



Improving the Incomes and Nutrition Outcomes of Rural Poor in Northern Kayin State: Nutritional Causal Analysis



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- World Concern Myanmar (WCM)
- Cordaid

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- SNV

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- Taungoo Kehko Kehbah Karen Baptist Association (KKBA)
- Taungoo Paku Karen Baptist (PKBA)
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LIST OF ACRONYMS

| | |
|------|-------------------------------------------|
| ANC | Antenatal Care |
| BMB | Bwe Moh Baw – Karen Baptist Association |
| CDN | Consortium of Dutch NGO's |
| CHW | Community Health Worker |
| FAO | Food and Agriculture Organization |
| FGD | Focus Group Discussion |
| IDP | Internally Displaced Person |
| INGO | International Non-Government Organization |
| IYCF | Infant and Young Child Feeding |
| KMSS | Karuna Myanmar Social Services |
| KKBA | Kehko Kehbah Karen Baptist Association |
| PK | Paku Karen Baptist Association |
| MAD | Minimum Acceptable Diet |
| MDD | Minimum Dietary Diversity |
| NCA | Nutrition Causal Analysis |
| NSA | Non-State Actors |
| ORS | Oral Rehydration Solution |
| TBA | Traditional Birth Attendant |
| U2 | Children under the age of two years |
| U5 | Children under the age of five years |
| WASH | Water, Sanitation and Hygiene |
| WHO | World Health Organization |

EXECUTIVE SUMMARY

Introduction

World Concern Myanmar with Consortium partners CDN-ZOA (lead), CORDAID and SNV received funding from Livelihoods and Food Security Trust Fund (LIFT) to implement interventions for improving the incomes and nutrition outcomes of rural poor in Thandaunggyi Township, which is located in Northern Kayin State.

During the Inception phase of the project, between October 2016 to January 2017, a Nutrition Causal Analysis (NCA) study was carried out by World Concern Myanmar (WCM) in Thandaunggyi Township. Mekong Economics Myanmar was hired as consultancy firm to support data collection and analysis.

Thandaunggyi Township is divided into three sub-townships namely Leik Tho, Thandaunggyi and Baw Ga Li. A random sampling technique was used to select 33 villages out of the 40 target villages of the program, also called 'core villages'. Some 13 villages from Leik Tho, 14 villages from Thandaunggyi and 6 villages from Baw Ga Li sub-Townships were included.

A Nutrition Causal Analysis (NCA) is a method for analysing the multi-causality of under-nutrition, as a starting point for improving the relevance and effectiveness of multi-sectoral nutrition security programming in a given context. The UNICEF conceptual framework¹ on the causes of under-nutrition was an essential contribution to highlight the multi-factoral nature of under-nutrition. However, it was not intended to be prescriptive of a set of universal causes relevant to every population.

In order to identify the actual and most important causes of under-nutrition in a local context, the Link-NCA method was developed. The Link-NCA is a structured, participatory, holistic study, based on the UNICEF causal framework, intended to build evidence-based consensus around the plausible causes of under-nutrition in a local context.

The Link-NCA links stakeholders across sectors, links risk factors and under-nutrition to identify pathways, links different sources of information to build a case for nutrition causality, and links the causal analysis to a programmatic response.

For the study in Kayin, the Link- NCA methodology was adapted and included the following:

1. **Identifying risk factors** and establishing 'causal pathways' for under-nutrition through a literature review and through consultations with technical experts who identified and rated potential risk factors for the Kayin context.
2. **Gathering evidence of causality** through a qualitative inquiry conducted during four weeks of intensive fieldwork and through collection of quantitative data through a household survey.
3. **Rating causal factors** according to their relative contribution to under-nutrition in a final stakeholder workshop, based on literature review, international scientific sources, and quantitative & qualitative survey results by communities and technical experts.
4. **Validating results** through a participatory and consensus-driven process where initial hypothesised risk factors were revised and validated in accordance with qualitative and quantitative inquiry results.

¹ The UNICEF causal framework on causes of under-nutrition is included in Annex 1.

Findings

Prevalence of malnutrition in Thandaunggyi Township is very high with 53.7% of children being stunted, 15.1% wasted and 33.3% under-weight. Stunting levels are very high in all sub-townships (above 40%), are high among all income groups and are equally high among both boys and girls. Immediate causes of these high rates of malnutrition were found to be inadequate dietary intake and disease.

Inadequate dietary intake

Early initiation of breastfeeding is good with 78.1% of all newborns being breastfed within one hour after birth. However, exclusive breastfeeding up to six months is very low as over half of infants received honey, other milk, rice, castor oil or water. Furthermore, around 15% of children are breastfed for less than 6 months. Recommended continued breastfeeding is not good either as only 12.5% is breastfed for two years.

Only 21.8% of women and 28.9% of children 6-23 months in Thandaunggyi Township have an acceptable minimum dietary diversity (MDD). This means that nearly 80% of women and over 70% of children 6-23 months are more vulnerable to micronutrient deficiencies. The food groups eaten by the children are very similar to those consumed by their mothers with a typical daily meal of rice, vegetables and fish paste. Mothers would add chili. Consumption of eggs, meat, fish, legumes, nuts and dairy were consumed less regular both by women and children, and consumption depends on availability of cash.

The above results clearly indicate inadequate dietary intake for both mothers and children. The underlying causes of inadequate dietary intake are: (1) inadequate access to nutritious foods due to limited and seasonal own production as well as limited financial means to buy (nutritious) foods, (2) poor maternal, infant and young child feeding practices, due to lack of nutrition awareness, cultural beliefs and taboos.

Agriculture mainly focuses on cash crops and less than one third of households produce rice. Home garden production is limited and seasonal (rainy season mostly). This means that a majority of households depends on their income and on local markets to access food. Animal products, such as meat, fish, or eggs are particularly expensive. For a family of five, a daily menu of rice, vegetables and some meat or fish (only 80 gram per person) would add up to around 3,000 or 4,000 MMK, while on average households only have 2,700 MMK per day (based on annual income calculations). Mothers with enough understanding of nutrition mentioned they could not afford to buy nutritious foods.

Misconceptions, cultural beliefs and taboos, seem to particularly affect diets of pregnant, lactating women and young children. Interestingly, younger mothers mentioned that they are reluctant to avoid foods. This might mean that these cultural beliefs and taboos are changing with the new generation. Nevertheless, there is a whole list of beliefs and taboos which mostly reduce consumption of nutritious foods (specific vegetables or fruits) during a critical time.

Only 16.5% of mothers had received counseling on infant and young child feeding practices. When discussing about breastfeeding practices, mothers mentioned that they never got any information about breastfeeding from health care providers. Therefore, another underlying

cause of inadequate dietary intake is lack of nutrition education and particularly on infant and young child feeding practices.

Disease

High malnutrition, and particularly high stunting rates suggest that other factors, such as repeated diseases, unclean drinking water, inadequate sanitary or caring practices further deteriorate the nutrition status. This is indeed the case in Thandaunggyi; as many as 29% of children under five had diarrhea in the two weeks prior to the survey. Other previous surveys (e.g. CDN survey from 2015) also found high diarrhea prevalence. Also, according to mothers, the most common disease is diarrhea. The mothers mentioned that diarrhea prevalence is high from April to October and then again high in December.

The underlying cause of diarrhea are poor hygiene and sanitation practices due to lack of WASH facilities and awareness.

Diarrhea was highest among children from households with unsanitary practices; 41% of children from households without a latrine, 31% from households using an unprotected water source and 31% of children from households with an unclean latrine had diarrhea. Diarrhea was lowest among children from households with sanitary practices; 17% of children from households with a sanitary and clean latrine had diarrhea. Only 14% of children coming from households that used a protected water source and whose mothers used soap after cleaning the babies' stool were found to have had diarrhea.

While the high prevalence of diarrhea is clearly linked to unsanitary practices and open defecation, unfortunately only 16% of households have a sanitary and clean latrine. As many as 31% of all households do not have any latrine at all and practice open defecation.

Drinking water was mostly fetched from communal water points, streams, waterfalls, springs, rain water storage, or ponds. Many households however use a combination of protected and unprotected drinking water sources. In the rainy season, a minority of 16.5% of households used only protected water sources, while in the dry season this was further reduced to only 10.8%. The high number of people using unprotected drinking water sources might be the reason why 97.4% of households affirmed to boil the water before drinking.

While 84.5% of mothers wash their hands after cleaning the stool of their baby, only 51.4% uses soap or detergent. Only a limited number of mothers wash their hands with soap before feeding their child, before preparing food or after working outside.

Another important underlying cause of inadequate dietary intake and repeated diseases, is inadequate care practices due to the high workload of women. Besides work at home and fetching water, women are also involved in livelihood activities and work outside the house to improve family income. This limits the time they have available for appropriate feeding and caring practices.

1 METHODOLOGY

NUTRITION CAUSAL ANALYSIS (NCA)



A nutrition causal analysis (NCA) is a method for analyzing the multi-causality of under-nutrition, as a starting point for improving the relevance and effectiveness of multi-sectoral nutrition security programming in a given context² – which in this case is Thandaunggyi Township in Northern Kayin State. The UNICEF conceptual framework on the causes of under-nutrition was an essential contribution to highlight the multi-factoral nature of under-nutrition. However, it was not intended to be prescriptive of a set of universal causes relevant to every population.

In order to identify the actual and most important causes of under-nutrition in a local context, the Link-NCA method was developed. The Link-NCA is a structured, participatory, holistic study, based on the UNICEF causal framework, intended to build evidence-based consensus around the plausible causes of under-nutrition in a local context.

The Link-NCA method does not seek to statistically demonstrate nutrition causality but instead creates consensus around the plausible causes of under-nutrition in a localized context.

Therefore, the Link-NCA methodology links:

- Stakeholders across sectors
- Risk factors and under-nutrition to identify pathways
- Different sources of information to build a case for nutrition causality
- The causal analysis to a programmatic response

² <http://linknca.org/resources.htm>

NCA IN KAYIN

World Concern Myanmar (WCM) undertook a Link-NCA study in Thandaunggyi Township between October 2016 and January 2017.

Aim

To provide a more nuanced understanding of the underlying causes of under-nutrition and their causal pathways in Thandaunggyi Township in Kayin.

Specific Objectives

- To identify current rates of under-nutrition in children under 5
- To identify access to, demand and utilization of mother-child-health services.
- To collect contextual information, including WASH, household and family factors, health communication and gender.
- To identify current breastfeeding and complementary feeding practices.
- To assess current proportion of infants and young children (6-23 months) with a minimum acceptable diet.
- Assess dietary diversity for women of reproductive age, identify key foods consumed by mothers and gaps in nutrition.
- Assess basic attitude and practices related to mother and child health including food taboos and food restriction practices.
- Identify facilitators and social and gender barriers to ideal feeding practices.
- Gather recommendations how to improve diets and feeding practices for mothers, men and children.

Research questions

The NCA report aims to answer the following research questions:

- What is the prevalence and severity of under-nutrition and wasting in the study population?
- What is the prevalence of known risk factors for under-nutrition among the population and key “nutrition vulnerable groups”?
- What are the causal pathways of under-nutrition by which certain children in this population have become undernourished?
- Did historical trends and seasonality affect under-nutrition?
- Which causal pathways are likely to explain most cases of under-nutrition? Which sets of risk factors and pathways are likely to be the most modifiable by stakeholders within a given context and within a given period?
- Based on the causal analysis results, what recommendations can be made for improving nutrition security programming?

Data collection

Planning for the NCA study was undertaken in October 2016 and entailed review of secondary data, consultation with the World Concern staff at country and field office in Taungoo, Kayin and field staff in CDN-ZOA and CORDAID. Consultation was also undertaken with local partners KMSS, KKBA, BAB and PK between 3rd to 9th November 2016.

The data collection for the NCA study took place from 21st November to 5th December in thirty three core villages. This was followed by a debriefing meeting in Taungoo and also in Yangon on 8th Dec 2016. Following this, consolidation of data, data analysis and report writing were undertaken between December 2016 and January 2017.

Methodology

For the study in Kayin, the Link- NCA methodology was adapted. After designing the NCA, the following four main steps were completed:

1. **Identifying risk factors** and establishing 'causal pathways' for under-nutrition through a literature review and through consultations with technical experts who identified and rated potential risk factors for the Kayin context.
2. **Gathering evidence of causality** through a qualitative inquiry conducted during four weeks of intensive fieldwork and through collection of quantitative data through a household survey. The quantitative study included a household (HH) survey among 381 HH from 33 villages. The Kobo tool was used to collect the data. The qualitative study included five Focus group discussions (FGDs); of which two in Leik Tho, two in Thandaunggyi and one in Baw Ga Li sub-townships. In addition, two Key Informant Interview (KII) of experienced nurses were carried out; one at the Thandaunggyi township level and the second in Leik Tho sub-township.
3. **Rating causal factors** according to their relative contribution to under-nutrition; the initial technical expert consultation was tested against community understanding and experience in selected study sites.
4. **Validating results** through a participatory and consensus-driven process where initial hypothesised risk factors were revised and validated in accordance with qualitative and quantitative inquiry results.

Table 1. 1: Sample Groups for Focus Group Discussion

| Sub-Township Level | Villages Involved | No. of Participants |
|--------------------|-----------------------------|---------------------|
| Leik Tho | 1. Thin Baw Taw (West) | 9 |
| | 2. Ka Saw Palo Ahtet (East) | 10 |
| Thandaunggyi | 3. La Mae Gyi | 10 |
| | 4. Late Pyar Kalay | 10 |
| Baw Ga Li | 5. Taung Gyi | 10 |

The household survey was designed to gather socio-demographic characteristics, as well as to assess home gardening and agricultural production, dietary diversity, hand washing and latrines, water sources, knowledge on nutrition and health service utilization.

Among the 381 surveyed households a total of 594 children under the age of 5 were included in the anthropometric measurements (weight and height). From the anthropometric measurements, the prevalence of stunting (Height-for-Age), wasting (Weight-for-Height) and underweight (Weight-for-Age) were calculated using the WHO Anthropometric software – SPSS version – for each child.

Quantitative methods objectively assessed under-nutrition status and the prevalence of known risk factors while qualitative methods unveiled the community's own conceptualization of under-nutrition and what it perceives to be the relevant causes. The results of this inquiry, in link with the secondary data analysis, were used to determine and rate key causal pathways to under-nutrition in a final stakeholder workshop where individual factors were rated and prioritized for action.

Limitations and Constraints

FGD's: The note takers and facilitators during the FGDs were male which caused the participating mothers to feel less comfortable to openly discuss some of the more intimate and personal topics such as family planning, pregnancy, breastfeeding or cultural practices (taboos) within their families. In general, mothers didn't have (take) much time to talk as they were busy.

Household survey: The enumerators mentioned that it was a challenge to work with the mobile phones; sometimes data was lost and they had to re-entry the answers, and if the phone battery died they were not able to charge in the village. They thought that using the phone made it more difficult to respectfully talk to people (when looking at the phone). People were not willing to share some information, especially on income.

