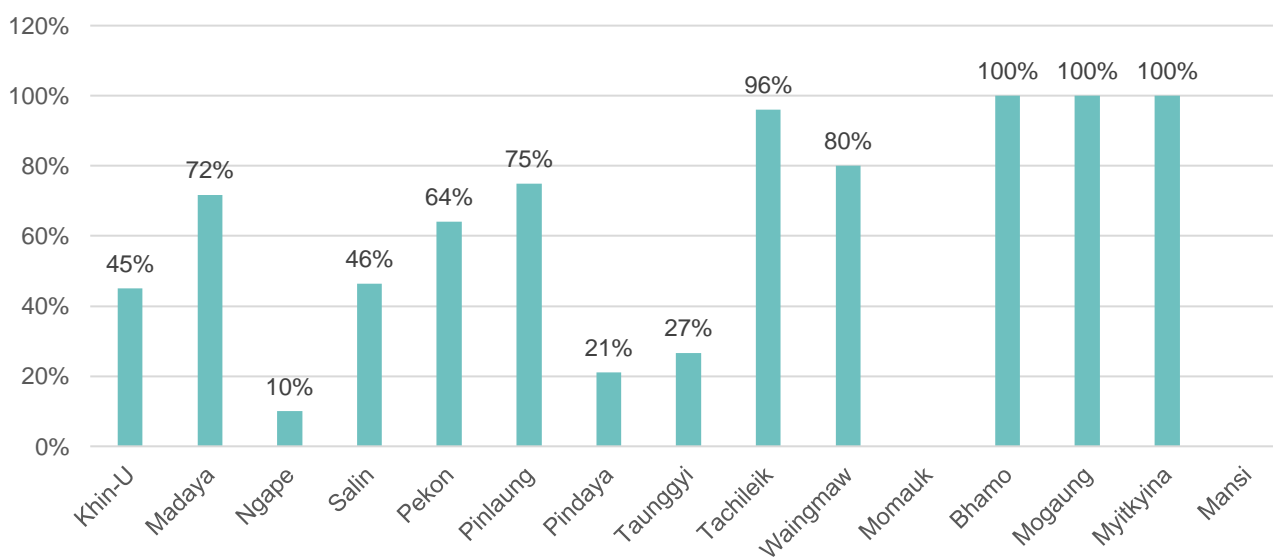
Figure 11. Percentage of women consuming items from Food Group 8 (vitamin A-rich vegetables and fruits).

For Food Group 9, all 15 townships had respondents who had consumed other vegetables (Figure 12). Mansi had the highest percentage, followed by Madaya and Salin. The lowest percentage was in Momauk, at just 50%.
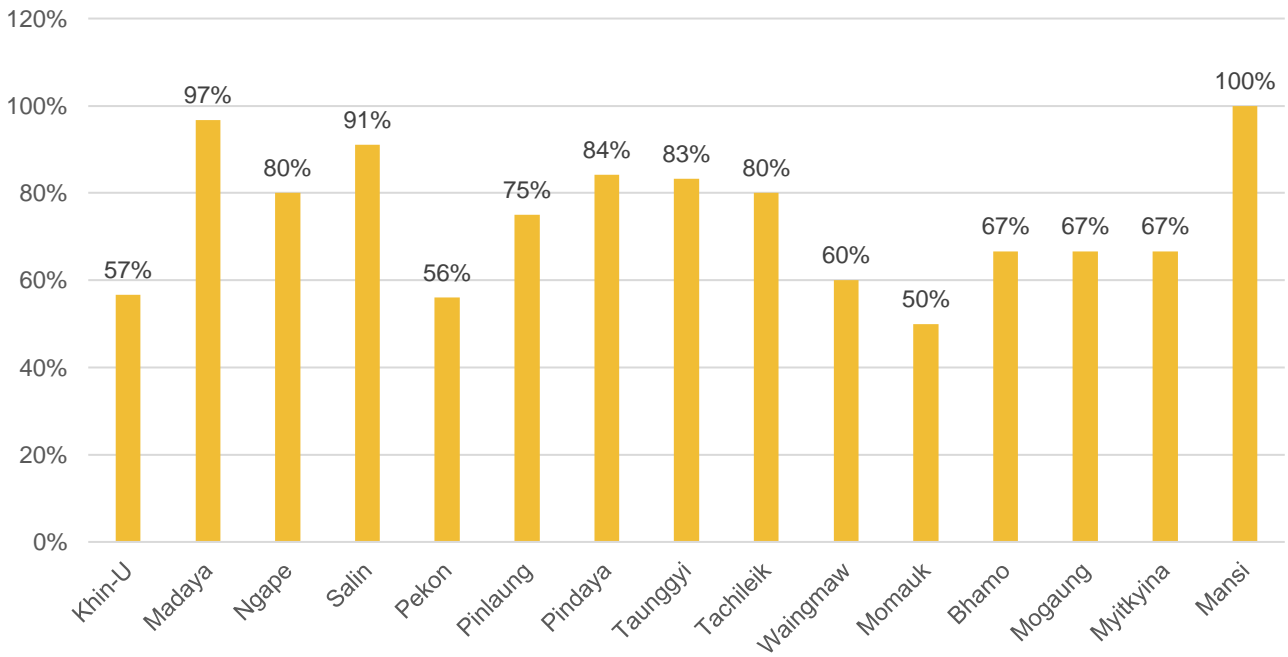
Figure 12. Percentage of women consuming items from Food Group 9 (other vegetables).

Finally, for Food Group 10, respondents from every township except Pinlaung had consumed other fruits (Figure 13). Mansi had the highest percentage, while Mogaung had the lowest. The average across all 15 townships was 56%.
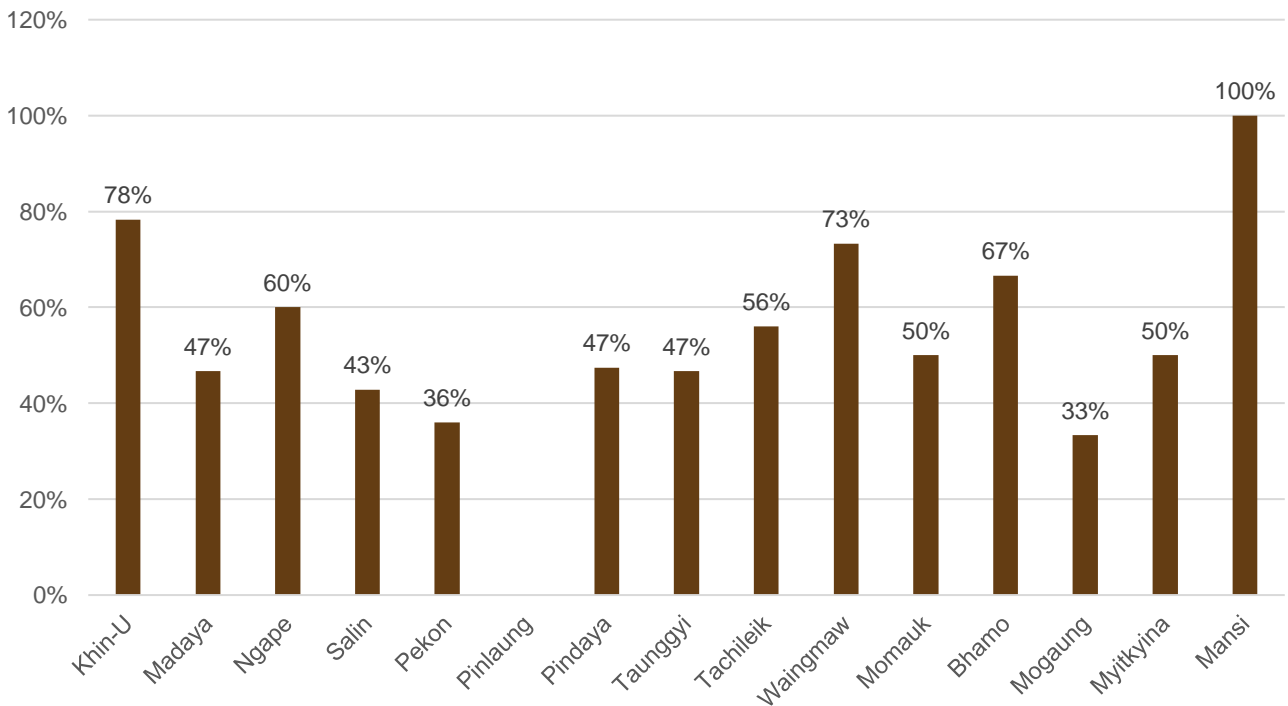
Figure 13. Percentage of women consuming food from Food Group 10 (other fruits).

Food group	Percentage	Rank
Food Group 1: Grains, white roots, and tubers or plantains	97.4	1
Food Group 5: Meat, poultry, and fish	86.8	2
Food Group 9: Other vegetables	78.2	3
Food Group 7: Dark green leafy vegetables	64.8	4
Food Group 8: Vitamin A-rich vegetable and fruits	52.7	5
Food Group 10: Other fruits	52.7	6
Food Group 2: Beans and peas	49.3	7
Food Group 6: Eggs	39.8	8
Food Group 3: Nuts and seeds	10.3	9
Food Group 4: Milk and milk products	9.7	10

Table 4. Food group consumption ranked from highest to lowest.

4.2. Fish consumption over the previous 7 days

Overall, 321 respondents (92%) said that they had consumed fish in the previous 7 days before the survey. Of those, the average number of meals containing fish was 5.4 (Table 5). The lowest frequency of consumption was once, for respondents in Khin U, Madaya, Pekon, Pinlaung, Salin, Tachileik, and Taunggyi (Figure 14). It was interesting to note that a few respondents in Salin and Tachiliek had eaten fish three times a day over the previous 7 days.
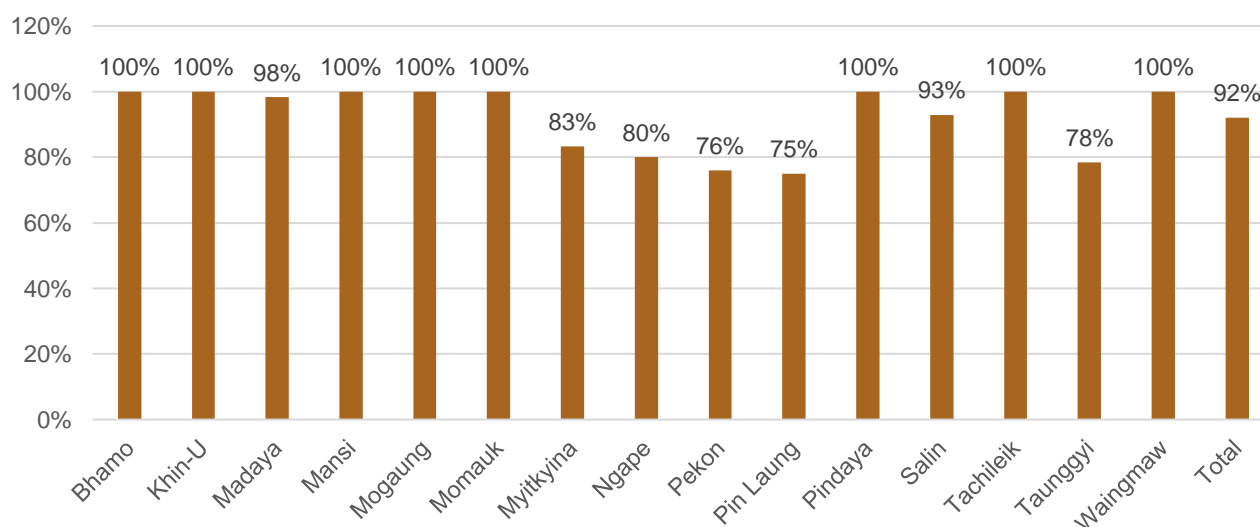
Figure 14. Percentage of respondents who had consumed fish in the previous 7 days.

Township	Average # of meals containing fish	Minimum # of meals containing fish	Maximum # of meals containing fish
Bhamo	9.7	7	12
Khin-U	6.2	1	14
Madaya	5.1	1	18
Mansi	9.0	9	9
Mogaung	7.7	4	14
Momauk	5.0	3	7
Myitkyina	4.2	3	5
Ngape	7.6	3	15
Pekon	4.3	1	18
Pin Laung	3.3	1	6
Pindaya	2.6	2	4
Salin	6.0	1	21
Tachileik	7.8	1	21
Taunggyi	3.2	1	12
Waingmaw	8.2	2	20
Total	**5.4**	**1**	**21**

Table 5. Number of meals containing fish in the previous 7 days.

4.3. Consumption of small indigenous species of fish over the previous 7 days

A total of 168 respondents (48%) said that they had consumed SIS in the previous 7 days (Figure 15). Of those, the average number of meals was three (Table 6). Among the townships, Ngape had the highest average frequency, at six. In addition, 97.6% of the respondents who had consumed SIS had done so whole, including the eyes, bones, and head.
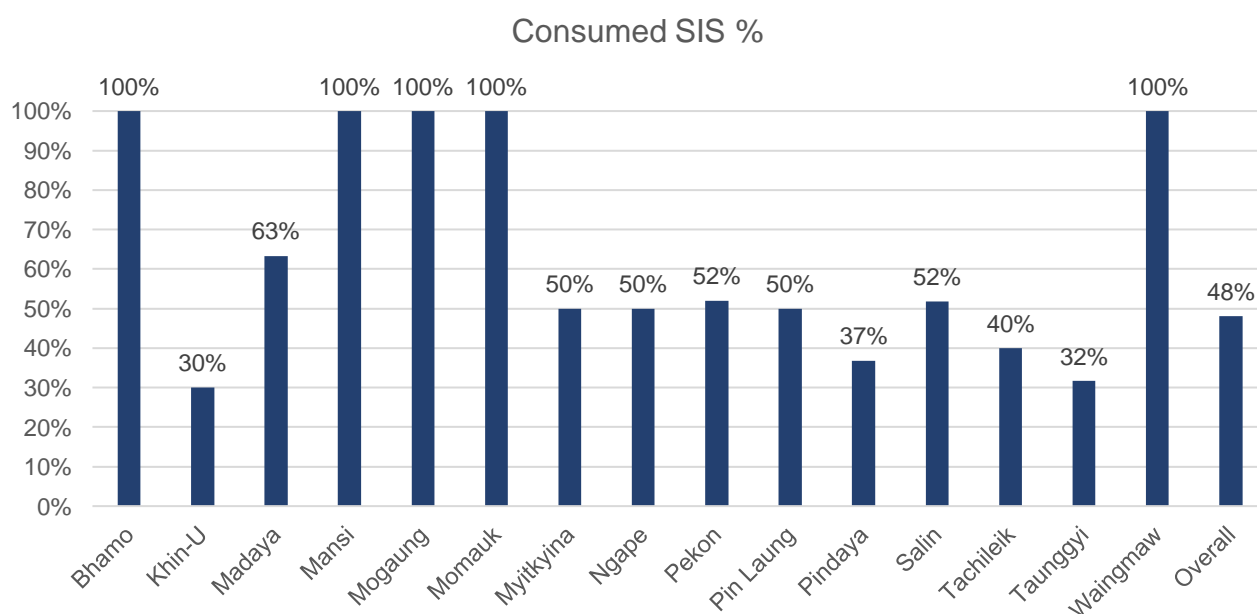
Figure 15. Percentage of respondents who had consumed SIS.

Township	Average # of meals containing SIS	Minimum # of meals containing SIS	Maximum # of meals containing SIS
Bhamo	2.7	2	3
Khin-U	4.2	2	7
Madaya	2.5	1	7
Mansi	4.0	4	4
Mogaung	2.7	1	4
Momauk	1.5	1	2
Myitkyina	3.3	2	6
Ngape	6.8	1	10
Pekon	3.4	1	10
Pin Laung	2.5	2	3
Pindaya	1.1	1	2
Salin	2.8	1	7
Tachileik	6.4	1	15
Taunggyi	2.4	1	4
Waingmaw	5.7	2	10
Total	**3.4**	**1**	**15**

Table 6. Meals containing SIS.

4.4. Source of fish

Overall, respondents rely on buying fish from ambulant vendors (53.6%) and the market (52%), followed by harvesting from their pond (30.2%). The lowest percentages were catching fish from the wild (4.7%) and gifts (1.6%). In Mogaung, specifically, respondents rely mostly on their ponds for their source of fish, while respondents from Mansi and Momauk depend on ambulant vendors (Figure 16).
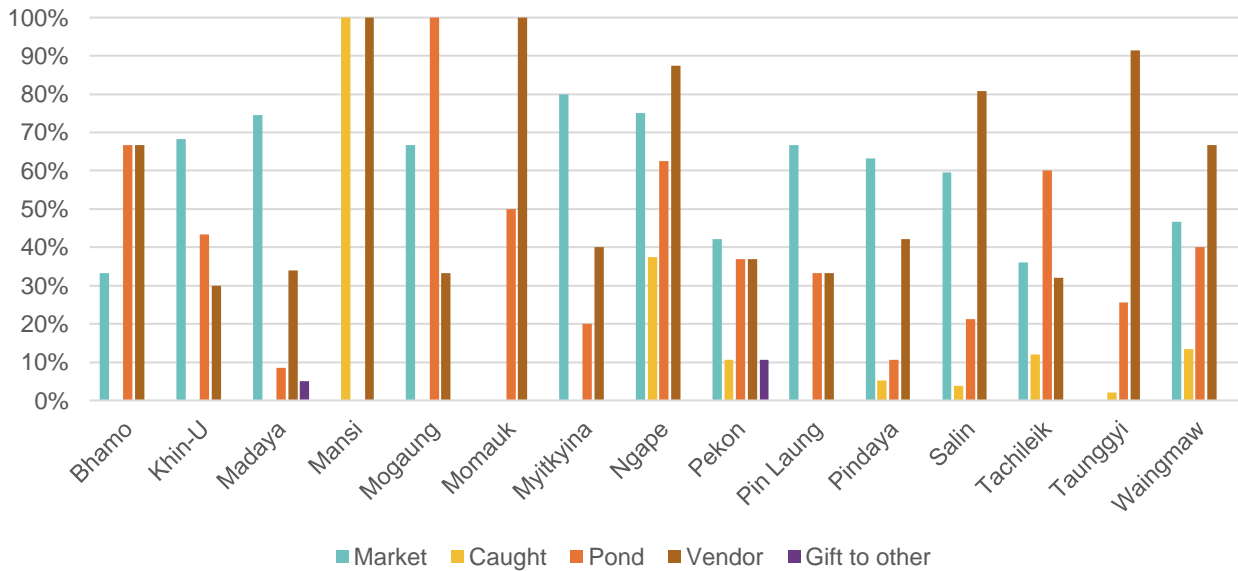
Figure 16. Sources of fish.

4.5. Consumption of fish-based processed products over the previous 7 days

Overall, 77% of the respondents said that they had consumed FBPs, such as dried fish, fish paste, pickled fish (fermented fish with rice traditionally wrapped in leaves), smoked fish, salted fish, and dried shrimp over the previous 7 days. All the respondents from Bhamo, Mansi, Momauk, and Waingmaw reported consuming these products. Mogaung and Myitkyina had the lowest percentages (Figure 17).
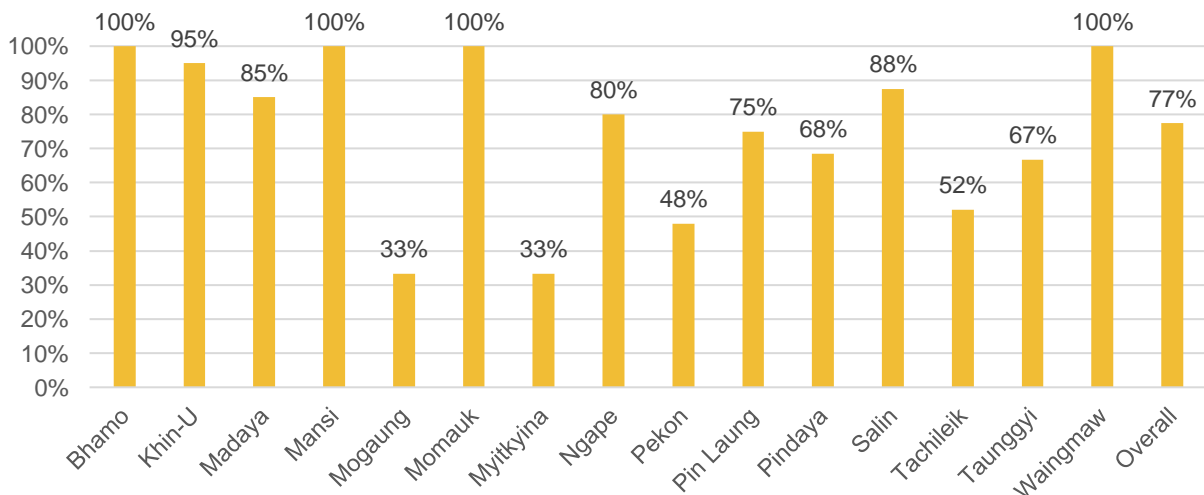
Figure 17. Percentage of respondents consuming FBPPs.

For 270 FBPPs eaters, the average number of meals that contained FBPPs was 5. Ngape has the highest average, at 15, followed by Salin, Khin U and Mansi with eight (Table 7).