NCA Report

This report shares the findings and analysis of the NCA study in Thandaunggyi Township. The findings include:

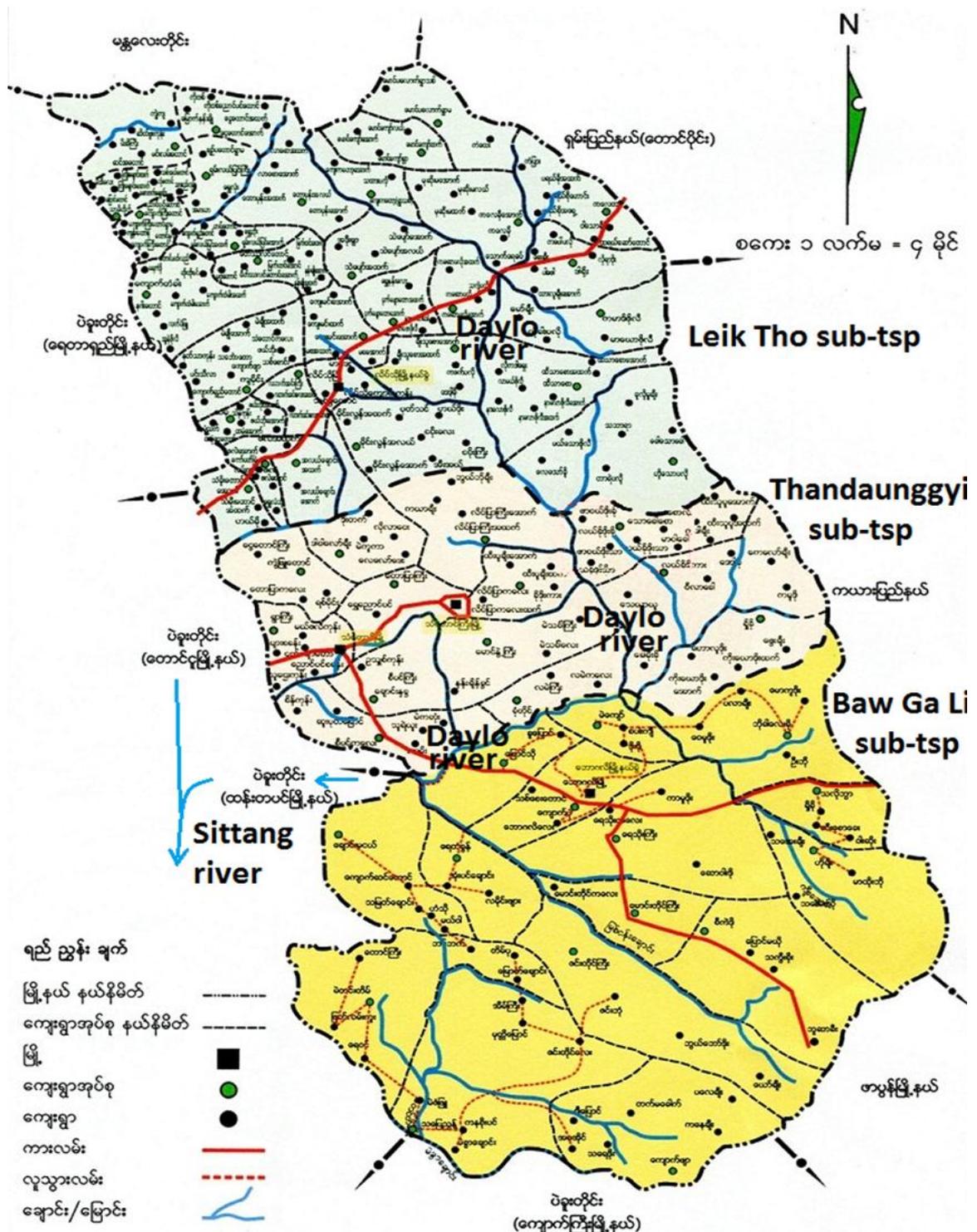
- The nutritional status of under five children
- The seasonal factors impacting the nutrition situation
- The historical timeline of events impacting nutrition
- Key factors contributing to under nutrition.

The report concludes with a discussion and conclusions drawn from the findings, which is followed by recommendations for future interventions in the Kayin region regarding the issue of under-nutrition based on the local causal pathway model to under-nutrition.

2 CONTEXT

BACKGROUND

Kayin is located in the southeast of Myanmar, bordered by Mandalay Region and Shan State to the north, Kayah State to the northeast, Mon State and Bago Region to the West, and Thailand to the East. It has 4 districts, 7 townships and 458 village tracks. Its capital is called Hpa-An.



The conflict between 1996 and 2011 in Thandaunggyi Township led to the destruction of most villages at the east side of the Daylo River. About 50 percent of those displaced fled to Thandaung and Thandaunggyi town in the same township with the remainder mainly fleeing to Thailand. The project is being implemented in Thandaunggyi Township which consists of a mixture of internally displaced persons (IDPs), IDP returnees and host households.

In June 2015, CDN-ZOA conducted a household (HH) survey on both sides of the Daylo River. The HH-survey was used to rank the biggest problems in life of the people in Thandaunggyi Township which were; no work opportunities, lack of medical care, lack of access to credit, crop destruction due to poor weather and poor road access.

In September 2016, the Myanmar Information Management Unit (MIMU) and the Peace Support Fund released a Situation Analysis report of Southeastern Myanmar (SEM), which includes Kayin State. The report states that a poverty assessment (2012) showed that two-third of SEM were unable to meet basic needs; defined as adequate shelter, safe drinking water, improved sanitation, food security and indebtedness. The report also highlights that poverty is particularly high in the uplands, in remote areas and in unstable areas (affected by current or past conflict). In the wealth ranking of all townships in Myanmar (World Bank), Thandaunggyi Township was ranked in the group of poorest 20-40% of all 330 townships in country.

Kayin has the second highest unemployment rate – 7.5% - in Myanmar (after Rakhine), compared to 4.0% unemployment nation-wide. Furthermore, Kayin has the second lowest female labour participation of 41.2% (after Rakhine), compared to 50.5% as national average. Migration and displacement is a way of life for many households in SEM. While around 80% of an estimated 9.2 billion USD of remittances (in 2013) was sent to the SEM, migrants risk bad labour conditions, being trafficking or ending up in a forced marriage.

The report reveals that a majority of the population in SEM are poor farmers, while only a small minority is earning an income through cross-border trades and/or through exploiting natural resources. Benefits from economic development are not equally distributed and particularly at risk of losing out are upland farmers (shifting cultivation), small fishermen and minority groups. Almost half of Kayin is still forested, however with declining tree coverage livelihood opportunities are decreasing. On a positive note, access to mobile phones doubled from 31% in 2014 to 62% in 2016.

Lessons learned as mentioned in the situation analysis in South-Eastern Myanmar:

- Spend enough time listening and appreciating the local context.
- Important to build trust and relationships between a multiplicity of local actors. A sustained field presence helps to establish those.
- Consult communities, including the voices of women and youth.
- Engage better with local organizations and share best practices.
- Lines of territorial control and authority are complicated; there is a need to understand the 'mixed-control' in the rapidly changing ceasefire dynamics.
- International organizations need to improve their understanding of power dynamics. Otherwise, they risk feeding and exacerbating pre-existing drivers of conflict.

- Establish working relationships with Government and non-state service providers.
- Work should not be limited only to easily accessible areas. Avoiding high-risk areas is counterproductive.
- In an uncertain and dynamic context, coordination is especially critical at local level.
- Foster information sharing; improve data collection and make information accessible.

HISTORICAL TIMELINE

Conflict has been the main event that shaped the current affairs in Kayin state and is arguably a prominent reason behind the prevailing incidence of under-nutrition. During the years of conflict and civil war many were forced to flee their villages in Thandaunggyi Township. Baw Ga Li sub-township was the most affected out of the three sub-townships examined. This was reflected in the FGDs where 40 percent were IDPs who had returned to their village and were all from households with monthly income of less than 40,000 Kyats. Hence, IDPs who were once forced to leave behind their land and source of income are amongst the most vulnerable groups to suffer from under-nutrition.

Conflict is not the only factor that affected nutritional intakes over the past decade. Climate change and increased frequency in natural disasters has also taken a toll on food production which had the double detrimental effect in terms of reduced income source as well as reduced food availability. This has been the case especially in Leik Tho sub-township. A summary of the context for the whole Thandaunggyi township between 2006 and 2016 and the resulting impact is detailed below based on accounts from participants in the FGDs.

Table.2.1: Historical Timeline of Context and Resulting Impacts for Thandaunggyi Township

| Year | Context | Impact |
|------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2006 | Conflict between KNU and Government army (Thandaunggyi sub-township village – Late Pyar Kalay) | Villagers were attacked by mine bombs. Some villagers were arrested and died in jails. So, they were afraid to work in the garden because mine bombs were planted. |
| 2007 | Civil War (Baw Ga Li sub-township village – Taung Gyi) | Many killed or displaced. This has disrupted source of livelihoods of many households which explains why IDPs are categorized as vulnerable to under-nutrition due to food and income insecurity |
| 2009 | Landslide (Leik Tho sub-township village) | No effect on agriculture only effect on village. Village move to new one away from the landslide area which creates a dent in household income curve following relocation costs |
| 2011 | Civil War (Thandaunggyi sub-township village – La Mae Gyi) | Villagers died and got hurt from mine bombs, ran and went to border and took temporary shelter, because their houses were burnt. |

| | | |
|-------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2011 | Conflict leading to IDP (Baw Ga Li sub-township village – Taung Gyi) | Those who have been displaced are suffering from lack of access to proper food impacting their nutrition. |
| 2012 | Landslide (Leik Tho sub-township village) | Most of the gardens were destroyed and the local products were reduced. |
| 2012 | Landslide (Thandaunggyi sub-township village) | Less production of cardamom, betel nuts, coffee which affected their source of household income and their ability to afford some types of food |
| 2012 | Conflict ended, people started coming back (Baw Ga Li sub-township village – Taung Gyi) | Some have been able to return to their former village but they still lost many of their resources and the ability to keep smooth consumption curve for necessities |
| 2014 | Climate change results in the hottest season in the village (Leik Tho sub-township village) | Destroyed fields of plantations. Reduce production which has an effect on own consumption as well as amount available for sale which is the source of income for households involved in pastoral agriculture |
| 2014 | Heavy Storm (Leik Tho sub-township village) | Reduced production of Cardamom which is the main source of income for many households in that region. This compromised their ability to acquire food |
| 2016 | Heavy Storm (Leik Tho sub-township village) | Reduced production of Cardamom which is the main source of income for many households in that region. This compromised their ability to acquire food |

3 FINDINGS & ANALYSIS

3.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Most of the mothers are between 20 to 30 years of age, while only two mothers were under 20 years of age. Both of these young mothers had underweight children. In general, the proportion of children per age group and per gender are in line with normal population demographics. The only exception is that in the less than 6 months age group, the survey included substantially more girls than boys.

| Age of Mothers of Children Under 5 | | % | |
|------------------------------------|--|-------|--------|
| <20 | | 1.0% | |
| 20 to 30 | | 53.0% | |
| 31 to 40 | | 37.0% | |
| Over 40 | | 9.0% | |
| Proportion of Children Under 5 | | % | |
| Less than 6 months | | 10.1% | |
| 6 to 23 months | | 36.9% | |
| 24 to 59 months | | 53.0% | |
| Gender of Children Under 5 | | Male | Female |
| Less than 6 months | | 41.7% | 58.3% |
| 6 to 23 months | | 50.7% | 49.3% |
| 24 to 59 months | | 52.1% | 47.9% |
| All children 0-59 months | | 50.5% | 49.5% |

The households are predominantly involved in the sale of their own produced crops, with an emphasis on cash crops such as cardamom, betel nut and coffee. Women are tasked with responsibilities in harvesting in fields and plucking in the forest as well as going to towns away from home to sell the produce.

| Livelihoods | % HH |
|--------------------------------|-------|
| Arable farming | 81.1% |
| Casual Labour | 3.9% |
| Employment with regular salary | 1.0% |
| Petty trade/ Small business | 0.2% |
| None | 3.5% |
| Other | 10.3% |

Overall, Thandaunggyi Township is economically poor which impacts food insecurity as the vagaries that exist in arable farming makes it hard to have consistent income from own production. As agriculture mostly focuses on cash crops which are not used for own consumption, food items remain the greatest source of expenditure.

| Monthly Household Income (1 USD = 1355 Kyats) | % HH |
|-----------------------------------------------|-------|
| Less than 40,000 MMK (less than \$30) | 61.9% |
| 41,000 – 80,000 Kyats (Up to \$59) | 21.3% |
| 81,000 – 100,000 Kyats (Up to \$74) | 9.7% |
| More than 100,000 Kyats (Over \$74) | 7.1% |
| Main Source of Expenditure | % HH |
| Food Items | 94.8% |
| School Fees | 1.6% |
| Healthcare | 3.1% |

Given the incidence of poverty in the region there is relatively high levels of basic education attainment which makes training initiatives and local community workshops seem more promising.

| Level of Education of Mothers | % |
|-------------------------------|-------|
| Primary | 46.5% |
| Middle | 26.5% |
| High School | 17.9% |
| Beyond High School | 1.8% |
| No Schooling | 7.4% |

3.2 NUTRITION SITUATION

Introduction malnutrition

Malnutrition is a condition which results from people (including children) receiving either insufficient or excessive amounts of nutrients according to their needs. This is caused by wrong dietary habits and/or by hampered utilization of consumed nutrients by the body (e.g. if the person is sick). Three standard indicators exist to measure under-nutrition in children; stunting, wasting and under-weight. Stunting is an indicator of *chronic* under-nutrition and is measured by comparing a child's height to the height as expected for their age (height for age)³. Stunting indicates chronic restriction of a child's potential growth and is associated with deficits in cognitive development, poor performance in school and reduced productivity in adulthood. Wasting is an indicator for *acute* malnutrition as it measures a child's weight in relation to its height (weight for height). Wasting can increase relatively quickly, such as after a natural disaster or during the lean season. Wasting is associated with a significant higher mortality risk compared to well-nourished children. Under-weight is a composite measure that can identify children with wasting or stunting, and is measured by a child's weight for age.

Almost half (45%) of all under-five child deaths globally are attributed to under-nutrition⁴; the joint effects of fetal growth restriction, suboptimum breastfeeding, stunting, wasting, and vitamin A and zinc deficiencies attribute to 44.7% of all child deaths (< 5 years). Besides increased mortality risk, malnourished children are also at higher risk of disease, have lower school performance and learning capacity, and later in life lower work capacity and productivity. The economic consequences of malnutrition are estimated at 11% GDP loss every year in Africa and Asia⁵.

Table 3.1 below includes the classifications for assessing the severity of stunting, underweight and wasting using the prevalence ranges.

⁶Table 3.1: Classification for assessing severity of malnutrition by prevalence ranges among children under 5 years of age

| Indicator | Severity of malnutrition by prevalence ranges (%) | | | |
|-------------|---------------------------------------------------|--------|-------|-----------|
| | Low | Medium | High | Very high |
| Stunting | <20 | 20-29 | 30-39 | >=40 |
| Underweight | <10 | 10-19 | 20-29 | >=30 |
| Wasting | < 5 | 5-9 | 10-14 | >=15 |

³ Children with a weight/age who are below 2 standard deviations (SD) from the WHO Growth Standards population median are stunted. Those below 3 SD are severely stunted and those between -2 SD and -3 SD are moderately stunted.

⁴ Lancet series on Maternal and Child Nutrition, Maternal and child under-nutrition and overweight in low-income and middle-income countries, 2013

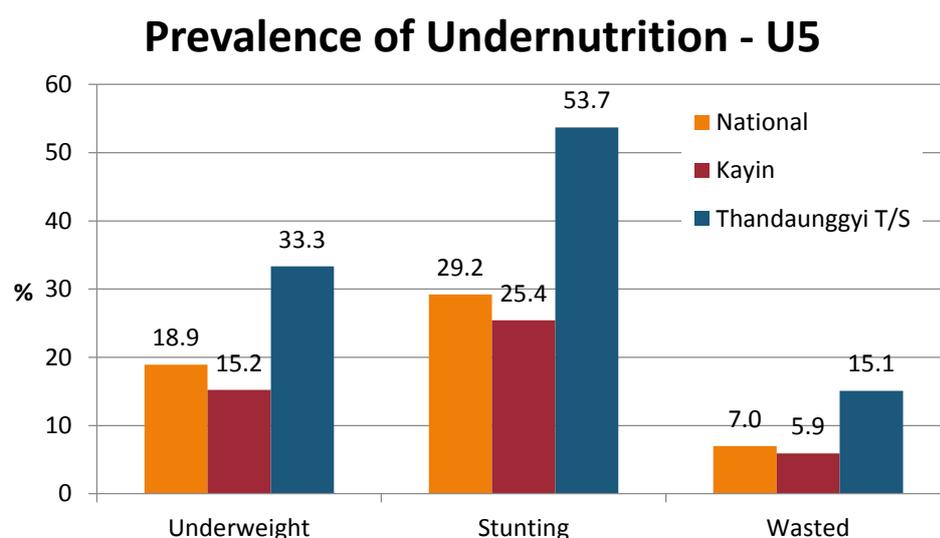
⁵ Global Nutrition Report (GNR) 2016

⁶ <http://www.who.int/nutgrowthdb/about/introduction/en/index5.html>

Malnutrition in Thandaunggyi

Figure 3.1 below presents the prevalence of under-weight, stunting and wasting of children under five years old at national level in Myanmar, at regional level in Kayin and at Township level in Thandaunggyi. It is striking that the prevalence of all forms of under-nutrition are substantially higher in Thandaunggyi Township compared to Kayin as a whole. Furthermore, 53.7% stunting, 15.1% wasting and 33.3% under-weight in Thandaunggyi all indicate a nutrition emergency situation as all three are classified as 'very high' (Table 3.1).