Township	Average # of meals containing FBPPs	Minimum # of meals containing FBPPs	Maximum # of meals containing FBPPs
Bhamo	1.7	1	2
Khin-U	8.5	1	21
Madaya	3.1	1	14
Mansi	8.0	8	8
Mogaung	3.0	3	3
Momauk	1.5	1	2
Myitkyina	2.5	2	3
Ngape	15.9	10	20
Pekon	1.9	1	5
Pin Laung	1.7	1	2
Pindaya	4.1	1	14
Salin	8.9	1	21
Tachileik	4.9	1	21
Taunggyi	2.6	1	4
Waingmaw	7.7	1	15
Total	**5.9**	**1**	**21**

Table 7. Meals containing FBPPs.

Township	Dried fish	Fish paste	Pickled fish (fermented fish with rice)	Smoked fish	Salted fish	Dried shrimp
Bhamo	100%	67%	66.7%	0%	33.3%	0%
Khin-U	57.9%	88%	3.5%	0%	1.8%	0%
Madaya	76.5%	63%	5.9%	0%	0%	100%
Mansi	0%	100%	100%	0%	0%	0%
Mogaung	100%	0%	100%	100%	0%	0%
Momauk	50%	50%	0%	0%	0%	0%
Myitkyina	100%	50%	50%	0%	0%	0%
Ngape	37.5%	100%	0%	0%	0%	0%
Pekon	50%	50%	0.0%	0%	8.3%	0%
Pin Laung	100%	67%	0%	0%	0%	0%
Pindaya	100%	54%	0%	0%	0%	0%
Salin	83.7%	86%	0%	0%	0%	100%
Tachileik	30.8%	77%	23.1%	7.7%	0%	100%
Taunggyi	97.5%	38%	0%	0%	0%	0%
Waingmaw	80%	80%	40%	53.3%	0%	0%
Overall	**74.1%**	**70%**	**7%**	**3.7%**	**1.1%**	**5.2%**

Table 8. Types of FBPs consumed.

The most popular FBPs were dried fish (74.1%) and fish paste (70%). All the respondents from Bhamo, Mogaung, Myitkyina, Pinlaung and Pindaya reported consuming dried fish, while respondents from Mansi did not consume any at all (Table 8).

4.6. Use of fish after harvest

Respondents reported multiple ways of using the fish they harvested from their homestead ponds (Table 9). Overall, 98.6% consume the fish that they harvested, 83.7% sell the fish and 70.5% give some of them away. A few respondents sell fish on credit to others. In addition, in a majority of the townships (11 out of 15), respondents indicated that different portions of the harvest are sold, consumed and gifted. The other four townships (Bhamo, Mansi, Momauk and Pinlaung) indicated that they only sold and consumed their harvested fish.

Township	Sold	Consumed	Gifted	On credit
Bhamo	100%	100%		
Khin-U	100%	100%	96.7%	
Madaya	90%	95%	86.7%	
Mansi	100%	100%		
Mogaung	100%	100%	100%	
Momauk	100%	100%		
Myitkyina	100%	100%	100%	
Ngape	60%	100%	20%	
Pekon	68%	100%	44%	
Pin Laung	50%	75%		
Pindaya	68.4%	100%	42.1%	
Salin	98.2%	100%	98.2%	
Tachileik	68%	100%	72%	4%
Taunggyi	63.3%	98.3%	35%	
Waingmaw	100%	100%	80%	
Total	**83.7%**	**98.6%**	**70.5%**	**0.3%**

Table 9. Types of fish use.

4.7. Decision-makers after harvest

During the survey, respondents were asked about who decides on what to do with the fish they harvest—whether to sell or consume it. A total of 47% said that husbands and wives decide together, 29% said husbands, 13.2% said parents, and 8% said wives. Notably, all respondents in Mansi said that the husband gets to decide, while in Momauk half of the respondents rely on their parents for what to do (Figure 18).
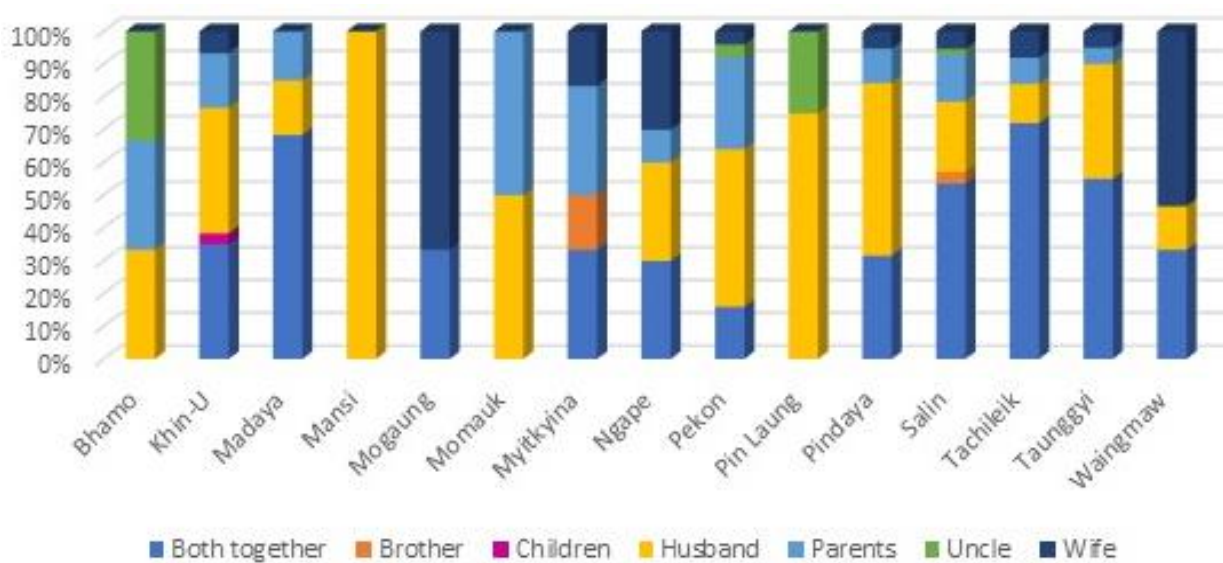
Figure 18. Household member who decides on how to use harvested fish.

A different pattern was found regarding who decides how to use the money generated from selling harvested fish from the household pond (Figure 19). A total of 37.5% of respondents said that the wife makes the decision, 33.5% said that husbands and wives decide together, 14% said husbands decide, and 13% said that parents do. Interestingly, over half the respondents from Mogaung, Madaya and Ngape said that they make the decisions on what to do with the income. In Mansi, the husband gets to decide, which is similar to what happens there regarding the use of harvested fish.
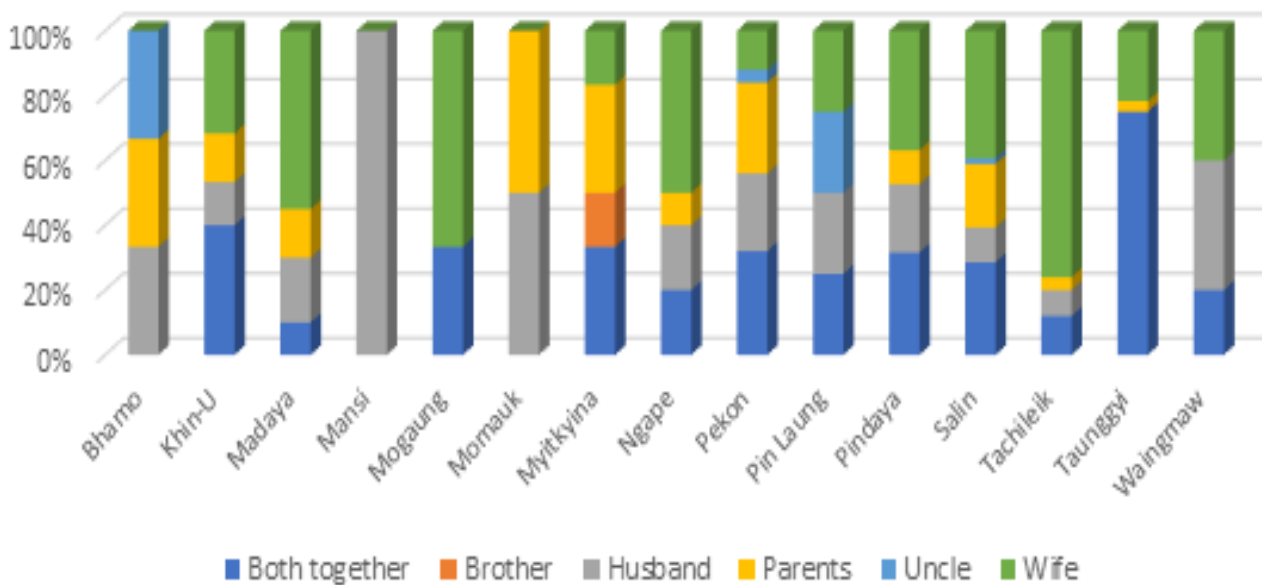
Figure 19. Household member who decides how to use income from fish sales.

5. Discussion and conclusion

To meet their daily nutrient requirements, it is important for women aged 15 to 49 years old to consume diverse foods, especially during pregnancy and lactation. However, poor access and lack of availability of foods are two factors that prevent women from eating a nutritious diet, and this has negative implications on their health and their infants.

In this survey, we investigated the food consumption patterns of women of reproductive age participating in the F4L project to support program implementation. Interviewees represented 15 townships: Myitkyina, Bhamo, Waingmaw, Momauk, and Mansi in Kachin State; Taunggyi, Pindaya, Pinlaung, Tachileik, and Pekon in Shan State; Salin and Ngape in Magway Region; Madaya in Mandalay Region; and Khin-U in Sagaing Region.

Before discussing the results, the following limitations of the survey should be taken into account:
1. Data was collected during the dry season when water from homestead ponds began to dry up and there was a limited supply of vegetables and fruits.
2. The ongoing COVID-19 pandemic and political instability resulted in travel restrictions, security concerns, and mobile phone/internet breakdowns. As a result, disrupted food supply chains might have affected the food availability and purchasing power of households interviewed. Since not all locations could be reached by enumerators, more than half of the interviews had to be conducted by phone. This might have affected the quality of the data. In some places, the survey had to be administered through paper recording because of poor or no internet access there. The data collected was entered in the KoBo tool and that chain might cause data entry errors.
3. Income and education can influence dietary diversity; however, the survey did not collect household income data nor information about the education levels of other household members.

Dietary diversity score

Overall, 73% of the respondents in the 15 townships had consumed at least five of the 10 food groups indicated in the MDD-W guide. In Myitkyina, Waingmaw, Mansi, and Momauk specifically, all the women had consumed at least five food groups. The rate was also high in Madaya (88%), Taunggyi (88%), and Tachileik (83%).

These dietary diversity scores are surprisingly high even though the survey was conducted not only in the dry season but also under the restrictions of the COVID-19 pandemic which can have negative effects on income levels. The high score might be due to coping mechanisms of farmers such as increased consumption of more foods produced from their ponds and gardens, finding alternative sources of income, and using their savings.

Low dietary diversity scores were found for Ngape, Pekon, and Pinlaung townships. Since Ngape is situated in a dry zone where inches of rainfall are significantly fewer, less food production can be expected than it is in other states and regions. However even both Pekon and Pinlaung are in Southern Shan State where the soil is fertile, the temperature is cooler and the yearly output of crops is higher, dietary diversity scores were in such a fewer number. So, further investigation is needed to understand the reasons behind the case.

Food groups and fish consumption

Grains, white roots, and tubers were the most frequently consumed food group as these are the staple foods in Myanmar. The second-most commonly consumed foods were meat, poultry, and fish. Surprisingly, relatively more expensive flesh foods were eaten during the time of crises without shifting to other more affordable options. The respondents likely eat fish from their homestead ponds regularly. This is also confirmed by the results of the 7-day food recall survey.

The least consumed food group was milk and milk products. This is in line with common food practices as people in Myanmar are not in the habit of drinking milk unless it is mixed with tea (lah-phat-yay), which is usually sweet. In a recent trend, however, many young children have been consuming milk products, which can be high in sugar. This is a direct result of the intensive and aggressive promotion of milk companies.

The majority of respondents said that they had consumed fish over the previous 7 days, with an average of five meals per week. A few respondents even reported that they had consumed fish three times a day for the previous 7 days. This underpins the importance of fish in rural diets as a source of protein and micronutrients.

Less than half the respondents reported eating SIS in the previous 7 days. This is a missed opportunity as when eaten whole, SIS is a good source of iron, calcium, vitamin A, vitamin B12, zinc, and essential fatty acids—all of which are essential in improving nutrition. As a result, there is a need to highlight the benefits of consuming SIS during information-sharing sessions at the community level.

Dried fish (74%) and fish paste (70%), both nutrient-dense foods, were regularly consumed as well, averaging five times over the previous 7 days. This signifies that these widely consumed FBPPs are also an important part of rural diets in Myanmar. However, the traditional methods used to produce them need to be improved, as these products are typically high in salt. Also, production methods do not adhere to the standards of good fish processing, and hygiene practices are poor, which can be harmful to health.

6. Next steps

Based on the findings, F4L should consider the following activities for implementation:

1) **Conduct a formative research study** to gain a deeper understanding of the motivations and barriers of the respondents to achieving diverse diets, especially for food groups that are not consumed. In Mansi, for instance, respondents did not consume dark green leafy vegetables, nor did those in Momauk consume vitamin A-rich vegetables and fruits. The results of such a formative study could support the team in developing key messages and identifying activities that would enable these respondents to change their behaviors, resulting in improved nutrition.

2) **Intensify promotion of integrated fish agri-food systems** to ensure diverse production, for the availability of diverse and nutritious foods at home. An integrated system uses pond polyculture methods that include SIS and carp in ponds, as well as micronutrient-rich vegetables and fruits on dikes and in homestead gardens. Aside from generating income from the fish, vegetables, and fruits sold, the surplus could be used for home consumption, which increases dietary diversity among family members, especially women of reproductive age and young children.

3) **Strengthen nutrition activities focusing on behavior change messages at the community level.** Building on the results of a formative research study, such as barrier analysis, the field team could conduct multiple activities to ensure that key messages are communicated and understood by the target audience. These activities include nutrition promotion month, competitions, model households, and informal nutrition sharing sessions. At the same time, F4L teams could develop and disseminate various information, education, and communications materials (pamphlets, posters, brochures), and promote the use of mobile apps (Shwe Ngar app, Htwet Toe app) to widen the reach of these messages.

Annex 1. MDD-W Food sub-groups guide

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

Annex 2. Ranking of food groups per township

One township in Sagaing and another township in Mandalay Region

Food groups	Khin U		Madaya	
	Percent	**Rank**	**Percent**	**Rank**
Food group 01: Grain, White roots and tubers or plantains	90.0	2	100.0	1
Food group 02: Beans or peas	48.3	5	76.7	4
Food group 03: Nuts or seeds			18.3	9
Food group 04: Milk or milk products	3.3	9	11.7	10
Food group 05: Meat, poultry, fish	96.7	1	95.0	3
Food group 06: Eggs	28.3	8	25.0	8
Food group 07: Dark green leafy vegetables	46.7	6	50.0	6
Food group 08: Vitamin A-rich vegetable and fruits	45.0	7	71.7	5
Food group 09: Other vegetables	56.7	4	96.7	2
Food group 10: Other fruits	78.3	3	46.7	7

Two townships in Magway Region

Food groups	Ngape		Salin	
	Percent	**Rank**	**Percent**	**Rank**
Food group 01: Grain, White roots and tubers or plantains	100%	1	100%	1
Food group 02: Beans or peas	30%	7	75%	3
Food group 03: Nuts or seeds			18%	9
Food group 04: Milk or milk products			2%	10
Food group 05: Meat, poultry, fish	40%	6	71%	4
Food group 06: Eggs	70%	4	20%	8
Food group 07: Dark green leafy vegetables	80%	2	54%	5
Food group 08: Vitamin A-rich vegetable and fruits	10%	8	46%	6
Food group 09: Other vegetables	80%	3	91%	2
Food group 10: Other fruits	60%	5	43%	7

Five Townships in Kachin State

Food groups	Waingmaw		Momauk		Bhamo		Mogaung		Myitkyina		Mansi	
	Percent	Rank	Percent	Rank	Percent	Rank	Percent	Rank	Percent	Rank	Percent	Rank
Food group 01: Grain, White roots and tubers or plantains	100%	1	100%	1	100%	1	100%	1	100%	1	100%	1
Food group 02: Beans or peas	20%	9	50%	2	33%	3	67%	2	100%	1	100%	1
Food group 03: Nuts or seeds	40%	8							17%	5		
Food group 04: Milk or milk products	47%	7					67%	2	83%	2		
Food group 05: Meat, poultry, fish	100%	1	100%	1	100%	1	100%	1	100%	1	100%	1
Food group 06: Eggs	67%	5	100%	1			33%	3	83%	2	100%	1
Food group 07: Dark green leafy vegetables	87%	2	100%	1	100%	1	67%	2	100%	1		
Food group 08: Vitamin A-rich vegetable and fruits	80%	3			100%	1	100%	1	100%	1		
Food group 09: Other vegetables	60%	6	50%	2	67%	2	67%	2	67%	3	100%	1
Food group 10: Other fruits	73%	4	50%	2	67%	2	33%	3	50%	4	100%	1

Four Townships in Southern Shan

Food groups	Pekon		Pinlaung		Pindaya		Taunggyi	
	Percent	Rank	Percent	Rank	Percent	Rank	Percent	Rank
Food group 01: Grain, White roots and tubers or plantains	88%	1	100%	1	100%	1	100%	1
Food group 02: Beans or peas	16%	6	25%	4	47%	5	25%	7
Food group 03: Nuts or seeds	12%	7		5	21%	6		8
Food group 04: Milk or milk products		9		5		7		8
Food group 05: Meat, poultry, fish	88%	1	50%	3	63%	4	88%	2
Food group 06: Eggs	8%	8	25%	4	47%	5	73%	4
Food group 07: Dark green leafy vegetables	52%	4	50%	3	79%	3	100%	1
Food group 08: Vitamin A-rich vegetable and fruits	64%	2	75%	2	21%	6	27%	6
Food group 09: Other vegetables	56%	3	75%	2	84%	2	83%	3
Food group 10: Other fruits	36%	5		5	47%	5	47%	5

One township in Eastern Shan

Food groups	Tachileik	
	Percent	Rank
Food group 01: Grain, White roots and tubers or plantains	100%	1
Food group 02: Beans or peas	36%	6
Food group 03: Nuts or seeds	4%	7
Food group 04: Milk or milk products	40%	5
Food group 05: Meat, poultry, fish	100%	1
Food group 06: Eggs	56%	4
Food group 07: Dark green leafy vegetables	56%	4
Food group 08: Vitamin A-rich vegetable and fruits	96%	2
Food group 09: Other vegetables	80%	3
Food group 10: Other fruits	56%	4

Annex 3. MDD-W results of all food groups in each township

All food groups - Khin-U

Food Sub Groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	85.0	5.0	43.3	48.3	5.0
Vegetables or roots (yellow or orange colored inside)	11.7		6.7	13.3	
White roots and tubers or plantains	3.3		5.0	10.0	3.3
Dark green leafy vegetables	5.0	1.7	31.7	35.0	3.3
Fruits that are dark yellow or orange inside	3.3		8.3	6.7	3.3
Other fruits	15.0	6.7	25.0	48.3	1.7
Other vegetables	11.7	1.7	30.0	35.0	3.3
Meat made from animal organs	1.7			1.7	
Other types of meat or poultry	38.3		28.3	53.3	3.3
Eggs	10.0	6.7	6.7	11.7	1.7
Fish or seafood	16.7	1.7	18.3	28.3	3.3
Beans or peas	28.3	1.7	20.0	18.3	5.0
Nuts or seeds					
Milk or milk products	3.3				
Insects or other small protein food					
Red palm oil					
Oils and fats	66.7	6.7	41.7	83.3	3.3
Savory and fried snacks	6.7				
Sweets	5.0				
Sugar-sweetened beverages	38.3	5.0	11.7	6.7	1.7
Condiments and seasoning	26.7	5.0	30.0	35.0	5.0
Other beverages and foods	13.3			8.3	
Other					
Nothing					

All food groups - Madaya

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	98.3	11.7	95.0	80.0	13.3
Vegetables or roots (yellow or orange colored inside)	6.7	6.7	8.3	5.0	
White roots and tubers or plantains	21.7		30.0	28.3	1.7
Dark green leafy vegetables	23.3	10.0	40.0	40.0	1.7
Fruits that are dark yellow or orange inside	13.3	3.3	50.0	33.3	11.7
Other fruits	10.0	6.7	26.7	25.0	5.0
Other vegetables	38.3	6.7	83.3	63.3	10.0
Meat made from animal organs			5.0	3.3	1.7
Other types of meat or poultry	15.0	8.3	38.3	33.3	1.7
Eggs	10.0		5.0	13.3	3.3
Fish or seafood	50.0	3.3	53.3	40.0	10.0
Beans or peas	40.0	10.0	46.7	45.0	6.7
Nuts or seeds	3.3		15.0	6.7	3.3
Milk or milk products	10.0		1.7	1.7	
Insects or other small protein food					
Red palm oil					
Oils and fats	6.7		6.7	5.0	
Savory and fried snacks	1.7	1.7	1.7	3.3	
Sweets	10.0	1.7			
Sugar-sweetened beverages	36.7		6.7	3.3	
Condiments and seasoning	15.0	1.7	25.0	16.7	3.3
Other beverages and foods				3.3	
Other					
Nothing					