Figure 3.1 Prevalence of under-weight, stunting and wasting of children under five in Myanmar, Kayin and Thandaunggyi Township.



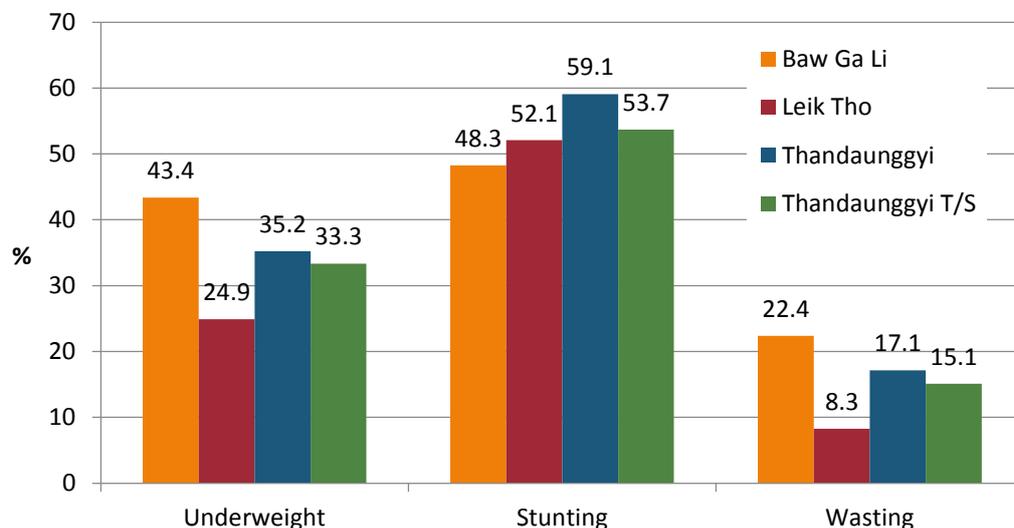
Stunting rates of over 50% and wasting rates of over 15% are highly exceptional. In Myanmar, wasting over 15% has only been found in northern Rakhine. On the other hand, not many localized nutrition surveys are available. With a nation-wide average of one out of three children stunted and 7.0% of all children under five years old wasted, we can expect localized concentrations of under-nourished children in remote, conflict-affected and under-developed areas.⁷

The prevalence was found to be different per sub-township as presented in Figure 3.2 below. Figure 3.2 shows that chronic under-nutrition (stunting) is highest in Thandaunggyi sub-Township (59.1%), although all sub-Townships are classified as having 'very high' stunting levels (all above 40%). Acute malnutrition (wasting) appears highest in Baw Ga Li (22.4%), while Thandaunggyi sub-Township is also classified as 'very high' as it is above 15%.

⁷ All children under two in the 40 core target villages will be screened again (weight & height) when mother groups are set up to cross-check these high malnutrition rates.

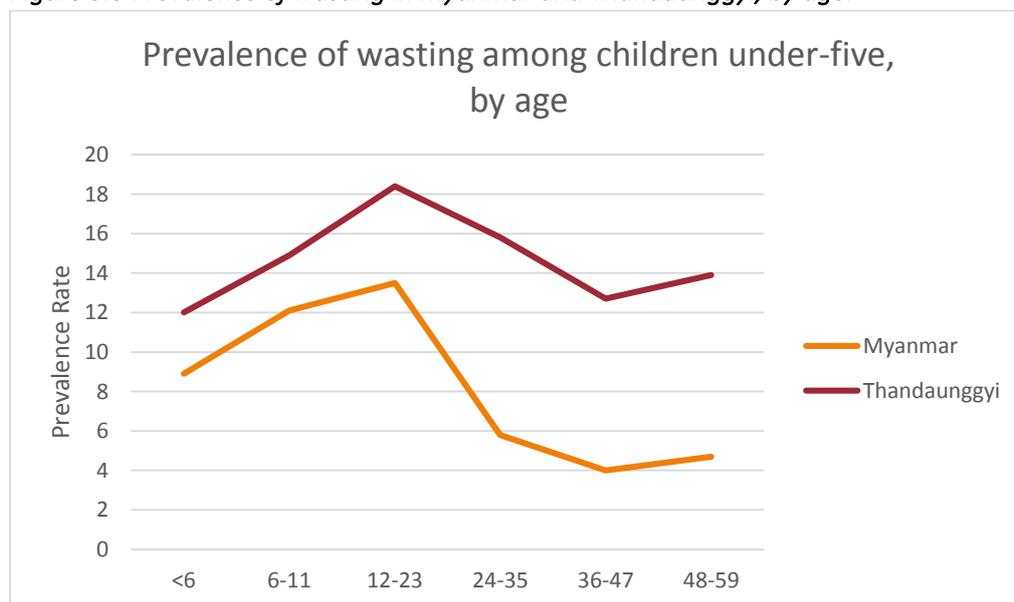
Figure 3.2 Prevalence of under-weight, stunting and wasting in the three sub-townships Baw Ga Li, Leik Tho and Thandaunggyi as compared to Thandaunggyi Township.

Prevalence of Undernutrition - U5



Figures 3.3 and 3.4 below present how prevalence rates of wasting and stunting are developing when comparing different age groups.

Figure 3.3 Prevalence of wasting in Myanmar and Thandaunggyi, by age.

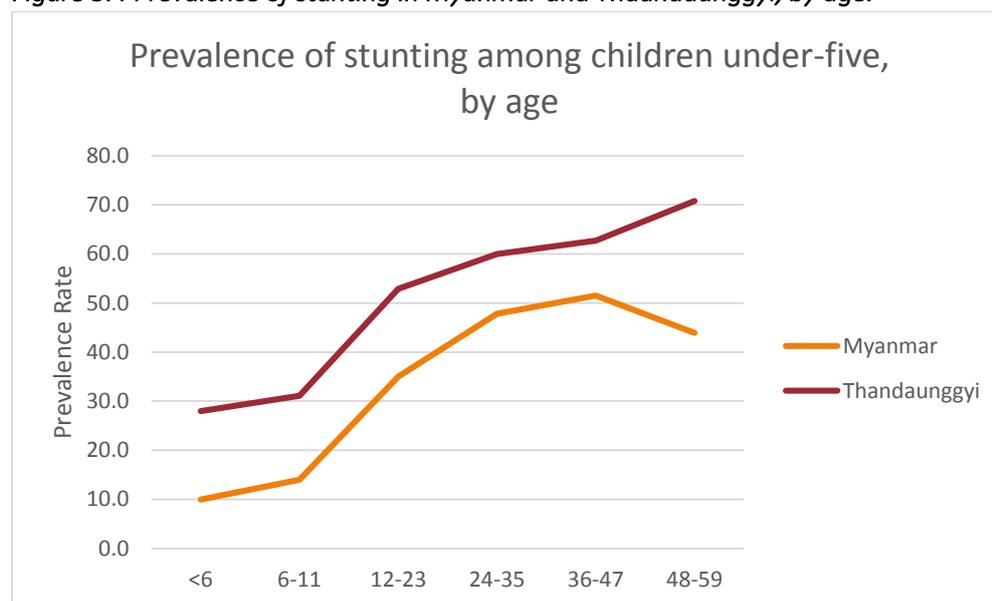


Prevalence of wasting by age group is following a similar pattern in Thandaunggyi Township as it does in Myanmar. The age group with the highest prevalence of wasting are the one-year olds (12-23 months). After the second birthday, wasting prevalence reduces although Figure 3.3 clearly shows that in Thandaunggyi it does not reduce as much as is seen on national level. In fact, wasting levels remain high among all age groups as it remains above 10% for all groups.

Similar to wasting, Figure 3.4 shows that stunting prevalence by age group also follows a similar pattern in Thandaunggyi Township compared to the whole of Myanmar. As the table shows, prevalence of chronic malnutrition increases particularly after the first year and continues to increase as the child grows older. As many as 28% of children under 6 months old are already stunted, which suggests that their growth and development were not optimal in utero (during pregnancy).

Then, as the figure shows, prevalence of chronic malnutrition increases particularly after the first year. Contrary to wasting however, the stunting prevalence continues to increase, as the children grow older, even up to five years. Again, in Thandaunggyi the prevalence rates are high among all age groups.

Figure 3.4 Prevalence of stunting in Myanmar and Thandaunggyi, by age.



The main question is if these results are accurate, given that they show unusual high prevalence rates. The fact that the Thandaunggyi wasting and stunting results follow a similar pattern as the national level suggest that –if data collection was not correctly done– enumerators consistently underestimated weight and/or height or consistently overestimated age among survey locations and different age groups. Measurement methods, data cleaning and data analysis were double checked and were done according to international and standard guidelines. Therefore, we can assume that malnutrition prevalence is high in Thandaunggyi Township. All children under two of the 40 core villages will be screened regularly and once the mother groups are set up, the first screening results (weight & height) will be used to crosscheck and to ensure that the right prevalence rates are used as a baseline.

The above results are all for children under five years of age, to be able to compare with national level and state level data which are also based on under-fives. However, one of the main objectives of the program is to improve nutritional outcomes, which is defined as ‘percentage of moderately/severely malnourished children under two years of age (by sex and age group)’.

Therefore, table 3.2 below therefore presents the baseline prevalence of moderate and severe under-nutrition among children under two years of age in Thandaunggyi.

Table 3.2: Moderate/Severe Malnutrition by Sex, Among Children Under 2 Years

| | Under-weight | | Stunting | | Wasting | |
|----------|--------------|-------|----------|-------|---------|-------|
| | Boys | Girls | Boys | Girls | Boys | Girls |
| Moderate | 12.6% | 9.0% | 21.3% | 21.8% | 4.7% | 6.0% |
| Severe | 15.0% | 14.3% | 21.3% | 19.6% | 12.6% | 9.1% |
| Total | 27.6% | 23.3% | 42.6% | 41.4% | 17.3% | 15.1% |
| Total U2 | 25.4% | | 41.9% | | 16.2% | |

These results show that –according to WHO categorization - stunting is ‘very high’ (above 40%) among the U2, while under-weight is ‘high’ (between 20 and 30%). Wasting is also ‘very high’ (above 15%) among the U2. Furthermore, boys are slightly more malnourished than girls, which is also found in the Myanmar DHS (Demographic and Health Survey) 2015-2016. Reasons for this difference between boys and girls can differ per location and any gender-based differences will be discussed further with the other results as well.

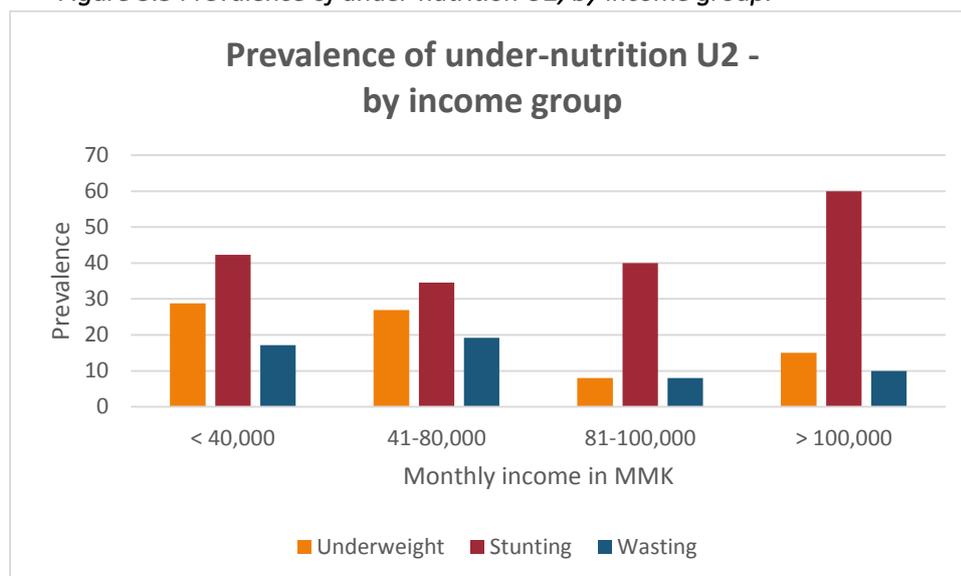
Table 3.3 below presents the moderate/severe malnutrition by the following age groups: children 0-6 months, 6-11 months and 12-23 months. In all three forms of malnutrition, we see a fairly high prevalence in the 0-6 months group, which suggests the need to improve maternal health and nutrition and potentially improve exclusive breastfeeding practices. Particularly in stunting, there is a steep increase of prevalence after the first birthday. This suggests that there is a need for improving infant and young child feeding practicing. Possibly, other causes such as unclean water, high disease burden, food insecurity, poverty also contribute to these high numbers, which will be further explored in the NCA report.

Table 3.3: Moderate/Severe Malnutrition by Age group, Among Children Under 2 Years

| Months | Under-weight | | | Stunting | | | Wasting | | |
|----------|--------------|-------|-------|----------|-------|-------|---------|-------|-------|
| | <6 | 6-11 | 12-23 | <6 | 6-11 | 12-23 | <6 | 6-11 | 12-23 |
| Moderate | 4.0% | 12.2% | 12.5% | 22.0% | 13.5% | 25.7% | 6.0% | 2.7% | 6.6% |
| Severe | 16.0% | 12.2% | 15.4% | 6.0% | 17.6% | 27.2% | 6.0% | 12.2% | 11.8% |
| Total | 20.0% | 24.3% | 27.9% | 28.0% | 31.1% | 52.9% | 12.0% | 14.9% | 18.4% |

With malnutrition prevalence this high, a good understanding of the causes is needed to address them effectively. Figure 3.5 below presents the prevalence of underweight, stunting and wasting per income group. Prevalence of under-weight and wasting is clearly higher among the poorest income groups, while prevalence of stunting is high among all income groups. This shows that chronic malnutrition affects all income groups and not only the poor. To effectively reduce stunting prevalence, the program therefore needs to work with the entire community.

Figure 3.5 Prevalence of under-nutrition U2, by income group.



The results on nutrition outcomes reveal the following:

- Prevalence of stunting, wasting and under-weight is substantially higher than the national or Kayin average.
- Prevalence of stunting, wasting and under-weight is high among all children under five, whether they are boy or girl. Prevalence is high already among infants < 6 months old.
- Prevalence of stunting, wasting and under-weight is high at all sub-townships.
- Comparing income groups, the survey found substantially higher wasting and under-weight prevalence among the two poorest income categories. Nevertheless, wasting and under-weight prevalence were found to be still above national average in the higher income groups.
- Stunting seemed to be very high among all income groups and even highest in the 'richest' income group (with the note that the 'richest' are households that earn over 100,000 MMK per month).

The results show a combination of high stunting and wasting prevalence. Childhood wasting and stunting are both important risk factors for illness and death, can be seen in the same child and share common risk factors. Yet, they are commonly portrayed as relatively distinct manifestations of under nutrition⁸. While much has been written about the causes and effects of stunting and wasting, the relationship and associations between the two remain poorly understood.

Wasting is synonymous with acute malnutrition (occurring acutely over a short period) and stunting with chronic malnutrition (occurring over a longer period); although what constitutes 'short' and 'long' is rarely defined. The average duration of untreated severe wasting may be between 1.5 and 7.5 months, depending on context. Similarly, repeated (e.g. seasonal) bouts of wasting occurring year after year should not be viewed as a short term issue. The mortality risk

⁸ Technical Briefing Paper – The relationship between wasting and stunting, policy, programming and research implications. Emergency Nutrition Network, USAID, July 2014.

for a child both wasted and stunted is 12.3 times higher than a healthy child, as compared to 11.6 for severely wasted and 5.5 for severely stunted child.

Immediate 'causal' factors (with evidence for an association) for both wasting and stunting: maternal stature, infectious disease, dietary inadequacy, diarrhea, inappropriate complementary feeding, and intrauterine growth restriction.

Evidence suggests that wasting adversely affects linear growth. During wasting, there is a point at which linear growth slows and potentially stops. There is some encouraging operational research to suggest that both wasting and stunting may be reduced with similar preventative food based approaches. However, more research and evidence are needed to illustrate effect on linear growth in particular.

The fact that a substantial number of children **under 6 months** of age are malnourished suggests that in-utero growth (during pregnancy) is not optimal due to poor maternal nutritional status. Maternal under-nutrition contributes to fetal growth restriction, increasing risk of neonatal deaths, and, for survivors, increased risk to become stunted. Furthermore, high malnutrition rates in general and specifically in the < 6 months group suggests low coverage of exclusive breastfeeding as well. The 9 months during pregnancy and first 6 months of a child's life account for 450 days, which is almost half of the well-known '1,000 days critical window' (from conception to the child's second birthday). It is therefore important to ensure sufficient focus on improving maternal health and nutrition.

Increasing malnutrition rates during the **6 to 23 months** period is not uncommon as it is the time when breast milk alone does not cover the nutrient needs of the growing children anymore and when children more and more depend on nutritious complementary foods. Covering the nutritional needs of a growing child of this age group can be a challenge particularly as small children cannot consume as much as an adult, which means that the (limited) food they consume need to be nutrient-rich. Reasons for under-nutrition within this age group therefore are often related to inappropriate feeding practices, which include insufficient amounts, frequency, consistency or variety of foods offered to the child.

Chapter 3.4 Infant and Young Child Feeding Practices and Maternal Nutrition will look further into maternal dietary practices, breastfeeding practices and complementary feeding practices.

This Nutrition Causal Analysis from this point onwards will describe and analyze the potential causes of such high levels of malnutrition in Thaundaunggyi Township.

The following risk factors are further analyzed: Food Security (chapter 3.3); Maternal Nutrition and Infant and Young Child Feeding practices (chapter 3.4);

Cultural belief and Taboos (chapter 3.5); Health infrastructure and service utilization (chapter 3.6); and Water, sanitation and hygiene (chapter 3.7).

3.3 FOOD SECURITY

Introduction Food Security

The generally used definition of food security⁹ is: all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

This definition refers not only to sufficient quantities of food (in terms of calories), but also to sufficient quality (in terms of variety and micronutrient content). Physical availability of nutritious foods – throughout the year – depends on own production, availability in the market and available natural resources where people can collect nutritious foods. Access to resources such as land, livestock, equipment and financial services influence people's capacity for own production. Agricultural and nutrition knowledge furthermore influence people's decisions on what to grow or buy or collect. Economic access to these foods depend on household income & income stability, food prices, availability and prices of non-foods as well as debt levels.

A CDN survey in 2015 in the same target area showed that people considered their biggest problems in life to be: 1. No work opportunities, 2. Lack of medical care, 3. Lack of access to credit and 4. Crop destruction due to climate change. At that time, three of their biggest problems were related to food security, and particularly to economic access to food and own production.

Experience hunger

The NCA household survey showed that 7.9% of all households either had a mother or a child who were hungry in the past four weeks. Most of respondents (90%) who experienced hunger in the past four weeks, said that it only occurred rarely (1-2 times). It should be noted however that the time of data collection (end of November to early December) is not the lean season, as it is right after the main cardamom harvest.

Own Production

A major factor affecting food security is own food production. The baseline survey found that in Thandaunggyi agriculture is mainly focusing on cash crops that are not suitable to support a healthy diet for pregnant, lactating mothers or small children; most commonly grown are cardamom, betel nut and coffee. Production of nutritious foods through home gardening and animal husbandry are presented below.

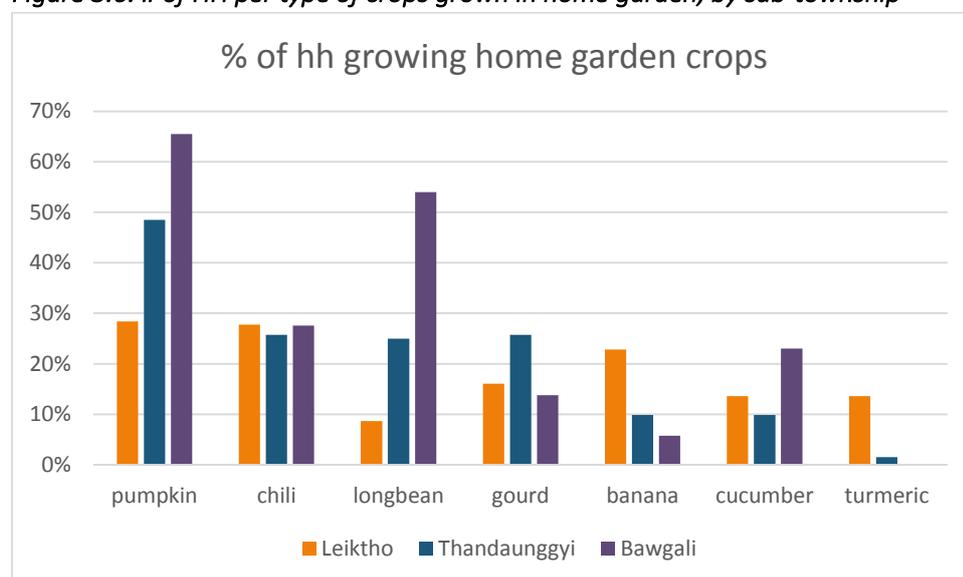
While ownership of poultry is not widespread, still 18.6% of all households have poultry. It was noted that most households prefer to have poultry for meat consumption and not for eggs. Mothers mentioned that they sometimes lose their whole chicken flock dies due to unknown disease. Some 60.4 percent of surveyed households owned livestock and of those, 90.4 percent stated the livestock to be mainly for their own consumption. However, depending on the type and number of livestock, this might mean only occasional consumption of meat and/or animal products. People confirmed that they only slaughter their pigs if there is a cultural festival, while otherwise they would prefer to keep is as a form of insurance or

⁹ Refined definition of Food Security as adopted at the 1996 World Food Summit.

savings. None of the households have fish ponds, while 21% of the surveyed households do not have any animal rearing (no livestock nor poultry nor fish). Considering the importance of high quality protein, particularly during pregnancy and for infants and young children, further study into how to improve local production of animal products would be recommended. Beans could also be a good source of protein; however, besides yard-long bean, no other beans or pulses are grown (according to both baseline and NCA surveys).

In Thandaunggyi Township, 59.8 percent have a home garden and of these, 89 percent use their home garden mainly for their own consumption. Crops that are grown include: pumpkin, chili, longbean, gourd, banana, cucumber, turmeric, roselle, betelnut, corn, ridgegourd, papaya, aubergine, bittergourd, chayote, yam, tomato, durian, lime, cassava, mango, pomelo, coconut, ginger, avocado, okra, bambooshoots, mangosteen, passionfruit, and sweet potato.

Figure 3.6: # of HH per type of crops grown in home garden, by sub-township



While the variety of home garden crops seems impressive, the home garden production is predominantly concentrated on pumpkin, chili, longbean, gourd, banana and cucumber. These 'top six' crops are also grown in all three sub-Townships. All other crops are grown by less than 10% of surveyed households and many of them not in all three sub-Townships.

Looking at the nutrients in these home garden crops, pumpkin is high in vitamin A and a good source of vitamin C, niacin and folate. Yard long beans are a good source of vitamin C, thiamin, riboflavin, niacin and folate. The type of Gourd was not specified; depending on which kind of gourd, it could be a good source of vitamin C, vitamin A and potentially iron. There are also different types of Bananas with different nutrient contents; they can be a good source vitamin C, folate and some varieties have good B vitamins (thiamin, riboflavin and niacin). Cucumber is not highly nutritious and chili is not suitable for small children. Some of the less commonly grown crops have good amounts of important micro-nutrients, such as corn, papaya, mango, avocado and sweet potato. These could also be suitable for small children and would be therefore worthwhile to promote.

In summary, most of the crops are not grown by a large number of households. Furthermore, it seems that most home garden production is limited to the rainy season (June-October). Another important factor is that not all people have vegetable gardens close to their house due to limited space around the home. Focus Group Discussions with mothers however showed their interest for producing their own crops to support nutrition, to save money and to have access to safe food without chemicals.

Table.3.4: FGDs on Home Gardening

| <i>Category</i> | <i>Leik Tho</i> | <i>Thandaunggyi</i> | <i>Baw Ga Li</i> |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <i>Home Gardening</i> | <p><i>“If we produce more vegetables and crops, we can eat more and more and become nutritious”</i></p> <p><i>“My home garden supports me and it gives many vegetables and I can manage my daily food preparation effectively”</i></p> <p><i>“If my children or my family members are getting ill, the garden will help us. It gives to my family more foods and we can save money instead of buying foods from others”.</i></p> | <p><i>“We, can get many vegetables, crops and some eatable plants from home garden”</i></p> <p><i>“We usually plant gourd and eggplant in the garden”</i></p> | <p><i>“Home garden products are more safe and nutritious as they do not contain chemicals”</i></p> |
| <i>Knowledge and Training on Home Gardening</i> | <p><i>“As for me it is important to prevent under-nutrition by planting more nutritious vegetables in the home garden”</i></p> | <p><i>“No one got and attended training concerned with agriculture, nutrition and WASH.”</i></p> | ----- |

Table 3.5 below presents other crops that are grown on agricultural land according to the NCA survey. A total of 91.6% of surveyed households had access to agricultural land. Technically, cardamom is grown at forest land, but we could say crops grown outside the home gardens.

According to the baseline survey, the three most important crops are cardamom (by far), betel nut and coffee. Based on that information, it seems that rice paddy is grown by many families as a fourth or fifth crop. Out of all surveyed households in the NCA, 29.4 percent grew rice paddy. This means that 70% of all households need to purchase their main staple food.

Table.3.5: Main crops grown on Agricultural Land at Township Level

| Types of Crops | % Households with agricultural land | % of all surveyed households | % households according to baseline |
|--------------------------------------------------------------------------|-------------------------------------|------------------------------|------------------------------------|
| Cardamom | 70.2% | 64.3% | 86.2% |
| Rice paddy | 32.1% | 29.4% | 17.7% |
| Betel nut | 28.4% | 26.0% | 23.6% |
| Coffee | 24.6% | 22.6% | 26.4% |
| Fruit (durian, dogfruit, banana, lychee, mangosteen, mango, wintermelon) | 19.2% | 17.6% | 23.6% ¹⁰ |
| Betel leaf | 17.8% | 16.3% | 8.6% |
| Ground Nut | 1.7% | 1.6% | 1.7% |

A majority of households grow cardamom, betel nut, coffee and betel leaf which indicates that households prefer to grow cash crops rather than those of vital importance for their diet intake and good food diversity. Besides rice, only 17.6% of all households grow fruits, which usually is one or two different kind of fruits per household. This indicates that there is a need for awareness and training on nutrition-sensitive food production and agriculture.

Availability of nutritious foods at local markets or at natural resources

The results of the NCA and baseline suggest that own production of (nutritious) food is limited and seasonal, and that households therefore highly depend on buying food or collecting food from natural resources. Besides relative low own production of food, the surveys also found that a majority of households to spend a high proportion of their income on food as well as taking out loans to buy food.

Therefore, in the feedback workshop to discuss the results of the NCA and the baseline, one session was included to gather information on availability of (nutritious) foods from local markets and from natural resources. The groups were asked to focus particularly on fresh foods suitable for pregnant, lactating women and young children.

In all sub-townships, market access was better in the dry season as compared to the rainy season. It was common for people to use 'mobile motorbike market' who come to the village to sell foods; mostly vegetables as fruits are not easy to transport without damaging. In the rainy season, some villages cannot be reached by motorbike, which is when goods are carried manually by carriers. All the foods, whether at local markets or from mobile (motorbike) markets, come from Taungoo market. The price of foods increased substantially comparing the price in Taungoo to the price in the village. For example, one bag of rice (around 50 kg) costs 20,000 MMK in Taungoo market, 30,000 MMK in Baw Ga Li market and 35,000 MMK in the village.

A wide variety of vegetables are available through these mobile markets, with different varieties per season (winter, summer and rainy season). Vegetable and tubers include: watercress, mustard, cucumber, long bean, horshoe leaf, garlic, potato, tomato, chili,

¹⁰ Includes only dogfruit, durian, lychee and banana

pumpkin, yam, taro, cassave, squash (chayoo), bamboo shoot, gourd, basil, cabbage, cauliflower, chickpeas as well as forest vegetables, such as 'dayingoon' (fern leaf), and 'kimuunchain'. All families eat leafy vegetables from the forest. Price of vegetables at local market: tomato 600 MMK/viss¹¹, cabbage 700 MMK/viss, cauliflower 150-300 MMK/piece, water cress 50-100 MMK/bunch, and corn 150-200 MMK/piece. People typically eat vegetables everyday with their rice, which are mostly bought at the local/mobile market or gathered in the forest.

With regards to fruit, papaya and banana are commonly available in the village, while mango-steen, durian, pineapple are grown in the forest. Local markets sell water melons, oranges, or jackfruit. Fruit is eaten in their respective growing season; if it is there, people eat it but if not then they don't eat fruit. In the season, fruit is easily available in the village, in the forest or at the market (e.g. an orange cost 100-200 MMK/piece).

Meat products in the market include: dried and fermented fish, pork, beef, chicken or wild forest meat. At the local market, pork, chicken or beef costs 5,000 MMK/viss, and at the mobile market on average 7,000 MMK/viss (can vary between 6,000-9,000 MMK/viss depending on the remoteness of the village). Wild forest meat is available for 5,000 MMK/viss on the local market or 7,000-8,000 MMK/viss at the mobile market. In general, people don't eat meat regularly or daily. In the village grocery shop, people can buy eggs; usually year round but sometimes there is a shortage. The village shop can order 100 eggs from the main market in the sub-township which will be carried manually by a carrier to the village. The chicken in the village are typically kept for the meat, less for eggs.

Fresh fish (caught in stream) is available for 4,000-9,000 MMK/viss, while dried fish can be sold at 7,000-15,000 MMK/viss. Some people catch fish or they eat fish from a can. Most common however, is for people to eat only fish paste.

Household income and expenditures

The baseline found that self-reported combined income from on-farm and off-farm activities on average was 967,343 MMK per household per year. This would result in 80,612 MMK/month or 2,687 MMK/day.

Household income however is not stable or regular, and depends mostly on the harvest. An increasing number of households have difficulty acquiring an income between February and September.

Furthermore, 94.7% of all households spend the majority of their income on food, while 83% of all households took out a loan or pre-sold their produce. An overall majority of the loans was taken to pay for food or health emergencies.

Families who do not grow their own rice (over 70% of the target population) need to buy their staple food. One family of 5 members will eat around 2 kg of rice per day, costing 1,400 MMK/day if bought on the local market. Vegetables are quite cheap and would only add a few hundred MMK/day. To add meat/fish to the diet (80 gram/person), this would cost an additional 1,250 MMK to 2,250 MMK, depending on which meat and location of buying. For

¹¹ 1 viss = 1.63 kg

one day, a menu of rice, vegetables and meat/fish would add up to around 3,150 to 4,150 MMK per day for a family of five. With an average income of 2,687 MMK per day, it is clear that people cannot afford meat every day, why they spend most of their income on food and why they need to borrow money to buy food to feed their families. Besides food, families also need money for non-food items and other expenses for their families.

In summary, families without paddy land, might only be able to afford rice, vegetables (including chili), and some fish paste, which is indeed what is confirmed by the other results of the survey on food consumption.

Food insecurity contingent on income poverty was a prominent recurring theme across the FGDs with mothers pointing out that income poverty is an important factor threatening their household food security. At all sub-townships level mothers made mention of financial circumstances as a hindrance to consuming adequate and diversified diets as presented in Table 3.6 below.