All food groups - Ngape

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0	20.0	80.0	50.0	50.0
Vegetables or roots (yellow or orange colored inside)					
White roots and tubers or plantains			20.0	10.0	
Dark green leafy vegetables	20.0	10.0	70.0	20.0	50.0
Fruits that are dark yellow or orange inside					10.0
Other fruits	10.0		50.0	10.0	
Other vegetables		10.0	50.0	20.0	30.0
Meat made from animal organs	10.0	10.0	10.0	10.0	10.0
Other types of meat or poultry	10.0	10.0		10.0	
Eggs	20.0		30.0	10.0	30.0
Fish or seafood	10.0		20.0	10.0	20.0
Beans or peas	30.0				
Nuts or seeds					
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats	70.0	20.0	70.0	40.0	50.0
Savory and fried snacks					
Sweets					
Sugar-sweetened beverages					
Condiments and seasoning	70.0	20.0	50.0	40.0	30.0
Other beverages and foods					
Other	30.0	10.0	20.0		20.0
Nothing					

All food groups - Salin

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0	7.1	58.9	100.0	
Vegetables or roots (yellow or orange colored inside)	10.7		1.8	1.8	
White roots and tubers or plantains	8.9	1.8	5.4	8.9	
Dark green leafy vegetables	21.4	5.4	14.3	28.6	
Fruits that are dark yellow or orange inside	1.8	5.4	30.4	5.4	5.4
Other fruits	10.7	3.6	33.9	7.1	1.8
Other vegetables	39.3	3.6	44.6	75.0	
Meat made from animal organs	1.8	1.8	3.6	5.4	
Other types of meat or poultry	7.1	3.6	10.7	21.4	
Eggs	8.9		5.4	10.7	
Fish or seafood	30.4	1.8	21.4	26.8	
Beans or peas	42.9	5.4	37.5	37.5	3.6
Nuts or seeds	7.1	1.8	7.1	5.4	3.6
Milk or milk products			1.8		
Insects or other small protein food					
Red palm oil					
Oils and fats	91.1	7.1	55.4	91.1	
Savory and fried snacks					
Sweets		3.6	1.8		
Sugar-sweetened beverages	3.6		3.6		
Condiments and seasoning	10.7	5.4	42.9	66.1	
Other beverages and foods			8.9	1.8	3.6
Other	62.5	5.4	57.1	87.5	3.6
Nothing					

All food groups - Pekon

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	48.0	4.0	16.0	16.0	
Vegetables or roots (yellow or orange colored inside)	24.0	16.0	8.0	16.0	
White roots and tubers or plantains	64.0	28.0	20.0	20.0	4.0
Dark green leafy vegetables	44.0	12.0	8.0	12.0	4.0
Fruits that are dark yellow or orange inside	12.0	12.0	4.0		
Other fruits	12.0	12.0	12.0	4.0	
Other vegetables	20.0	16.0	12.0	24.0	
Meat made from animal organs	16.0	4.0	8.0	20.0	4.0
Other types of meat or poultry	16.0		8.0	16.0	
Eggs	4.0		4.0	4.0	4.0
Fish or seafood	12.0	16.0	16.0	28.0	
Beans or peas	12.0		8.0	4.0	
Nuts or seeds	4.0	4.0	4.0		
Milk or milk products					
Insects or other small protein food			4.0		
Red palm oil					
Oils and fats	4.0				
Savory and fried snacks	4.0				
Sweets	16.0		12.0	8.0	4.0
Sugar-sweetened beverages	12.0		8.0	16.0	
Condiments and seasoning	4.0	4.0	4.0	4.0	
Other beverages and foods	12.0			8.0	
Other	16.0	12.0	4.0	16.0	
Nothing					

All food groups - Pinlaung

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	50.0	50.0		50.0	
Vegetables or roots (yellow or orange colored inside)	50.0		25.0		
White roots and tubers or plantains	50.0			25.0	
Dark green leafy vegetables	50.0				25.0
Fruits that are dark yellow or orange inside	50.0	50.0			
Other fruits					
Other vegetables	50.0	25.0			
Meat made from animal organs	25.0			50.0	
Other types of meat or poultry					
Eggs		25.0			
Fish or seafood				50.0	
Beans or peas					25.0
Nuts or seeds					
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats		25.0			25.0
Savory and fried snacks					
Sweets		25.0			
Sugar-sweetened beverages					
Condiments and seasoning			25.0		25.0
Other beverages and foods					
Other			25.0		
Nothing					

All food groups - Pindaya

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	94.7	31.6	57.9	68.4	10.5
Vegetables or roots (yellow or orange colored inside)	10.5		5.3	5.3	
White roots and tubers or plantains	21.1	21.1	21.1		5.3
Dark green leafy vegetables	47.4	26.3	31.6	47.4	
Fruits that are dark yellow or orange inside	5.3	5.3			
Other fruits	21.1	5.3	21.1	10.5	
Other vegetables	73.7	26.3	26.3	21.1	10.5
Meat made from animal organs	5.3				
Other types of meat or poultry	10.5		10.5	5.3	
Eggs	26.3	15.8	10.5	5.3	5.3
Fish or seafood	10.5	5.3	10.5	26.3	5.3
Beans or peas	15.8	10.5	10.5	21.1	5.3
Nuts or seeds	10.5		15.8	5.3	
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats	84.2	36.8	47.4	63.2	10.5
Savory and fried snacks	26.3	21.1	10.5	31.6	5.3
Sweets	10.5	5.3	21.1		
Sugar-sweetened beverages	21.1	10.5	10.5	10.5	
Condiments and seasoning	84.2	36.8	52.6	63.2	10.5
Other beverages and foods	26.3	15.8	10.5	26.3	5.3
Other					
Nothing					

All food groups - Taunggyi

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0	1.7	100.0	95.0	3.3
Vegetables or roots (yellow or orange colored inside)	8.3		8.3		3.3
White roots and tubers or plantains	23.3		45.0	31.7	
Dark green leafy vegetables	78.3	1.7	75.0	78.3	3.3
Fruits that are dark yellow or orange inside	1.7		10.0	1.7	
Other fruits	16.7	1.7	20.0	26.7	
Other vegetables	43.3		66.7	55.0	1.7
Meat made from animal organs	3.3		11.7	6.7	
Other types of meat or poultry	13.3		30.0	28.3	
Eggs	53.3		18.3	15.0	
Fish or seafood	13.3		43.3	36.7	1.7
Beans or peas	15.0	1.7	16.7	16.7	1.7
Nuts or seeds					
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats	91.7	1.7	96.7	91.7	3.3
Savory and fried snacks	5.0		11.7		
Sweets					
Sugar-sweetened beverages					
Condiments and seasoning					
Other beverages and foods					
Other					
Nothing					

All food groups - Tachileik

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0	92.0	12.0	92.0	
Vegetables or roots (yellow or orange colored inside)	56.0	24.0	4.0	28.0	
White roots and tubers or plantains	12.0	4.0		8.0	
Dark green leafy vegetables	48.0	24.0	4.0	12.0	
Fruits that are dark yellow or orange inside	28.0	36.0	20.0	24.0	
Other fruits	40.0	32.0	12.0	12.0	
Other vegetables	56.0	40.0	8.0	40.0	
Meat made from animal organs	36.0	44.0		36.0	
Other types of meat or poultry	56.0	44.0	8.0	40.0	
Eggs	40.0	20.0	4.0	16.0	
Fish or seafood	24.0	32.0	4.0	24.0	
Beans or peas	24.0	24.0		12.0	
Nuts or seeds	4.0				
Milk or milk products	28.0	36.0			
Insects or other small protein food	8.0	4.0		12.0	
Red palm oil					
Oils and fats	56.0	56.0		52.0	
Savory and fried snacks	8.0	28.0	4.0	8.0	
Sweets	32.0	36.0	16.0	4.0	
Sugar-sweetened beverages	12.0	32.0	28.0	8.0	
Condiments and seasoning	72.0	76.0	8.0	68.0	
Other beverages and foods	4.0	8.0	8.0	12.0	
Other	32.0	12.0	8.0	20.0	
Nothing					

All food groups - Waingmaw

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0	80.0	53.3	53.3	
Vegetables or roots (yellow or orange colored inside)	73.3	6.7	13.3	26.7	
White roots and tubers or plantains	46.7	13.3	6.7	20.0	
Dark green leafy vegetables	80.0	26.7	26.7	26.7	
Fruits that are dark yellow or orange inside	13.3	6.7	20.0	13.3	
Other fruits	46.7	40.0	26.7		6.7
Other vegetables	33.3	20.0	6.7	26.7	
Meat made from animal organs					
Other types of meat or poultry	93.3	46.7	26.7	26.7	
Eggs	33.3	6.7	20.0	20.0	
Fish or seafood	26.7	6.7	13.3	6.7	
Beans or peas	6.7	6.7	6.7		6.7
Nuts or seeds	13.3	13.3	6.7	13.3	6.7
Milk or milk products		20.0	6.7	13.3	6.7
Insects or other small protein food		6.7			
Red palm oil					
Oils and fats					
Savory and fried snacks	20.0	33.3	20.0	13.3	
Sweets	13.3	20.0	13.3	6.7	13.3
Sugar-sweetened beverages	6.7				
Condiments and seasoning	6.7	6.7	6.7	20.0	
Other beverages and foods	6.7	6.7	6.7	13.3	
Other					
Nothing					

All food groups - Momauk

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0		50.0	100.0	
Vegetables or roots (yellow or orange colored inside)					
White roots and tubers or plantains					
Dark green leafy vegetables	50.0		50.0	100.0	
Fruits that are dark yellow or orange inside					
Other fruits	50.0				
Other vegetables			50.0	50.0	
Meat made from animal organs					
Other types of meat or poultry	50.0		50.0	100.0	
Eggs	100.0				
Fish or seafood	50.0				
Beans or peas	50.0			50.0	
Nuts or seeds					
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats					
Savory and fried snacks					
Sweets					
Sugar-sweetened beverages					
Condiments and seasoning	50.0				
Other beverages and foods					
Other	50.0				
Nothing					

All food groups - Bhamo

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0		33.3	100.0	
Vegetables or roots (yellow or orange colored inside)				33.3	
White roots and tubers or plantains	33.3			33.3	
Dark green leafy vegetables	100.0			33.3	
Fruits that are dark yellow or orange inside	66.7			33.3	
Other fruits	66.7				
Other vegetables	33.3			33.3	
Meat made from animal organs					
Other types of meat or poultry	66.7			100.0	
Eggs					
Fish or seafood	66.7			33.3	
Beans or peas	33.3			33.3	
Nuts or seeds					
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats					
Savory and fried snacks	33.3				
Sweets					
Sugar-sweetened beverages	33.3		33.3		
Condiments and seasoning					
Other beverages and foods					
Other					
Nothing					