Table.3.6: Local Perception of Limited Income on Nutritional Outcomes

| <i>Category</i> | <i>Baw Ga Li Sub-township</i> | <i>Leik Tho Sub-township</i> | <i>Thandaunggyi Sub-township</i> |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Nutritional Knowledge</i> | <i>"I know which kind of food provides the necessary nutrition, but I'm not in good financial position to provide them for my children"</i> | <i>"If I eat more food, the child will get more breastmilk. If I don't eat, the child will not. But because of my poor economic situation I eat only two times per day"</i> | <i>"To be nutritious, three main food groups must be needed to feed the children but the mothers can't be able to feed such food to their children because of the financial problems"</i> |
| <i>Diet Intake, Family size and Money</i> | <i>"I'm not in good financial position to provide them [diverse nutrients intake] for my children"</i> | <i>'Because of my poor economic situation I ate only two times of meal per day'</i> | <i>"Poor economic situation can lead to children under-nutrition. Big family is something linked with our business and may be it can also affect on getting nutritious food"</i> |
| <i>Health and Eating and Food production/ Home gardens</i> | <i>"Under- nutrition is related to home gardening because home gardening products are more safe and nutritious"</i> | <i>"If we produce more vegetables and crops, we can eat more and more and become nutritious"</i> | <i>"Home gardening is one of the methods to prevent the malnutrition because we, mothers, got many vegetables, crops and some eatable plants from it"</i> |

It was revealed in the FGDs that mothers who had some awareness of good nutritional practices were constrained by their economic position to provide for their children or to feed themselves when they are pregnant, lactating or breastfeeding. Many of the participants even recognised that family size is an important aspect for food security and that less family members implied more food is available for each individual which would prevent inadequate food intake. Additionally whenever family size was mentioned it was related to poverty and

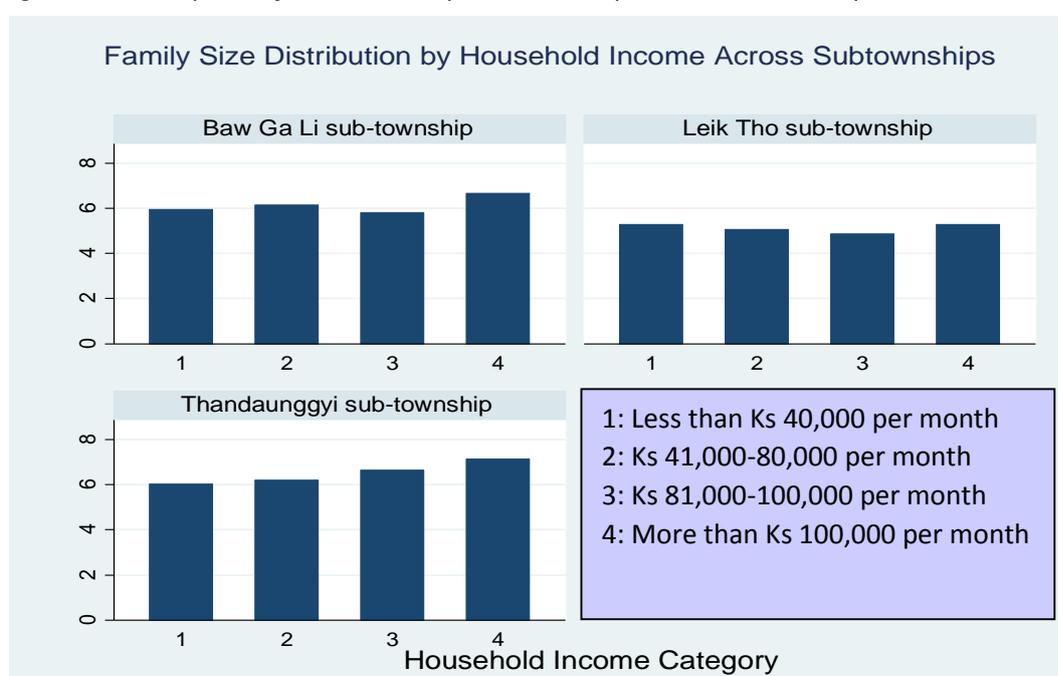
its impact on food security. Economic factors were important especially given large families in Leik Tho sub-township.

Family size

The rural farming and food production model is based on big families whereby more children in a household means that there are more hands to help in agricultural activities and can therefore produce more. Figure 3.7 below therefore presents family size distribution by household income across the different sub-township. With the focus on cash crops, this should translate in larger income for larger families.

As illustrated in Figure 3.7, the expectation that the largest families are also the best off seems to be slightly true in Baw Ga Li and Thandaunggyi sub-townships, although the difference in family size is minimal. Family size in general is not substantially different between sub-townships nor between the different income groups.

Figure.3.7: Family Size of Households by Income Group at the Sub-township Level



In the FGDs, the advantages of small families and their positive implications for nutrition was recognized amongst women as presented in the Table 3.7 below. There was greater awareness of the outcomes of family planning on food production and consumption in Thandaunggyi sub-township as opposed to Leik Tho and Baw Ga Li. In the latter sub-township there was absolutely no knowledge of family planning.

Table.3.7: Local Perceptions of Family Size, Food Production and Food Consumption

| Category | Leik Tho | Thandaunggyi | Baw Ga Li |
|-----------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Family Size | <i>"If the family size is big, can't share food to all the family members and it leads to under-nutrition"</i> | <i>"Big family is something linked with our business and may be it can also affect on getting nutritious food"</i> <i>"Having own garden is good and having small family is also great because the family members do not need to share too much to each other"</i> | <i>No mention of family size during the discussions in Taungyi village</i> |
| Family Planning | ----- | <i>"About family planning, we use contraceptive pills, injection and intrauterine device. We don't know how to relate breastfeeding and contraception"</i> <i>"If contraceptive methods are not used, there will be frequent conception and it leads to reduced production of breastmilk of mothers and so the children will not get enough breastmilk."</i> | <i>"I don't know about family planning"</i> |

The opinion of the mothers that larger families leads to more sharing of (limited) food and thus to under-nutrition is supported by the household survey as well. Larger than average families (8 or more family members) were more likely to have stunted children than smaller than average families (4 or less family members). Some 66% of larger households compared to 55% of smaller families were found to have one or more stunted children.

These findings suggest that having a large family (in Baw Ga Li and Thandaunggyi sub-township) slightly helps to increase income, but at the same time increases risk to malnutrition. This might mean that the difference in income is not sufficient to cover for the needs of the larger family. It should be noted that the group with an income of over 100,000 MMK per month is not exactly rich either. It could also indicate that malnutrition is not income related but caused by other factors, which will be explored further in the remainder of the report.

3.4 MATERNAL NUTRITION & INFANT & YOUNG CHILD FEEDING PRACTICES (IYCF)

Insufficient maternal nutrition and improper infant and young child feeding practices are recognized causes of malnutrition. To identify if these are also an issue in Thauंगाunggyi, this chapter will look at existing maternal dietary practices and infant and young child feeding practices.

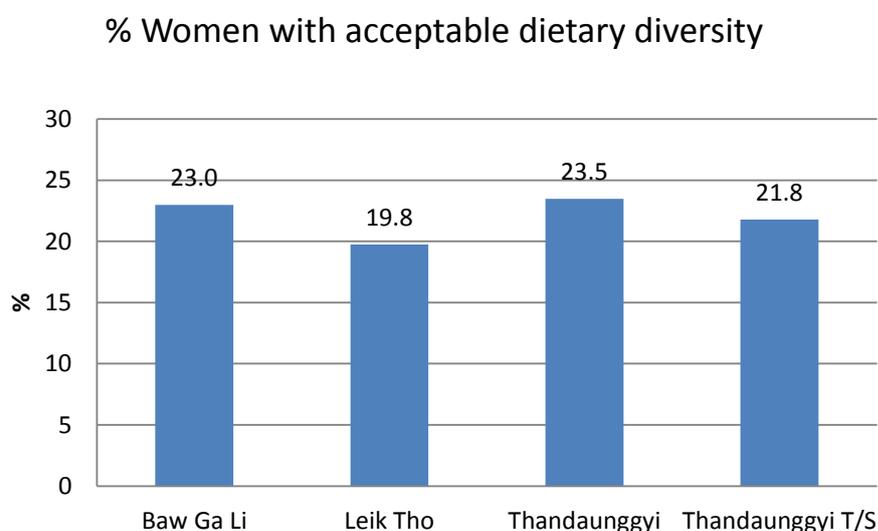
Maternal dietary practices

To assess the dietary practices of mothers, the Minimum Dietary Diversity for Women (MDD-W) was gathered for 381 women who for this survey are all mothers of infants or young children.

The MDD-W is an indicator to assess whether women 15-49 years of age have consumed at least five out of ten defined food groups¹² the previous day or night. The proportion of women 15-49 years of age who reach this minimum in a population can be used as a proxy indicator for higher micronutrient adequacy, one important dimension of diet quality. It should be noted that the MDD can be affected by seasonality.

The results of the Minimum Dietary Diversity for Women (MDD-W) is presented in Figure 3.8 below.

Figure 3.8. Prevalence of Women with acceptable dietary diversity (MDD-W above 5).



Only one out of five women (21.8%) in Thandaunggyi Township have an acceptable dietary diversity. This means that one fifth of the WRA population is expected to have a higher micronutrient adequacy. The proportion of women with an acceptable MDD is slightly lower in Leik Tho (19.8%) and slightly higher in Baw Ga Li (23.0%) and Thandaunggyi sub-township

¹² 1. Grains, white roots and tubers, and plantains, 2. Pulses (beans, peas and lentils), 3. Nuts and seeds, 4. Dairy, 5. Meat, poultry and fish, 6. Egg, 7. Dark green leafy vegetables, 8. Other vitamin A-rich fruits and vegetables, 9. Other vegetables, 10. Other Fruits

(23.5%). This means that as many as 76-80% of women in the whole of Thangdaunggyi Township are more vulnerable to micronutrient deficiencies.

The above results indicate that the diet quality of a majority of women (mothers) is poor, which means that there is a gap between their intakes and their requirements for a range of micronutrients. As the surveyed women are all mothers of infants and young children, their nutrition requirements are higher if they are pregnant or lactating as compared to non-pregnant/non-lactating women. Therefore, having this large proportion of women not reaching their MDD is worrying.

Insufficient nutrient intakes before and during pregnancy and lactation can affect both women and their infants. Maternal weight gain during pregnancy and intra-uterine growth restriction¹³ (growth of the baby during pregnancy) have been identified as causes of wasting and/or stunting in literature.

Looking at the results, it was found that the food groups that are consumed amongst women were:

1. Grains, white roots, tubers and plantains (94.8%)
2. Meat, poultry and fish (69.6%)
3. Other vegetables (46.7%)
4. Dark green leafy vegetables (42.0%)
5. Other Vitamin A rich fruits and vegetables (34.9%)
6. Eggs (26.5%)
7. Pulses (25.4 %)
8. Other Fruits (13 %)
9. Dairy (12.5%)
10. Nuts and Seeds (7.8%)

The grains/tubers category includes consumption of rice. The meat/poultry/fish category includes mostly fish paste (which in regular MDD is categorized as a condiment) and to a lesser extend fresh meat or fish. This is confirmed by mothers who said their daily diet always includes rice, vegetables, fish paste and chili. If they have money, they buy fresh meat or fish, which could be once a week for some households.

To see if there is connection with income and dietary diversity for women, the following table shows percentage of women with an acceptable dietary diversity by income group and by sub-Township.

¹³ Maternal weight gain pregnancy (WHO 1997), Intra-uterine growth restriction (Chrstian, Lee et al. 2013; Black, Victora et all, 2013)

Table 3.8: Percentage of women with an acceptable Minimum Dietary Diversity (MDD >5)

| Percentage women with acceptable dietary diversity | | | |
|----------------------------------------------------|---------|---------------------|-----------|
| Monthly income: | Leiktho | Thandaungyi sub-Twn | Baw Ga Li |
| < 40,000 MMK | 15.7% | 27.0% | 24.6% |
| 41-80,000 MMK | 20.0% | 18.9% | 28.6% |
| 81-100,000 MMK | 57.1% | 24.0% | - |
| > 100,000 MMK | 29.4% | 14.3% | - |
| All households | 19.8% | 23.5% | 23.0% |

The above table shows some interesting results; in Leiktho, a larger proportion of the richer households compared to the poorer segments have an acceptable dietary diversity score for women. In Thandaungyi sub-township, there doesn't seem to be much difference between the poorer or richer groups. In Baw Ga Li, none of the richer households have an acceptable dietary diversity. In general, these results show that even large proportions of the richest category had failed to achieve minimum dietary diversity for women.

This shows that simply improving incomes will not automatically lead to improved diets, in this case among women. Considering that malnutrition prevalence (stunting/wasting/underweight) was also high in all income groups shows that nutrition programs need to include and target all households and not only the poorest.

These results might suggest that people lack the proper knowledge on nutrition. This might be true, however, we should be careful to assume that without actually testing their knowledge. Furthermore, there are some hints that even the 'richest' household lack sufficient financial resources to access food, let alone nutritious and diverse food items. For example, the baseline shows that 94.7% of all households spend the majority of their income on food, while 83% of all households took out a loan or pre-sold their produce. An overall majority of the loans was taken to pay for food or health emergencies. This shows that even the 'richest' households might not be that financially secure. In Focus Group Discussions, people mentioned that a major obstacle to consume nutritious food was income poverty. This suggests that people have some understanding of nutrition but do not have the (financial) means to purchase nutritious foods.

It can be concluded that women from all income categories lack dietary diversity and thus programs need to include all households, not only the poorest. There might be an issue with proper understanding and knowledge on nutrition, but this needs to be investigated further. It seems that even richer households lack sufficient financial resources, and therefore lack of income is likely to be a main barrier to access nutritious foods.

Finally, micronutrient adequacy is an important part of a quality diet, however, it should be noted that –besides micronutrient adequacy - high-quality diets are characterized by a balanced intake of protein, carbohydrates and fat, as well as a moderation in consumption of unhealthy foods.

Infant and young child feeding practices (IYCF)

To assess the infant & young child feeding practices (IYCF), breastfeeding practices, dietary diversity (MDD) and the Minimum Acceptable Diet (MAD) were gathered for 218 children aged 6-23 months.

Core standard indicators for infant and young child feeding practices include:

- Breast feeding initiation within one hour after birth, exclusive breastfeeding up to six months, continued breastfeeding up to two years.
- Minimum dietary diversity (MDD) and minimum acceptable diet (MAD) for children 6-23 months. The MDD identifies the number of food groups that were consumed out of seven pre-defined food groups¹⁴ in the past 24 hours. From the seven food groups a child had to consume at least four different types in order to have received the minimum dietary diversity. The MAD is a composite indicator which includes both dietary diversity as well as meal frequency among children 6-23 months.
- Percentage of children 6-23 months who consumed iron-rich foods and vitamin A rich foods.

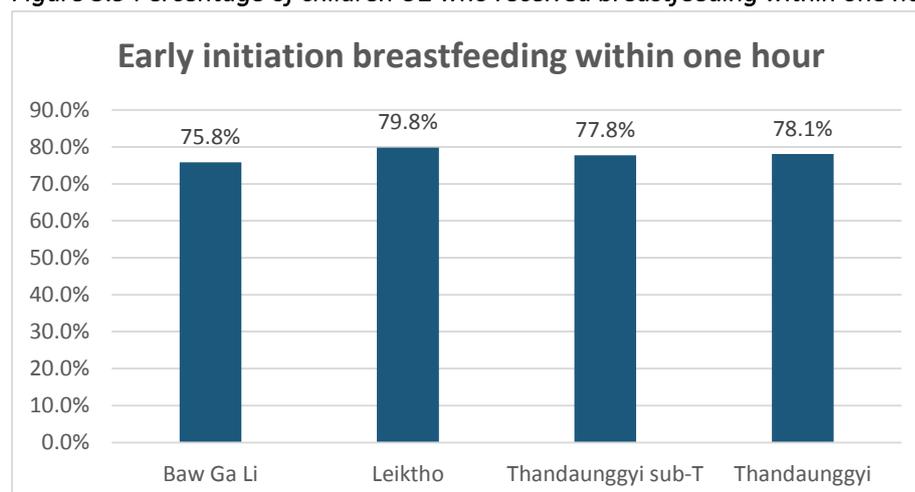
Breastfeeding practices

Globally accepted standards for optimal breastfeeding practices are:

- Breastfeeding a new-born within the first hour of birth
- Exclusive breastfeeding up to the age of six months with no water or food provided
- Continued breastfeeding up to the age of 24 months

Although it was found that across the sub-townships women were given practically no support during the breastfeeding initiation and implementation phases, 78.1 percent of the children under two were breastfed within an hour of delivery. This good practice is seen across all sub-townships as well.

Figure 3.9 Percentage of children U2 who received breastfeeding within one hour after birth



¹⁴1. Grains, roots and tubers, 2. Legumes and nuts, 3. Dairy products (milk, yogurt, cheese), 4. Flesh foods (meat, fish, poultry and liver/organ meats), 5. Eggs, 6. Vitamin-A rich fruits and vegetables, 7. Other fruits and vegetables

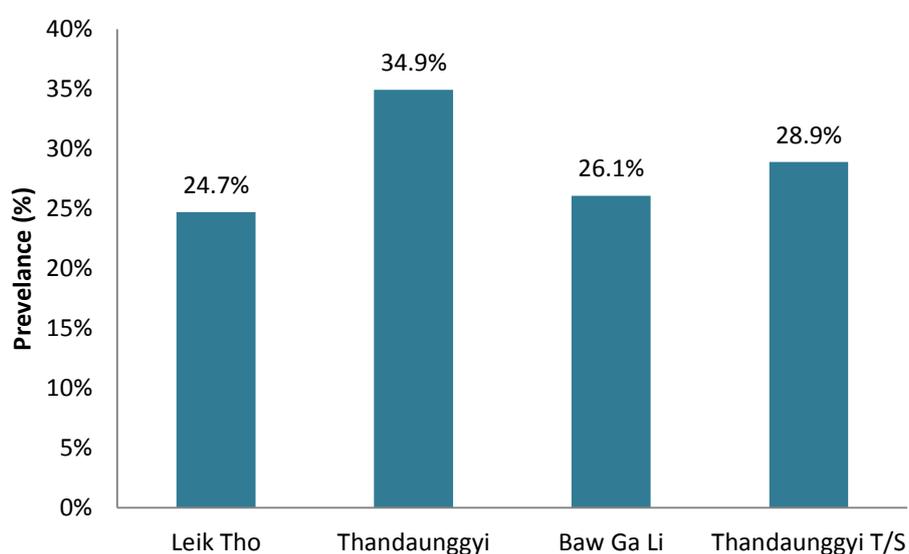
Exclusive breastfeeding up to six months with no water or food provided however is very low. Already over half of infants 0-5 months received honey, other milk, castor oil or water within three days after birth. While 85.2% were breastfed for more than 6 months, 58.2% was breastfed for one year or more and only 12.3% were breastfed for two years or more. This indicates that although the breastfeeding initiation within 1 hour of child birth is encouraging, exclusive breastfeeding up to six months and continuation of breastfeeding up to 23 months is poor. Mothers admitted during FGDs that continued breastfeeding was difficult due to their high workload and the need to leave the house to do work.

Suboptimum breastfeeding practices (0-23 months) alone attribute to 11.6% of child mortality among children < 5 years. Besides increased mortality risk, suboptimal breastfeeding leads to reduced IQ and earnings, reduced GDP and increased health costs.

Minimum dietary diversity (MDD) and minimum acceptable diet (MAD) among children 6-23 months

The prevalence of children 6-23 months meeting the minimum dietary diversity is 28.9% in the whole of Thandaunggyi Township. This is higher than the 21.8% of their mothers who had an acceptable dietary diversity. However, it still is fairly low and it means that as many as 71.1% of children receives inadequate micronutrient levels from their diet. Similar to the MDD-W, again Leiktho has the lowest proportion meeting the MDD and Thandaunggyi the highest.

Figure 3.10. Prevalence of Children Aged 6-23 Months Old Meeting Minimum Dietary Diversity (DDS>4).

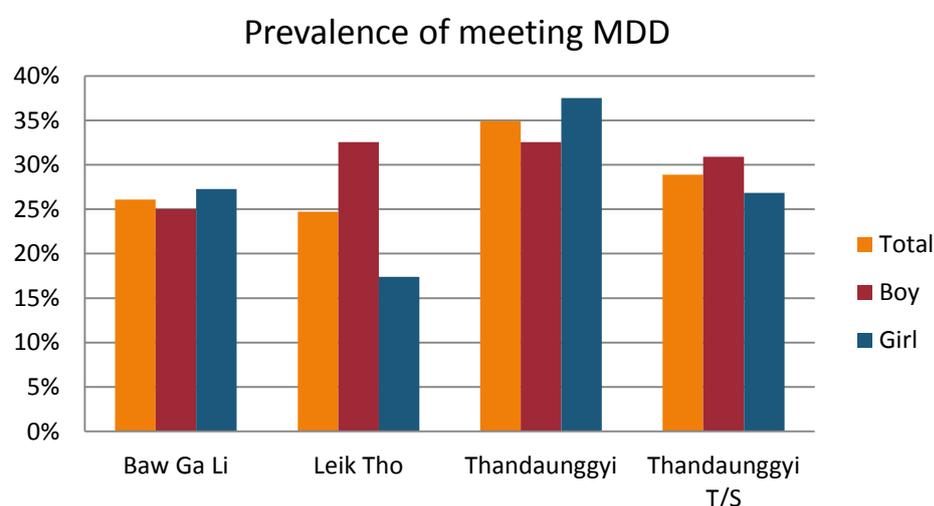


The four major food groups consumed by children were more or less identical to the major food groups consumed by the mothers:

1. Grains, roots and tubers (54.9%)
2. Flesh foods (meat, fish, poultry and liver/organ meats) (33.5 %)
3. Vitamin A rich fruits and vegetables (24.1%)
4. Other fruits and vegetables (22.4%)
5. Eggs (19.5%)
6. Legumes and nuts (14.9%)
7. Dairy (11.6%)

Comparing the MDD for boys and girls 6-23 months old in the whole of Thaundaunggyi township, slightly more boys (30.9%) as compared to girls (26.9%) had an acceptable dietary diversity, as presented in figure 3.11 below.

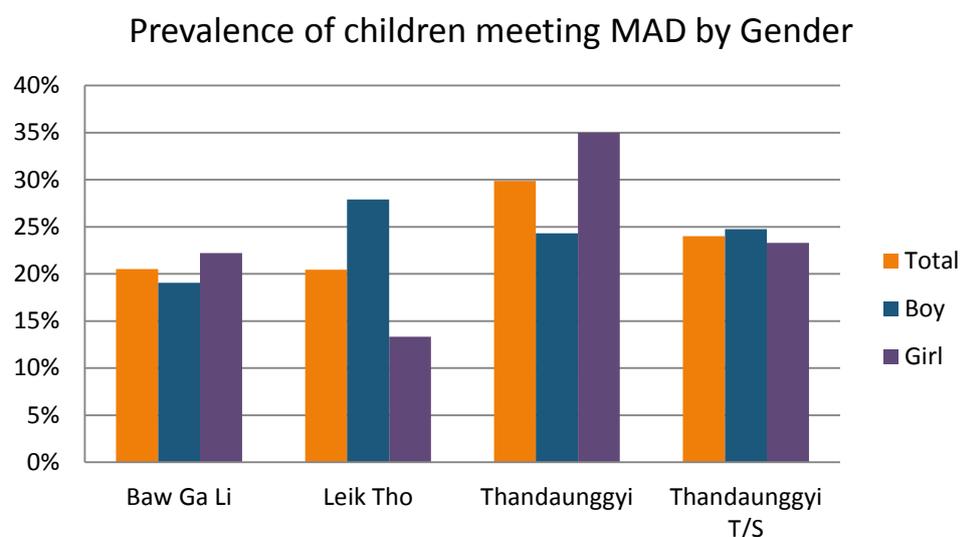
Figure 3.11. Prevalence of Children Aged 6-23 Months Old Meeting Minimum Dietary Diversity (DDS \geq 4), by gender and by sub-Township



However, comparing the sub-Townships it shows that in Baw Ga Li a similar proportion of boys and girls reach the MDD, while in Thaundaunggyi, slightly more girls reach the MDD. In Leiktho however, a substantially higher proportion of boys (33%) achieve an acceptable dietary diversity as compared to only 17% of the girls. The MDD-W for women (in fact the mothers of these surveyed children), Leiktho also showed the lowest group of women (19.8%) that achieved the MDD-W. These results might indicate that in Leiktho there are gender-biased practices in nutrition whereby boys are given a more diverse diet than girls.

The MAD, as presented below in Figure 3.12, is a composite indicator, which includes both dietary diversity as well as meal frequency among children 6-23 months.

Figure 3.12. Prevalence of Children Aged 6-23 Months Old Meeting Minimum Acceptable Diet, by gender and by sub-Township.



The minimum acceptable diet (MAD) is used to assess the proportion of children aged 6-23 months who meet the minimum standards with respect to IYCF practices. In Thandaunggyi Township, only 23% of all children 6-23 months have a Minimum Acceptable Diet. The MAD shows a similar pattern as the MDD with lowest rates in Baw Ga Li (21%) and Leik Tho (20%) as compared to Thandaunggyi sub-township where 30% of children meet the MAD.

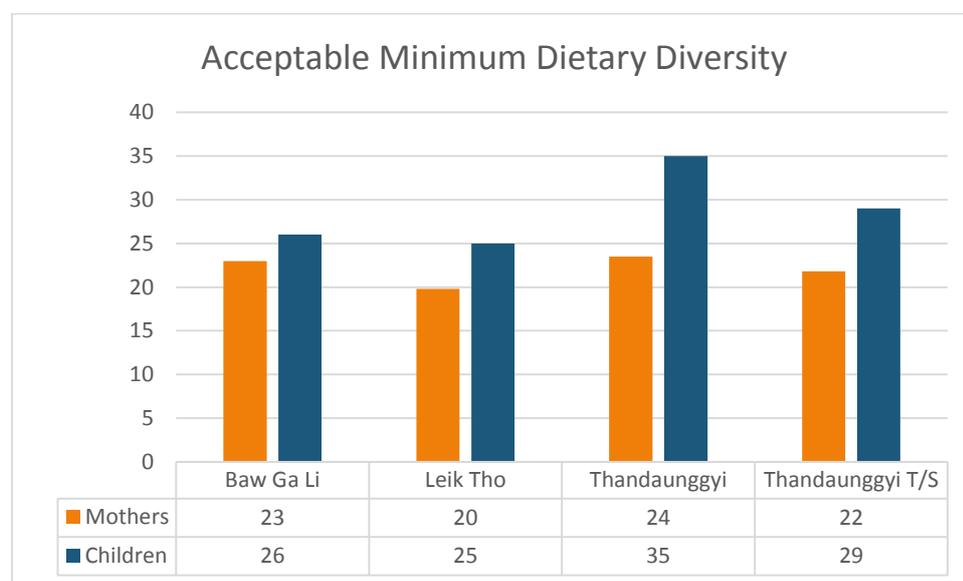
The gender-biased nutrition practices are more pronounced in the MAD with only 13% of girls in Leiktho reaching the MAD as compared to 28% of the boys. This shows that boys not only receive a more diverse diet but also are fed more often. In Thandaunggyi, more girls (35%) than boys (24%) have an MAD. These potential gender-biased practices should be further looked into. In general, however, it can be concluded that dietary diversity and quality of complementary foods is not good for a majority of children, whether they are boys or girls.

Linkage Minimum dietary diversity (MDD) of mothers and their children 6-23 months

A study by USAID (2012) asserted a strong link between maternal nutrition and their dependent infants and young children. It was found that the percentage of children eating each food group was strongly related to whether their mothers also ate the food group. Also, as the mothers' diversity increased, the percentage of breastfed children meeting the MDD criterion increased in line; such that between 50 percent and 80 percent of children met the criterion if maternal dietary diversity reached 5 or greater. This NCA study hence tried to determine whether this relationship holds true in the Thandaunggyi township context as well by comparing the MDD indicators for the mothers and their under five children.

Figure 3.13 below shows that the percentage of children (6-23 months) with an acceptable MDD (29%) is higher when compared to the percentage of their mothers with an acceptable MDD (22%). In Baw Ga Li and Leik Tho however, the difference between children and their mothers is not that big.

Figure 3.13. Prevalence of Children Aged 6-23 Months Old Meeting Minimum Dietary Diversity, by sub-Township.

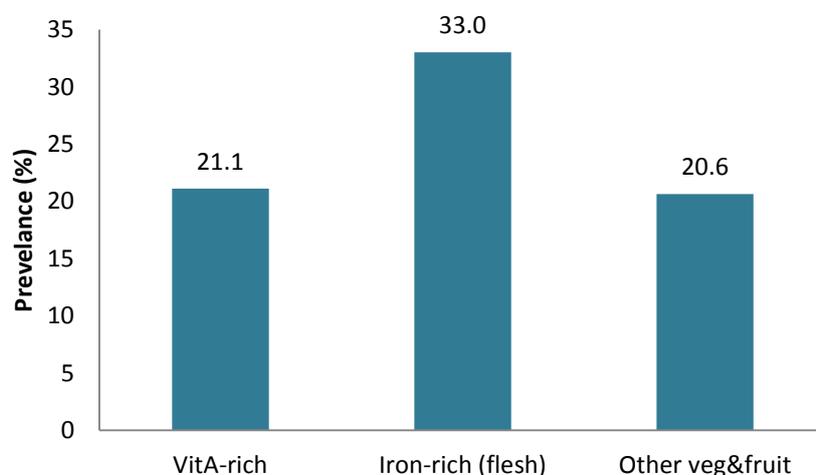


Furthermore, the food groups most common among the mothers are also most commonly eaten by their children. Similarly, in both the MDD for women and for children, the inclusion of eggs, legumes & nuts and dairy products in their diet are amongst the lowest. As per FGDs, having poultry is less common in general and in addition, people mentioned they prefer to have their chicken for meat, not for their eggs. So to consume eggs and milk, mothers need to buy from the market and considering the low economic status of the studied sample, it explains why these food are not consumed. As for the low consumption of pulses and legumes, data on home garden reveals that except for long bean, no other pulses are grown. Nuts are not grown much locally and mothers confirmed they have to buy groundnuts, sun flower seeds and cashew nuts. Mothers confirmed that if they had more cash, they would buy more meat, fish, eggs, and nuts.

Consumption of vitamin A and iron-rich food

Along with dietary diversity survey on children age 6-23 months, consumption of vitamin A, iron-rich food and other vegetables/fruits was examined for the same age group. Flesh foods (meat, fish, poultry and liver/organ meats) were regarded as iron-rich foods, which was consumed by 33.0% of the children the day before the interview survey. Vitamin-A rich fruits and vegetables were consumed by 21.1% of children and other fruits and vegetables are consumed by 20.6% of them.

Figure 3.14. Micronutrient Consumption of Children (Age 6-23 Months).



The analysis above has shown that mothers, infants and young children do not have significantly diverse diets in order to maximize nutrient intake. This is particularly worrying since pregnant or lactating women as well as infants and young children have higher nutrient needs. Furthermore, the first 1,000 days of a child's life (from conception to their second birthday) are a critical period because of the rapid growth process and brain development. These results confirm that dietary diversity and lack of proper complementary feeding practices are among the main reasons for the high malnutrition prevalence. In addition, the results show that both poor and rich households are affected, which means that programs need to include all households. Another important point is that many children in Thandaunggyi already start off being under-nourished; therefore, it is important to improve dietary habits of pregnant and lactating mothers, as well as improve breastfeeding practices.

Micro-nutrient deficiencies

The prevalence of micro-nutrient deficiencies could not be assessed due to the highly technical and expensive assessments that are needed. UNICEF has planned to a micro-nutrient deficiency survey in Myanmar to provide an update of this form of malnutrition. Iron-deficiency anemia, vitamin A deficiency, vitamin B1 deficiency and iodine deficiency have been identified in Myanmar in previous assessments.