All food groups - Mogaung

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	1.0			100.0	
Vegetables or roots (yellow or orange colored inside)	0.7			100.0	
White roots and tubers or plantains	0.7			33.3	33.3
Dark green leafy vegetables	66.7			33.3	
Fruits that are dark yellow or orange inside	66.7			33.3	
Other fruits				33.3	
Other vegetables	33.3			66.7	
Meat made from animal organs				33.3	
Other types of meat or poultry	66.7			33.3	
Eggs	33.3			33.3	
Fish or seafood	66.7			100.0	
Beans or peas				66.7	
Nuts or seeds					
Milk or milk products	66.7			66.7	
Insects or other small protein food					
Red palm oil					
Oils and fats	100.0			66.7	
Savory and fried snacks					
Sweets	33.3				
Sugar-sweetened beverages	33.3				
Condiments and seasoning					
Other beverages and foods					
Other					33.3
Nothing					

All food groups - Myitkyina

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0		50.0	50.0	
Vegetables or roots (yellow or orange colored inside)	100.0		50.0	33.3	
White roots and tubers or plantains	50.0		16.7	16.7	
Dark green leafy vegetables	83.3		50.0	50.0	
Fruits that are dark yellow or orange inside	33.3			50.0	
Other fruits			50.0		
Other vegetables	50.0		16.7	16.7	
Meat made from animal organs			50.0	16.7	
Other types of meat or poultry	100.0		50.0	50.0	
Eggs	83.3		50.0	16.7	
Fish or seafood	66.7		33.3	33.3	
Beans or peas	50.0		33.3	50.0	
Nuts or seeds	16.7				
Milk or milk products	50.0		33.3	16.7	
Insects or other small protein food					
Red palm oil					
Oils and fats	66.7		33.3	50.0	
Savory and fried snacks	16.7				
Sweets	33.3		16.7		
Sugar-sweetened beverages	33.3				
Condiments and seasoning			16.7		
Other beverages and foods					
Other					
Nothing					

All food groups - Mansi

Food sub-groups	Morning	Mid-day	Afternoon	Evening	Night
Grain	100.0		100.0	100.0	
Vegetables or roots (yellow or orange colored inside)					
White roots and tubers or plantains					
Dark green leafy vegetables					
Fruits that are dark yellow or orange inside					
Other fruits			100.0		
Other vegetables			100.0		
Meat made from animal organs					
Other types of meat or poultry				100.0	
Eggs				100.0	
Fish or seafood			100.0		
Beans or peas				100.0	
Nuts or seeds					
Milk or milk products					
Insects or other small protein food					
Red palm oil					
Oils and fats					
Savory and fried snacks					
Sweets	100.0				
Sugar-sweetened beverages					
Condiments and seasoning					
Other beverages and foods					
Other					
Nothing					

Annex 4. Fish species consumed in each township

Fish Consumption: Five townships in Kachin State

Fish Species	Bhamo	Mansi	Mogaung	Momauk	Myitkyina	Waingmaw
Rohu - *Labeo rohita*			100.0%	100.0%	100.0%	73.3%
Mrigal - *Cirrhinus cirrhosis/Cirrhinus mrigala*	66.7%					40.0%
Catla - *Catla catla*						13.3%
Common carp - *Cyprinus carpio*	66.7%		100.0%	50.0%	80.0%	73.3%
Grass carp - *Ctenopharyngodon idella*	33.3%				20.0%	53.3%
Silver carp - *Hypophthalmichthys molitrix*						20.0%
Big head carp - *Hypophthalmichthys nobilis*	33.3%					6.7%
Tilapia – *Oreochromis sp.*	66.7%		100.0%	50.0%	20.0%	33.3%
Silver barb - *Barbonymus gonionotus*						6.7%
Striped river catfish/Pangasius - *Pangasianodon hypophthalmu*						6.7%
Pacu - *Piaractus brachypomum*					40.0%	40.0%
Climbing perch – *Anabas testudineus*		100.0%				13.3%
Striped snakehead - *Channa striata*	33.3%	100.0%	33.3%			46.7%
Zig zag eel/Nga- mway- doe/Nga Lin Mway						60.0%
Bronze featherback - *Notopterus notopterus*	33.3%	100.0%			20.0%	13.3%
Walking catfish - *Clarias batrachus*		100.0%	66.7%	100.0%		46.7%
Asian swamp eel - *Monopterus albus*						20.0%
Spotted barb - *Barbodes binotatus*				50.0%		20.0%
Gangetic scissortail rasbora - *Rasbora rasbora*			33.3%		20.0%	20.0%
Malabar loach - *Lepidocephalus thermalis*		100.0%	33.3%		20.0%	13.3%
Mola/mola carplet - *Amblypharyngodon mola*	66.7%			50.0%		6.7%
Carplet barb/Nga pha ma - *Osteobrama sp.*						6.7%
Dhela/Nga phel oung - *Osteobrama cotio*						13.3%
Boal fish - *Wallago Attu*	33.3%					

Fish Consumption: Khin U, Sagaing and Madaya, Mandalay Region

Fish Species	Khin-U	Madaya
Rohu - *Labeo rohita*	85.0%	42.4%
Mrigal - *Cirrhinus cirrhosis/ Cirrhinus mrigala*		1.7%
Catla - *Catla catla*		1.7%
Common carp - *Cyprinus carpio*	1.7%	10.2%
Big head carp - *Hypophthalmichthys nobilis*		5.1%
Tilapia – *Oreochromis sp.*	48.3%	59.3%
Silver barb - *Barbonymus gonionotus*		1.7%
Striped river catfish/Pangasius - *Pangasianodon hypophthalmu*	43.3%	6.8%
Pacu - *Piaractus brachypomum*	35.0%	
Striped snakehead - *Channa striata*	3.3%	5.1%
Bronze featherback - *Notopterus notopterus*		8.5%
Banded Gourami - *Trichogaster fasciata*		1.7%
Three spot gourami - *Trichopodus trichopterus*		1.7%
Spotted barb - *Barbodes binotatus*	16.7%	30.5%
Gangetic scissortail rasbora - *Rasbora rasbora*	1.7%	11.9%
Malabar loach - *Lepidocephalus thermalis*	3.3%	11.9%
Indian glassy fish - *Parambassis ranga*	1.7%	5.1%
Burmese barb/Nga maw tawt- *Esomus ahli*	6.7%	25.4%
Dhela/Nga phel oung - *Osteobrama cotio*		1.7%
Striped dwarf catfish - *Mystus vittatus*		1.7%

Fish Consumption: Four townships in Shan south

Fish Species	Pekon	Pin Laung	Pindaya	Taunggyi
Rohu - *Labeo rohita*	10.5%		5.3%	4.3%
Mrigal - *Cirrhinus cirrhosis/Cirrhinus mrigala*	10.5%	33.3%	5.3%	17.0%
Common carp - *Cyprinus carpio*	26.3%	33.3%	52.6%	48.9%
Grass carp - *Ctenopharyngodon idella*	5.3%		52.6%	6.4%
Tilapia – *Oreochromis sp.*	36.8%	33.3%	21.1%	51.1%
Silver barb - *Barbonymus gonionotus*	5.3%			
Striped snakehead - *Channa striata*	31.6%		36.8%	2.1%
Zig zag eel/Nga- mway- doe/Nga Lin Mway				4.3%
Bronze featherback - *Notopterus notopterus*	5.3%	33.3%		
Asian swamp eel - *Monopterus albus*			15.8%	
Spotted barb - *Barbodes binotatus*	21.1%			36.2%
Gangetic scissortail rasbora - *Rasbora rasbora*	10.5%			
Malabar loach - *Lepidocephalus thermalis*	26.3%	33.3%	31.6%	12.8%
SIS (Nga Tha Phwe)	5.3%			
SIS (Hmae Ta Pauk)	5.3%			

Fish Consumption: Salin and Ngape, Magway Region

Fish Species	Salin	Ngape
Rohu - *Labeo rohita*	57.7%	25.0%
Mrigal - *Cirrhinus cirrhosis/ Cirrhinus mrigala*	23.1%	
Tilapia – *Oreochromis sp.*	36.5%	12.5%
Silver barb - *Barbonymus gonionotus*	11.5%	12.5%
Striped river catfish/Pangasius - *Pangasianodon hypophthalmu*	9.6%	
Pacu - *Piaractus brachypomum*	9.6%	
Climbing perch – *Anabas testudineus*	5.8%	
Striped snakehead - *Channa striata*	7.7%	25.0%
Zig zag eel/Nga- mway- doe/Nga Lin Mway		12.5%
Spotted barb - *Barbodes binotatus*	32.7%	25.0%
Gangetic scissortail rasbora - *Rasbora rasbora*		25.0%
Malabar loach - *Lepidocephalus thermalis*	21.2%	
Mola/mola carplet - *Amblypharyngodon mola*		25.0%
Burmese barb/Nga maw tawt- *Esomus ahli*	9.6%	12.5%
Dhela/Nga phel oung - *Osteobrama cotio*		12.5%
Shrimp - *Caridea*	1.9%	

Fish Consumption: Tachiliek, Eastern Shan

Fish Species	Tachileik
Rohu - *Labeo rohita*	20.0%
Common carp - *Cyprinus carpio*	12.0%
Tilapia – *Oreochromis sp.*	72.0%
Striped snakehead - *Channa striata*	8.0%
Walking catfish - *Clarias batrachus*	36.0%
Tuna fish - Thunnini	12.0%
Spotted barb - *Barbodes binotatus*	24.0%
Gangetic scissortail rasbora - *Rasbora rasbora*	4.0%
Mola/mola carplet - *Amblypharyngodon mola*	16.0%

Annex 5. MDD-W Survey Questionnaire

"Hello, my name is _. I am currently conducting a survey for WorldFish "Fish for Livelihoods project". We work with small scale aquaculture farmers and fisherfolks in Magway, Mandalay, Kachin, Eastern and Southern Shan. The goal of the project is to increase income and improve the nutrition of households that we are working with. May I ask you some questions about your food intake for the past 24 hours? The interview will take at least 20 minutes of your time."

မင်္ဂလာပါ၊ ကျွန်တော်/ကျွန်မကတော့ _____ပါ။ WorldFish အဖွဲ့ရဲ့ "Fish For Livelihoods" စီမံချက် အတွက် စစ်တမ်းကောက်ယူနေတာပါ။ ကျွန်တော်တို့ကတော့ စီမံချက် ရည်ရွယ်ချက်ရေရိယာများဖြစ်တဲ့ မကွေး၊ မန္တလေး၊ ကချင်၊ ရှမ်း အရှေ့နှင့် ရှမ်းတောင်ပိုင်းရှိ အသေးစားငါးမွေးမြှူသူများ၊ ငါးဖမ်းသူများနှင့်အတူ စီမံချက်ကို အကောင်အထည်ဖော်နေ ပါတယ်။ စီမံကိန်း၏ရည်မှန်းချက်ကတော့ ကျွန်ုပ်တို့နှင့် အတူ လက်တွဲ လုပ်ကိုင်နေသော အိမ်ထောင်စုများ၏ ဝင်ငွေတိုးရန် နှင့် အာဟာရများ တိုးတက်စေရန်ဖြစ်ပါတယ်။ လွန်ခဲ့သော ၂၄ နာရီအတွင်း သင်၏အစားအစာ စားသုံးမှုနှင့် ပတ်သက်၍ (အမ/ညီမ/အဒေါ်)ကို မေးခွန်းလေးတွေ မေးချင်ပါတယ်။ မေးခွန်းဖြေဆိုရန် ကြာချိန်မှာ အနည်းဆုံးမိနစ် ၂၀ လောက် ကြာပါလိမ့်မည်။

>>> Would you like to participate in this interview?
(မေးခွန်းလေးတွေ မေးလို့ရမလား/မေးခွန်းလေးတွေ ဖြေပေးနိုင်မလား?)

1   Yes (ဖြေပေးနိုင်ပါတယ်)

0   No (မဖြေပေးနိုင်ပါ) >>> "If no, find another HH" (မဖြေပေးနိုင်ပါက အခြား အိမ် တစ်အိမ် ကို ပြောင်းပေးပါ။)

Q1. Date of interview (အင်တာဗျူးရက်စွဲ)   : _____

Q2. Start Time (စတင်ချိန်)   : _____

Q3. Name of IP (မိတ်ဖက်အဖွဲ့အစည်းအမည်)   : _____

Q4. Name of Township (မြို့နယ်)   : _____

Q5. Name of enumerator/Community Facilitator (စာရင်းကောက်သူ၏အမည်) : _____

Q6. Village Tract/Ward (ကျေးရွာအုပ်စု/ ရပ်ကွက်)   : _____

Q7. Village/Ward (ကျေးရွာ အမည်)   : _____

Respondent Information (ဖြေဆိုသူ၏ သတင်းအချက်အလက်)

Q1. Farmer ID (တောင်သူနံပါတ်)   : _____

Q2. Name of respondent(ဖြေဆိုသူ၏အမည်)   : _____

Q3. Sex of respondent (ကျား/မ)   : _____

Q4. Age of respondent အသက် (ပြည့်ပြီးအသက်)   : _____

Q5. Age Category (အသက်အုပ်စု)

1. 15 to 18 (Under 19) (၁၅ နှစ်မှ ၁၉ နှစ်အတွင်း (၁၉ နှစ်အောက်))
2. 19 to 49 (၁၉ နှစ်မှ ၄၉ နှစ်အတွင်း)
3. >49 (၄၉ နှစ်အထက်)

Q6. Is the current respondent a woman between 15 and 49 years of age? * (လက်ရှိဖြေကြားသောသူသည် အသက် ၁၅နှစ်မှ ၄၉ နှစ်ကြားဟုတ်ပါသလား။)

1. Yes (ဟုတ်ပါတယ်)
1. No (မဟုတ်ပါ)

Q7. Highest level of Education completed (ပြီးမြောက်ခဲ့သည့် အမြင့်ဆုံးပညာရေး)

1. No formal education (ဘုန်းကြီးကျောင်းပညာရေး/အသုံးလုံး)   2. Grade 1

3. Grade 2   4. Grade 3

5. Grade 4   6. Grade 5

7. Grade 6   8. Grade 7

9. Grade 8   10. Grade 9

11. Grade 10   12. Grade 11

13. degree/diploma   14. Vocational Training

15. Other

Please specify "Other Level of Education" အခြား ဖော်ပြပါ(အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) : _____

Q8. Marital Status (အိမ်ထောင်ရှိ/မရှိ)

1. Single, never married (အပျို/ လူပျို)

2. Married (အိမ်ထောင်ရှိ)

3. Widow/Widower (မုဆိုးဖို/ မုဆိုးမ)

4. Divorced/Separated (အိမ်ထောင်ကွဲ/ ခွဲနေ)

Q9. How many household members are there? (မိသားစုဝင် အရေအတွက်)

_____

Q10. How many under 5-year-old children are there at your home? (သင့်အိမ်တွင် ငါးနှစ်အောက် ကလေး ဘယ်နှစ်ယောက်ရှိပါသလဲ။)

_____

Q11. Did your household stock fingerlings previous year? (သင့်အိမ်တွင် ယခင်နှစ်က ငါးမွေးမြူခဲ့ပါသလား)

1. Yes 0. No

Q11. If Yes, have your household harvested fingerlings? (ယခင်နှစ်က ငါးမွေးမြူခဲ့လျှင် ယခု ငါးဖော်ပြီးပြီလား)

1. Yes 0. No

"**MDDW:** Now I'd like to ask you to describe everything that you ate or drank yesterday during the day or night, whether you ate it at home or anywhere else. Please include all foods and drinks, any snacks or small meals, as well as any main meals. Remember to include all foods you may have eaten while preparing meals or preparing food for others. Please also include food you ate even if it was eaten elsewhere, away from your home.
" (မနေ့က သင့်အိမ်မှာ ဖြစ်စေ၊ အခြား မည်သည့် နေရာ (အလှူအိမ်၊ စားသောက်ဆိုင်၊ ထမင်းဆိုင်) တွင် မဆို နေ့ရော ညပါ စားခဲ့ သောက်ခဲ့သမျှ အစားအစာတွေကို ပြောပြပေးနိုင်မလား။ ကျေးဇူးပြုပြီး စားခဲ့သမျှ အစားအသောက် (အချိုရည်၊ လက်ဖက်ရည်၊သစ်သီးဖျော်ရည် စသည်)၊ သရေစာ၊ အစာပြေ ပါမကျန် အခြားစားခဲ့သမျှ စားဖွယ်ရာများကို ပြောပေးပါ။ အစားအစာ ပြင်ဆင်ချိန်၊ ချက်ပြုတ်ချိန် တွင် စားခဲ့သည် များကို ပါ ထည့်သွင်း ပြောပြပေးပါ။)

"Q1. 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."

Q1. လွန်ခဲ့သော ၂၄နာရီအတွင်း သင်စားခဲ့သော အစာသည် သင့် နေ့စဉ်သာမန် စားသုံးမှုကို ကိုယ်စားပြုပါသလား။ ဆိုလိုသည်မှာ (သင်အစာရှောင်တဲ့အခါ, လိုအပ်တာထက်ပိုစားတာ, ပွဲ/အလှူမှာစားတာ) ဒါတွေဟာ သင်နေ့စဉ်သာမန် စားသုံးမှုကို ကိုယ်စားမပြုပါ။

"If no, why? (Festival? other specify)" ကိုယ်စားမပြုပါက ဘာကြောင့်လဲ ဖော်ပြပေးပါ။ (ပွဲ/အလှူ???) _____

"Q2. In the last 24 hours, when did you eat, including snacks?"

Q2. ပြီးခဲ့သည့် ၂၄ နာရီအတွင်း၊ သရေစာ အပါအဝင် မည်သည့်အချိန်တို့တွင်အစာ စားသုံးခဲ့သနည်း။
1. Morning (5am to 12am)   မနက်ပိုင်း (နံနက် ၅နာရီမှ နေ့လည် ၁၂နာရီ)
2. Mid-day (12am)   နေ့လည်ပိုင်း (နေ့လည် ၁၂နာရီ)
3. Afternoon (12am to 5pm) မွန်းလွဲပိုင်း *(နေ့လည် ၁၂နာရီမှ ညနေ ၅နာရီ)
4. Evening (5 pm to 7 pm) ညနေ (၅နာရီ မှ ည ၇နာရီ)
5. Night (7pm to 5 am) ညနေပိုင်း * (ညနေ ၅နာရီ မှ ည ၇နာရီ)

Sr	What did you eat from the following food Groups?	Morning	Mid-day	Afternoon	Evening	Night
1	Any foods made from grains, like: Porridges, breads, flatbreads, rice, pasta/noodles, millet or other foods made from grains (ဆန်၊ဂျုံ၊ ပြောင်း၊ဆပ်၊လူး စသည့်အစေ့အဆန်မှ ရသော အစာများ_ပေါင်မုန့်၊ ပလာတာနံပြား၊ ခေါက်ဆွဲ၊ မုန့်ဖုတ်)					
2	Any vegetables or roots that are orange colored inside, like: Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside (အတွင်းသား လိမ္မော်ရောင်ရှိ ဟင်းသီးဟင်းရွက်နှင့် ဥများ_ဖရုံသီးမှည့်၊ ကန်စွန်းဥ အဝါ၊ မုန်လာဥနီ)					
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 (အတွင်းသား အဖြူရောင်ရှိ သစ်ဥ သစ်ဖုများ_အာလူး၊ ပိန်းဥ၊ အာတာလွတ်ဥ၊ မြောက်ဥ၊ ကန်စွန်းဥအဖြူ)					

Sr	What did you eat from the following food Groups?	Morning	Mid-day	Afternoon	Evening	Night
4	Any dark green leafy vegetables, such as: Chinese cabbage, romaine, bibb lettuce, bean leaves and pumpkin leaves (အစိမ်းရင့်ရောင်အရွက်များ_ဖရုံဖူး၊ ဂေါ်ရခါး၊ပဲညွန့်၊ မုန်ညင်း၊ ကိုက်လံ၊ ဒန့်သလွန်)					
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 (အတွင်းသား လိမ္မော်ရောင်နှင့် အဝါရောင်ရှိသော အသီးအနှံများ_သရက်သီးအမှည့်၊ သင်္ဘောသီးအမှည့်၊ ရွှေနီဂုက်ပျောသီး၊ ပိန္နဲသီးမှည့်)					
6	Any other fruits: Unripe mango and papaya, white/cream-fleshed bananas (အခြားသစ်သီးများ_ သရက်သီးအစိမ်း၊ သင်္ဘောသီးအစိမ်း၊ အဖြူရောင် အသားရှိ ဂုက်ပျောသီး၊ သံပုရာသီး)					
7	Any other vegetables: fresh peas, snow peas, snap peas or green beans, cucumber, tomato and okra (အခြားဟင်းသီးဟင်းရွက်_ပဲအစို၊ ချဉ်ပေါင်ရွက်၊ မျှစ်၊ ခရမ်းချဉ်သီး၊ ရုံးပတီသီး၊ သခွားသီး၊ ပိန္နဲသီးအနု၊ ခရမ်းသီး)					
8	Any meat made from animal organs, such as: Liver, kidney, heart or other organ meats or blood-based foods, including from wild game (ကြက်၀က်၊ အမဲတို့၏ အသည်း၊ နှလုံး၊ကျောကပ်၊ အူ၊ သွေးခဲ)					
9	Any other types of meat or poultry, like: Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck, other birds" (အသား၊ကြက်ဘဲ၊ ဂုက်၊ယုန်၊ ဆိတ်၀က်၊အမဲ)					
10	Any eggs: Eggs from poultry or any other bird (ဥများ)					
11	Any fish or seafood, whether fresh or dried: Fresh or dried fish, shellfish or seafood (ငါးနှင့် ပင်လယ်ထွက်ကုန်များ_အခြောက်၊ အစို)					