The preliminary results of the DHS 2015-2016 revealed that 57.4% of children aged 6-59 months had anemia. This was even higher among children 6-23 months, of whom around three out of four had anemia. Among women of reproductive age, nearly half (46.6%) were found to have anemia as well. Anemia in children and women was found equally high in all wealth quintiles.

Iron is a key component of hemoglobin, and iron deficiency is estimated to be responsible for half of all anemia globally. Other causes of anemia include hookworm and other helminths, other nutritional deficiencies, chronic infections, and genetic conditions. Anemia is of concern for children because it can impair cognitive development, stunt growth, and increase morbidity from infectious diseases.

Iron helps the body to transport and store oxygen, improve immunity, it is required for growth, energy production, drug metabolism and proper mental functioning. Iron-deficiency signs include anemia, reduced physical and mental performance, fatigue, poor circulation, depression, decreased resistance to infection and illness.

Iron needs of women of reproductive age (12-16 mg/day) are almost double than of men (7 mg/day). The highest needs are among pregnant women (22-36 mg/day). Lactating mothers do not have additional iron for lactation as only small amounts are passed through breast milk.

Infants below 6 months use the iron from their birth stores which are expected to last for around 6 months. Infants above 6 months are required to consume sufficient iron through complementary feeding (with breast-milk only providing a small amount of the needs).

Iron-folic acid supplements are recommended for pregnant women to ensure their high iron-needs are met. Iron supplements are not recommended for children as an overdose of iron can be lethal.

Although the individual micro-nutrient deficiencies were not assessed in this survey, the results of the MDD among women and children suggests that a majority did not consume adequate micro-nutrients. Furthermore, not all salt in the area is iodized. (More on vitamin A is included in chapter 3.6 on health service utilization which includes information on vitamin A supplementation.)

Nutrition Knowledge

Table 3.9 below presents the percentage of mothers who have received IYCF counseling in their village in the past half year.

Table 3.9: Counselling on IYCF Practices by Sub-township

Did you receive any counselling on IYCF in your village in the past 6 months?

| | Yes | No |
|---------------------|--------------|--------------|
| Ba Gaw Li | 16.0% | 83.9% |
| Leik Tho | 10.5% | 89.5% |
| Thandaunggyi | 24.2% | 75.7% |
| Total | 16.5% | 83.5% |

A majority of mothers with children under five years of age did not receive any IYCF counseling in the past six months. Comparing the three sub-townships, Thandaunggyi sub-township is doing slightly better with one out of four mothers having received IYCF counseling. Such low coverage of IYCF counseling is expected to result in limited understanding of proper infant and young child feeding practices.

Some mothers are able to explain the importance of breastfeeding, although they mention that they do not receive information on breastfeeding from health care providers. Many mothers are giving other drinks/foods to their infants besides breast milk; e.g. infant formula, other milk, honey, plain water. It is worrying, however, that as many as 60% of mothers who had their delivery with doctor, nurse, midwife, TBA, CHW gave other drinks/foods compared to 39% of mothers who delivered with family members/relatives/friends. This could suggest that awareness about the importance of exclusive breastfeeding is not optimal among local health workers. Or, that families who can afford to see a health worker for delivery are better off and therefore also can afford additional foods thinking this is better for the child.

In all five villages selected for Focus Group Discussions, the majority of the participants had a fairly good idea of what is good and bad for infants and young children. Mothers showed understanding of the importance of diversifying diets and of the three food groups. However, some mothers did not know which types of food groups were important and what were their dietary utility. Besides the general idea to diversify diets, there was little evidence of understanding the high nutrient needs for PLW and infants/young children or of maternal diets and complementary feeding practices.

Another important observation was that even those participants who possessed the right knowledge, did not always put it into practice as they said that they did not have the financial means to buy different types of food for themselves and their children.

Table.3.10: General knowledge on infant nutrition and breastfeeding

| Category | Leik Tho | Thandaunggyi | Baw Ga Li |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nutrition | <i>'I never feed the child if he or she is ill or sick. I do not feed rice, and also fluid because it can harm the children and become more ill'</i> | <i>'Under-nutrition makes the victim less immune and causes diseases and vice versa. So, if we are getting ill, we should eat more food and so we will have good immune'</i> | <i>'Lack of proper nutrients in the food causes illness among children'</i> |
| Breastfeeding as the feeding choice | <i>'I accept that breast milk is the best for my child'</i> | <i>"We breastfeed the child within half hour or one hour after delivery of the child"</i> | <i>'I prefer to breastfeed because the milk provides all the necessary nutrients to the baby' "During pregnancy and breastfeeding, mothers are constantly being advised by the elders to consume or avoid food."</i> |
| Introduction of and Implementing Breastfeeding | <i>'We follow our traditional methods as we didn't get any information about breastfeeding from health care providers' "We face difficulties in breastfeeding. For lactating women who are not experienced, she feels pain and it disappears gradually. It happens only in the first child." "We solve the problems ourselves during breastfeeding to our child"</i> | <i>"Colostrum is yellow white thick fluid produced immediately after delivery" "We didn't know the proper methods of breastfeeding"</i> | <i>'No one influenced on breastfeeding so I adopted traditional custom of feeding baby when he cries' "Young mothers rarely follow advise of elders because they are reluctant to do fasting or avoid from things they love to eat" One thing they all experienced through breastfeeding is that they should alternately let their children suck because if they allow only one side, other breast would continue to enlarge"</i> |
| Work Overload | <i>'We can only breastfeed at night when we are at home. So the children didn't get enough breast milk'</i> | <i>"In the period of over workload, we left our children with relatives or took the child to the field to breastfeed or sometimes come back home to breastfeed"</i> | <i>'When we go cultivate peanut out of the village, our husband take care of our children'</i> |

3.5 CULTURAL BELIEFS AND TABOOS

In Thandaunggyi Township, there are a number of cultural beliefs and taboos which lead to misinformed practices and misconceptions that unintentionally contribute to under-nutrition of children.

- Many mothers did not know the importance of colostrum and therefore would throw it away.
- Many mothers wrongly believed that feeding babies less than 6 months solid food was a good practice to make them accustomed to a better diet. A study conducted with Karen women in a refugee camp revealed that the neonates of the Karen people are usually given a few grains of rice before introducing breast milk. This tradition is practiced to introduce infants to foods which they will receive after breast milk¹⁵.
- There is a misconception among mothers that feeding a child when she/he is ill could make them more ill, but in fact by doing so they do not realize that they are harming the child further.
- Misconceptions about some nutritional foods that were deemed harmful to the child; mothers mentioned for example that they don't give beans or papaya to children. They also had misconceptions about types of food where all starch and fats were deemed unsuitable for children.
- Some literature reviews of Karen people did reveal that the Karen people believe that those who have hepatitis should avoid yellow foods and papaya as it is thought to trigger malaria. The yellow discoloration of the skin in hepatitis is thought to be aggravated by yellow foods¹⁶.
- Some have the idea that if a child or lactating mother eats too much they would be poisoned.
- Some cultural practices like avoiding all kinds of food and drinking boiled water for a month after delivery are particularly worrying.
- There is strong preference for sweet food during pregnancy and avoiding sour food (dog fruits, bamboo shoot, roselle) and bitter food as well. This coincides with the finding that sour and bitter fruits and vegetables are not among the popular crops grown in the home gardens. Pumpkin, cabbage and cucumber are preferred choices as noted in the FGDs.
- FGD findings also reiterated evidence in earlier sections revealing that consumption of eggs, dairy and pulses are amongst the lowest in the township and are items not consumed by pregnant mothers.
- The FGDs also revealed that pregnant and lactating women chew betel leaf and betel nut which are not the most recommended behavior for pregnant or lactating women by medical personnel.
- Taboos on the use of latrines in one of the Leik Tho villages resulted in widespread practice of open defecation and related sanitation problems. The FGD participants in

¹⁵ https://www.health.qld.gov.au/multicultural/support_tools/14MCSR-pregnancy.pdf

¹⁶ <https://ethnomed.org/culture/karen/karen-cultural-profile>

this village (Ka Saw Pa Lo) even perceived this taboo worthy of a '2' in their risk factor rating.

- In the Karen culture, there is some opposition to birth control as children are considered as a gift from God and therefore use and knowledge of birth control is limited¹⁷. Just over a quarter of households (26%) has five or more children; out of these households, 75% has one or more stunted children.
- Furthermore, some mothers believe that oral contraceptive pills cause reduced milk production.

Table 3.11 below (next page) includes some of the statements mothers shared during the Focus Group Discussions.

Adequacy of dietary and feeding practices –both for mothers and for children – clearly depends on the care-givers knowledge and attitude which are often linked to cultural beliefs and taboos. Improved understanding on nutrition needs in general, and in particular of pregnant or lactating women, infants and young children will change the care-givers decisions and practices.

Besides knowledge, however, feeding practices also depend on the availability of a variety of (appropriate) foods in the households. This depends on the households' financial resources to grow or buy nutritious food, choices and ability to diversify own production, availability in the local market and availability from natural resources. Availability of nutritious foods might change throughout the year, depending on the different seasons.

Furthermore, under-nutrition can also be caused by inadequate caring practices, particularly if mothers have limited time or have a poor mental state. Other factors contributing to under-nutrition could be contamination of foods (food safety issues), unclean drinking water, and limited access to health care or repeated child diseases which all results in reduced utilization of the consumed foods.

¹⁷ <https://ethnomed.org/culture/karen/karen-cultural-profile>

Table 3.11 Community practices in pregnancy, lactation and child feeding

| Category | Baw Ga Li Sub-township | Leik Tho Sub-township | Thandaunggyi Sub-township |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pregnancy | <p>"I prefer sweet and sour food"</p> <p>"After delivery we eat only dry and salty fish for a whole month while avoiding vegetables, coffee or tea"</p> <p>"In pregnancy and child birth we should avoid roselle, beef, mushroom and pork and should have more vegetables including pumpkin, cabbage and cucumber"</p> <p>"We don't like to eat eggs that much as costly"</p> <p>Most of them chew betel leaves and betel nuts from time to time during the day</p> <p>"We eat some kind of meat at least once a week"</p> | <p>"In pregnancy I need to eat more meat, more vegetables and crops"</p> <p>"I ate sweet food more and avoid sour, salty and bitter food when I was pregnant"</p> <p>"I could eat one kilo of Myanmar sweet candies (Htan-Nyat-Kae)"</p> <p>"Need to avoid too spicy food, and too sour food, need to take multivitamins tablet during pregnancy"</p> | <p>"We should avoid sour food like Dog fruits (Ngapi nut) Bamboo shot and should eat fruits, vegetables, meat ,fish and bean "</p> <p>"Pregnant women usually have one extra meal than before (total times of having meal – 4 to 5 times) and can eat one or two big bowl of Mont Hinn Garr (Traditional food) and avoid dog fruit"</p> |
| Lactation | <p>After child birth some avoid all form of sweet substances, including sugar, preferring to drink only plain boiled water</p> | <p>"All mothers avoid fruits during breastfeeding period"</p> <p>"I think there is no association between food I eat and breastmilk production"</p> <p>"We eat rice, some meat and green vegetables"</p> | <p>Some young and less experienced mothers breastfeed between one day and 1 week after delivery of the baby because milk production is less. For that time, they usually feed honey to their children</p> <p>"Less milk production is related with using the Oral contraceptive pill or injection"</p> |
| Feeding Children | <p>"Children should avoid spicy or hard food"</p> <p>"Sick children should eat whatever strengthen them and avoid anything that will upset their stomach, what is good for children includes chicken soup, milk, eggs and avoid chilly hot spices, nuts and pickles"</p> | <p>"Children eat more porridge, banana as that is only product I got from my home garden"</p> <p>"As for me I never feed the child if he or she is ill or sick. I do not feed rice, and also fluid because it can harm the children and become more ill"</p> | <p>"Foods that children should not eat are spicy, sour, and salty foods"</p> |

3.6 HEALTH INFRASTRUCTURE & SERVICE UTILIZATION

Important components of maternal and child health services are antenatal care visits (ANC), safe deliveries with skilled health staff present, postnatal care, immunization for infants and children, and supplementation programs for both mothers and children.

Antenatal Care (ANC)

Just over half of all mothers (52.1%) confirmed that they went for antenatal care visits when pregnant. That means that nearly half (47.9%) didn't have any antenatal care.

However, as Figure 3.15 below shows, only 14.6% of all mothers attended the recommended four or more ANC's. This is substantially lower than the national average of 59% of pregnant women and even Kayin state level average of 53% of women attending four or more ANC's when pregnant (DHS 2015-2016).

Figure 3.15 Percentage of women with number of ANC visits

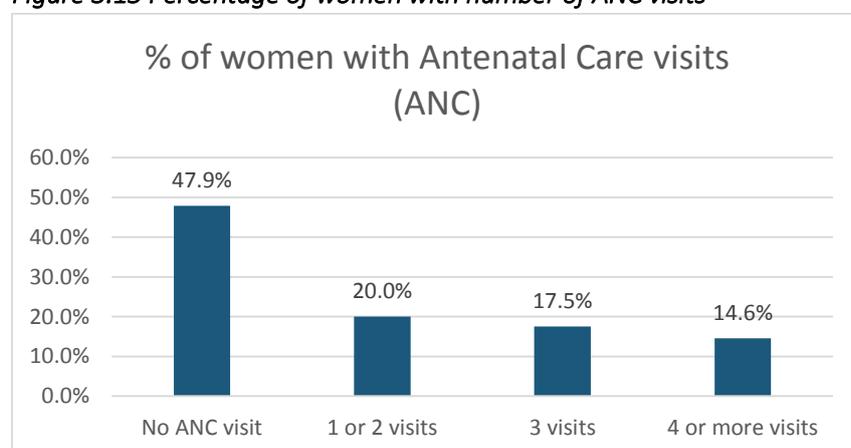
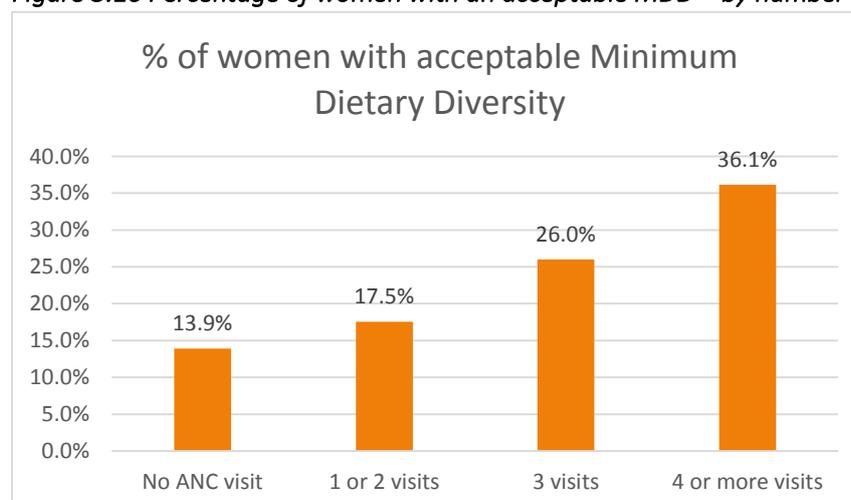


Figure 3.16 below presents the % of women who reached an acceptable Minimum Dietary Diversity, comparing them by number of ANC visit they had taken.

Figure 3.16 Percentage of women with an acceptable MDD – by number of ANC visits



The more antenatal care visits a mother attended, the higher the proportion of mothers achieving the MDD. Only 13.9% of women who did not have any antenatal care reached an acceptable Minimum Dietary Diversity (an MDD of 4 or higher), compared to 36.1% of women who had the recommended number of at least four ANC's.

The reason for this substantial difference could be that women who have the financial means and possibility to free time to attend four ANC's, might also have the financial means to improve their dietary diversity. Furthermore, we can expect that mothers who consider ANC's to be important, will also 'invest' in proper health and nutrition (including dietary diversity for themselves and their children. Finally, it could also be that nutrition sessions during ANC's contributed to improved dietary practices, such as diversifying diets.

It should be noted however, that among women with four or more ANC's, still 64% did not achieve an acceptable MDD.