Sr	What did you eat from the following food Groups?	Morning	Mid-day	Afternoon	Evening	Night
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 (ပဲမျိုးစုံ_ပဲအခြောက်၊ တိုဖူး၊ ပဲနို့)					
13	Any nuts or seeds, like: Any tree nut, groundnut/peanut, or certain seeds or nut/seed "butters" or pastes" (မြေပဲ၊ သီဟိုရ်စေ့၊ နေကြာစေ့၊ ဖရုံစေ့၊ ကွာစေ့၊အခွံမာသီးနှင့် အစေ့များ)					
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 (သကြားမပါသောနွားနို့/ဒိန်ချဉ်နှင့် အခြားနို့ထွက်ကုန် (ရေခဲမုန့်၊ထောပတ် တို့မပါပါ)					
15	Any insects or other small protein foods, including: Insects, insect larvae/grubs, insect eggs and land and sea snails" (ခရု၊ ပုရစ်၊ ခါချဉ်၊ ပျားသလက် စသည့်အင်းဆက် ကောင်လေးများ)					
16	Any red palm oil (စွန်ပလွန်ဆီ)					
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" (ချက်ပြုတ်သည့်ဆီ၊ တိရစ္ဆာန်ဆီ)					
18	Any savoury and fried snacks, such as: Crisps and chips, fried dough, other fried snacks" (အရသာရှိသော သရေစာများ၊ အကြွပ်ကြော်များ)					
19	Any sweets, such as: Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream" (ချောကလက်၊ဘီစကစ်၊ကွတ်ကီး၊ကိတ်မုန့်၊ ရေခဲမုန့်)					
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"(ချိုသော အဖျော်ယမကာများ (သကြားထည့် ဒိန်ချဉ်/ ကော်ဖီ/လက်ဖက်ရည်၊ချောကလက်၊ အိုဗာတင်း၊ အမြုပ်ထဖော်ရည်များ)					

Sr	What did you eat from the following food Groups?	Morning	Mid-day	Afternoon	Evening	Night
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" ဟင်းခတ်အမွှေးအကြိုင် မဆလာ၊ ကြက်သားမှုန့်၊ ငါးမှုန့်၊ နှံနှံမှုန့်၊ငရုတ်ကောင်းမှုန့်					
22	Any other beverages and foods: Tea or coffee if not sweetened, clear broth, alcohol, Pickles, olives and similar" (အချိုဓာတ်မပါသော ဖျော်ရည်/ ကော်ဖီခါးခါး/သောက်စရာနှင့် အစားအစာများ (အရက်၊စွပ်ပြုတ်အကြည်)					
23	Other (အခြား)					
24	Nothing (�‌�‌ဘာမှမစားပါ)					

Please specify "Other for morning" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

Please specify "Other for mid-day" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

Please specify "Other for afternoon" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

Please specify "Other for evening" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

Please specify "Other for night" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

Fish Consumption (ငါးစားသုံးမှု)

I would like to ask about your fish consumption for the past 7 days.

သင့်၏ ၇ရက် အတွင်း ငါးစားသုံးမှုနှင့် ပတ်သက်သော အကြောင်းအရာများကို မေးပါမယ်။

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

Q1. လွန်ခဲ့သော ၇ရက် အတွင်းသင်စားခဲ့သော အစားအစာများတွင် ထမင်း�‌ဘယ်နှစ်နပ်မှာ "ငါး"ပါဝင်ခဲ့ပါသလဲ။

_____

Q2. What type of fish species did you consume in the past 7 days? (Q2. ၇ရက်အတွင်း သင် ဘာ "ငါး"တွေကို စားသုံးခဲ့သနည်း။)

_____

Q3. In the past 7 days, how many meals did you have consumed the whole fish (including eyes, bones etc.)? (လွန်ခဲ့သော ၇ရက်အတွင်း သင်စားခဲ့သော အစားအစာဘယ်နှနပ်လောက် (ထမင်းဘယ်နှနပ်) တွင် ငါးကို တစ်ကောင်လုံး စားခဲ့ပါသလဲ။ (ဥပမာ- မျက်လုံး၊ အရိုး၊ စသဖြင့်...)*

_____

***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)

(Q2 တွင် ဖြေခဲ့သည့် ငါးများတွင် ငါးခုံးမ၊ ငါးဒေါင်းဇင်း၊ ငါးသလဲထိုး၊ ငါးဇင်စပ်၊ ငါးဘဲဖြူ၊ ငါးမော့တော့၊ ငါးဖါးမ၊ ငါးရေပေါ် တို့ကို ဖြေခဲ့ခြင်း ရှိမရှိ ပြန်စဉ်းစားဖို့ လိုပါသည်။)

_____

Q4. In the past 7 days, how many meals with SIS (whole including eyes, bones, etc.) did you consume? (လွန်ခဲ့သော ၇ ရက်အတွင်း သင်စားသောဟင်းတွင် ဒေသမျိုးရင်း ငါးမျိုးစိတ်သည် (ထမင်း) ဘယ်နှနပ်မှာပါဝင်ပါသလဲ။*

_____

Q5. Which of the following criteria did the majority of SIS, consumed in the past 7 days, fit? (လွန်ခဲ့သော ၇ရက်အတွင်း သင်စားခဲ့သော ဒေသမျိုးရင်း ငါးမျိုးစိတ်ကို ဘယ်လိုမျိုးပုံစံ စားသုံးခဲ့ပါသလဲ။*

1. Whole fish (including eyes, bones, and head) (ငါးတစ်ကောင်လုံး (မျက်လုံး အရိုး၊ခေါင်း အပါအဝင် စသည်ဖြင့်)
2. Fish with bones but head removed (ငါး (အရိုးပါသည် (သို့သော်) ခေါင်းဖယ်ထားသည်))
3. Head and bones removed (ခေါင်းနဲ့ အရိုးဖယ်ထားသည်)
4. Other (အခြားဖော်ပြပါ)

Q5. Please specify "Other" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____
"Processed fish means preserved fish with salt, dried prawn, dried fish, fermented fish and fish paste."
Processed fish ဆိုသည်မှာ ငါးပိ၊ ငါးခြောက်၊ ပုစွန်ခြောက်၊ ငါးဆားနယ်၊ ငါးချဉ် ကို ခေါ်သည်။

"Q1. In the past 7 days, how many meals containing processed fish products have you consumed? (Processed fish means fermented fish, dried fish, fish paste)" (လွန်ခဲ့သော ၇ရက်အတွင်း သင်စားခဲ့သော ဟင်းလျာများထဲတွင် ငါးဖြင့် ပြုလုပ်ထားသော အစားအစာ (ငါးပိ၊ ငါးခြောက်၊ ပုစွန်ခြောက်၊ ငါးဆားနယ်၊ ငါးချဉ်) သည် (ထမင်း) ဘယ်နှနပ်မှာ ပါဝင်ပါသလဲ။*)_____

Q2. In what forms of processed fish that they ate? (ဟင်းလျာများထဲတွင် ပါဝင်ခဲ့သည့် ငါးဖြင့် ပြုလုပ်ထားသော အစားအစာက ငါးပိ? ငါးခြောက်? ငါးဆားနယ်? ငါးချဉ်?)

1. dried fish (ငါးခြောက်)
2. fish paste (ငါးပိ)

3. picked fish (fermented fish with rice) (ငါးချဉ်)
4. smoked fish (ငါးကြပ်တိုက်)
5. others (အခြား)
6.

Q4. Please specify the name of other processed fish? Please specify "Other" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

"Q3. What is the source (market, caught, ponds) of the fish they ate?" (သင်စားသုံးသည့် ငါး သို့ ငါးဖြင့် ပြုလုပ်ထားသော အစားအစာများကို �‌ဘယ်ကရပါသလဲ။)

1. Market (ဈေး)
2. Caught (မြစ်ချောင်းမှ ကိုယ်တိုင်ဖမ်း)
3. Pond (ငါးကန်)
4. Vendor (ဈေးသည်)
5. Gift from Other (လက်ဆောင်ရ)

Q4. Please specify the name of market? (ဈေးအမည်ကို ဖော်ပြပေးပါ။) _____

Gender (ကျားမ အခန်းကဏ္ဍ)

Q1. Of the fish harvested from your pond did you? (ငါးဖော်ပြီး ငါးများကို ‌ရောင်းချခဲ့ပါသလား၊ လက်ဆောင်ပေးခဲ့ပါသလား၊ စားခဲ့ပါသလား၊ ‌ချေးခဲ့ပါသလား၊ ‌ရောင်းချရုံသာမက စားသုံးခဲ့ခြင်းရှိပါသလား။)

1. Sell it (ရောင်း)
2. Eat it (စားပါသည်)
3. Gift it (လက်ဆောင်ပေး)
4. Loan it(ချေး)

Q2. Who decides what to do with the fish harvested (whether to sell it or consume)? (ရောင်းချခြင်း စားသုံးခြင်း ကို မည်သူက ဆုံးဖြတ်ပါသလဲ။)

1 Husband (ယောက်ျား)
2 Wife (မိန်းမ)
3 Both together (အတူတကွ)
4 Parent/in law (မိ�‌ဘ/ယောက္ခမ)
5 Other (အခြား)

Please specify "Other" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

"Q3. If sold, who decides what to do with the money from the sale of the fish?" (ငါးရောင်းချခြင်းမှ ရရှိသည့် ‌ငွေစီမံခန့်ခွဲမှု မည်သူက ဆုံးဖြတ်သနည်း။)

1 Husband (ယောက်ျား)
2 Wife (မိန်းမ)

3   Both together (အတူတကွ)

4   Parent/in law (မိဘ/ယောက္ခမ)

5   Other (အခြား)

Please specify "Other" (အခြား အမည်ကို တိတိကျကျ ဖော်ပြပေးပါ။) _____

"For enumerator, please say: This is the end of the survey. Thank you for taking time to participate in this survey."

(မေးခွန်းလေးတွေတော့ မေးပြီးသွားပါပြီ။ အခုလို အချိန်ပေးတဲ့အတွက် ပူးပေါင်းပါဝင်ပြီး ဖြေကြားပေးတဲ့အတွက် ကျေးဇူးတင်ပါတယ်။)

End time: (ပြီးဆုံးချိန်) _____