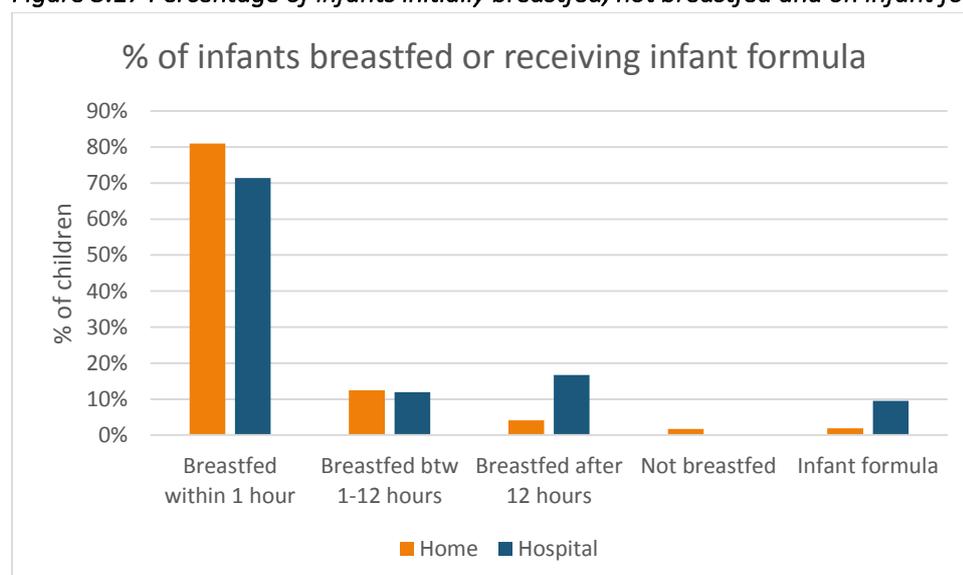
Delivery with skilled health staff

As many as 92% of all mothers had health staff assisting during their last delivery. These mostly included a Traditional Birth Attendant, doctor, nurse, and/or midwife. Some 8% of women did not have any health staff assisting during delivery.

Some 90% of mothers delivered at home, while 7.4% delivered at a government hospital. (The remaining 2.6% mentioned 'others' but did not clearly specify where.) This finding is in line with the cultural belief that Karen women prefer home births with the use of traditional midwives over delivering in the hospital¹⁸. Delivery at a health facility is substantially lower in Thaundaunggyi compared to national average (37%) or state level (29%) – DHS survey.

Graph 3.17 below compares breastfeeding initiation after delivery and infant formula use, comparing home delivery with hospital delivery.

Figure 3.17 Percentage of infants initially breastfed, not breastfed and on infant formula



¹⁸ https://www.health.qld.gov.au/multicultural/support_tools/14MCSR-pregnancy.pdf

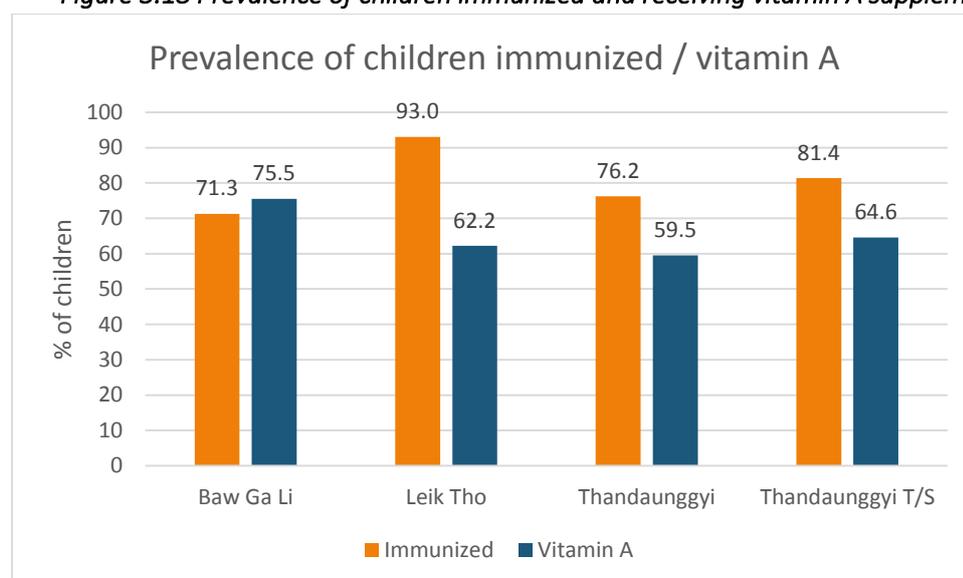
The above graph shows that infants born at home were more likely to be breastfed within one hour after birth (80.9%) compared to those born in a hospital (71.4%). Some 16.7% of infants delivered at the hospital only received breast-milk after 12 hours. Use of infant formula is low in general, however among hospital delivered babies, 9.5% received infant formula compared to 1.9% of home delivered babies.

Child Immunization and vitamin A supplementation

The vaccination program for children from the Ministry of Health includes the following basic vaccinations: BCG, measles, DPT-Hepatitis B-HiB and polio. Vitamin A supplementation programs targeted at children aged 6-59 months improve immune function and thereby reduce mortality risks associated with measles, diarrhea and other illnesses.

Caregivers were asked if they had vaccinated their child and if they had received vitamin A supplements for their child. The results are presented in Figure 3.18 below.

Figure 3.18 Prevalence of children immunized and receiving vitamin A supplements



There is a difference between the sub-townships with as many as 93% of children in Leik Tho to only 71.3% of children in Baw Ga Li having been immunized.

These results seem quite good with 81.4% of all children having received immunization. However, what is not known is how many children completed the recommended immunization package.

The DHS results show that in Kayin State, only 6.9% did not receive any vaccinations, however that only 65.0% of children received the complete package of basic vaccinations.

Compared to immunization coverage, the vitamin A supplementation coverage seems to be lower as only 64.6% of children under 5 received it. Similar to the immunization program, it is not known if the child received their vitamin A supplementation at recommended times.

The main purpose within the NCA however is to assess access to health services, rather than assessing completion of vaccine or vitamin A programs. From that point of view, these results are encouraging as a majority of children did have access to these basic health services. This is in line with the results of the village mapping exercise which found that out of 35 (at that time selected) core villages, 22 villages always had a health worker present in the village, 4 villages sometimes had a health worker visiting and 9 villages didn't have a health worker visiting at all. These health workers were mostly community health workers and only a few were auxiliary midwives.

It is outside the scope of this NCA to assess vitamin A deficiency within the target area. UNICEF has planned a nation-wide micro-nutrient deficiency (MND) survey in Myanmar which will give updated information on MNDs.

Vitamin A deficiency is commonly associated with night blindness which is the clinical sign of advanced lack of vitamin A. However, the prevalence of these clinical signs typically occur to a small proportion (2% or less), while a much larger group shows inadequate vitamin A levels when we measure the serum retinol level. In Myanmar, studies have shown that 38% of children 6-59 months had low serum retinol (Htin Lin et al, 2014). Inadequate vitamin A (even without the clinical signs) is associated with high rates of under-five mortality, diarrhea, measles and acute respiratory infections (ARI). Global evidence suggests that while the widespread use of vitamin A supplements has reduced the prevalence of night blindness, the prevalence of low serum retinol has not been affected. High dose vitamin A supplements improve the Vitamin A status for only up to three months in children who have low dietary intake. Therefore, additional interventions such as (bio-fortification, improving dietary diversity, nutrition education, and prevention and control of infectious disease are needed.

Health service utilization

Close to one out of three children had diarrhea in the two weeks preceding the survey. Caregivers of those children would mostly seek help with family and friends (39%) or would take care of the sick child themselves (25%). Some 36% of caregivers of children with diarrhea would seek help from a health worker.

The Key Informant Interview (KII) with a nurse at the Taungoo hospital which operates at the township level revealed that families make less use of the healthcare services available at the sub-township level for various reasons. The main cause being the opportunity cost in terms of distance to the hospital and the limited time that mothers have due to overload of work responsibilities which their livelihoods depend on. While there were demand-side problems in terms of lack of service utilization, the supply-side was no less problematic. According to the nurse, these compounded elements contribute to two key issues which she believed explained under-nutrition in the villages: 1. Lack of knowledge on what is nutritious, and 2. Double burden on mothers as caregivers and contributing to livelihoods. The second reason is an important one explaining malpractices in Infant and Young Child Feeding practices. The statements of the nurse also corresponded to some of the findings from the FGDs as presented in Table 3.12 below.

Table.3.12: Local Mentality to Healthcare Services

| <i>Category</i> | <i>Leik Tho</i> | <i>Thandaunggyi</i> | <i>Baw Ga Li</i> |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <i>Health Seeking Behaviour</i> | <i>'Our child was treated with traditional medicine if the symptoms are not bad' 'We know we must see health care providers if our child is getting sick, but can't give enough time to him/her for taking treatment'</i> | <i>"We can't often send our children to the health center to immunize because the travel is too far away from the village"</i> | <i>"We only seek midwife for the children when they are seriously ill"</i> |
| <i>Service Utilisation</i> | <i>'We go to local health care worker which is trained by the Christian Organization to avoid going to centres'</i> | <i>"We know how to monitor the growth and development of the children because we all used to go and see the health care providers for weighing of our children."</i> | <i>"Must be seriously ill before we decide to go to the health centre"</i> |

Health seeking behaviour is not as positive as we would hope but the main reason seems to be accessibility rather than lack of willingness. It must be noted that there are stark variations between villages within the same sub-township. For instance, in Late Pyar Kalay village in Thandaunggyi sub-township access to healthcare was less of an issue as confirmed by the community. Eventhough the hospital is 3 hours on foot, there is greater presence of non-government organizations who set up community health workers. Another village, La Mae Gyi, does not have any (health) organization supporting their village and the hospital is even further away with a 6 hour long trip on foot.

In Baw Ga Li, there was trust in the healthcare services but still, due to inaccessibility, the households relied mostly on home remedies and local midwives if children were seriously sick as it was at least an hour bike ride to the health centre. The visits would cost up to 1,500 Kyats which is a significant amount for them.

In Leik Tho, distance to public healthcare infrastructures was also mentioned by households as main reason not to use the services, even though sometimes poor families are not charged for their visits. This goes to show how significant road access is in determining the demand for healthcare services for these rural households. The community in Ka Saw Pa Lo village in Leik Tho rated 'poor health services' as an important risk factor for under-nutrition.

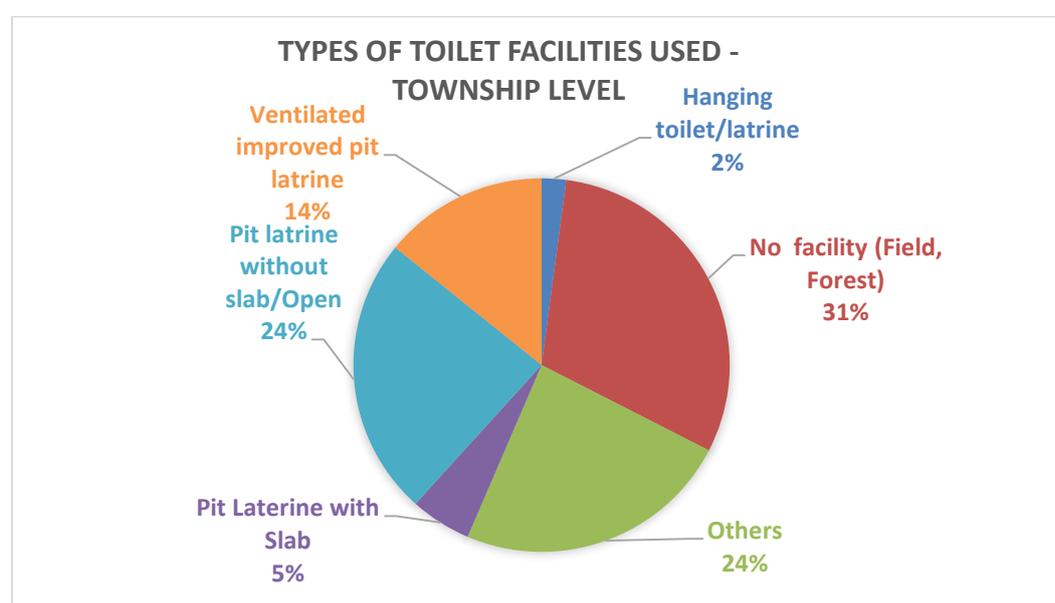
3.7 WATER, SANITATION AND HYGIENE

Latrine use

As the results above confirm that sanitary latrines, protected drinking water sources and sanitary practices reduce risk to diarrhea, it is interesting to look at how many households use or practice these.

Figure 3.19 below shows that as many as 31% of all households do not have any latrine and practice open defecation. Furthermore, only 21% have sanitary latrine with 2% hanging toilets, 14% VIPs and 5% pit latrines with slab. Under 'Others', potentially another 13% has sanitary latrines, which would bring the total of households using sanitary latrines to 34%.

Figure.3.19: Types of Latrine Facilities Usage at the Township Level



Unfortunately, nearly half of all these sanitary latrines (48.6%) were rated as not clean. That would bring the total number of households with a sanitary and clean latrine back to 16.5%.

With regards to toilet facilities, some difference per sub-township were observed as presented in Table 3.13 below. Thandaunggyi sub-township had the highest proportion of households with no facility at all.

Table 3.13. Types of Toilet Facilities – per sub-Township.

| Toilet facilities | n = 381 | Total | Leiktho | Thandaunggyi | Bawgali |
|---------------------------------|---------|-------|---------|--------------|---------|
| Hanging toilet/latrine | 8 | 2.1% | 1.2% | 4.6% | 0% |
| No facility (Field, Forest) | 116 | 30.5% | 22.2% | 43.9% | 25.3% |
| Others(Specify) | 91 | 23.9% | 19.8% | 12.1% | 49.4% |
| Pit Latrine with slab | 20 | 5.3% | 11.7% | 0.8% | 0.0% |
| Pit latrine without slab/Open | 92 | 24.2% | 30.9% | 25.0% | 10.3% |
| Ventilated improved pit latrine | 54 | 14.2% | 14.2% | 13.6% | 14.9% |

Drinking water: water source, water treatment and storage

With regards to drinking water in the rainy season, 37.4% of households use communal water points (taps/pipes), 28.3% use stream/water falls, 23.6% use unprotected springs and 17.2% use rain water storage. The most common source of the widely used communal water points are stream/water falls, followed by rainwater, fenced ponds or protected springs.

In the dry season, 42.9% of households use a fenced pond, protected spring (22.9%) or communal water points (20.9%). Similar to the rainy season, the communal water points mostly come from streams/water falls, and to a lesser extent from fenced ponds or unprotected springs.

Many households were found to use both protected and unprotected drinking water sources. In the rainy season, a minority of 16.5% of households used only protected water sources, while in the dry season this was further reduced to only 10.8%. This high number of people using unprotected drinking water sources might be the reason why 97.4 percent of the households affirmed that they boil it before use. Women mentioned that they collect the water in the morning and in a big pot boil the collected water for drinking, which will then be used throughout the day. They mentioned that children do not always return home to drink the (boiled) water but rather drink water where they find it when playing outside.

The majority of the households store water in containers with covers. Plastic containers with cover was the most popular type of storage with 33.6 percent of the households opting for it. Only 32.7 percent of the households make use of containers without covers for storing water. When broken down by the sub-township level Baw Ga Li households lead in using containers with covers while Thandaunggyi has slightly higher percentages of households using storage containers without covers but the use of covered containers is still widespread in the sub-township.

Hand washing practices

Some 84.5% of all mothers confirm to wash their hands after cleaning the stool of their baby. However, only 51.4% of all mothers use water and soap/detergent when they wash their hands after cleaning the baby.

A majority of mothers (59.8%) says to wash hands with water and soap before eating. At other critical moments, only a limited number of mothers washes their hands with soap; 18.9% before feeding their child, 18.6% before preparing food, and 22.3% after working outside.

Diarrhea prevalence

The World Health Organization estimates that 50 percent of under-nutrition is associated with infections caused by unsafe water, inadequate sanitation or insufficient hygiene.¹⁹

Figure 3.20 below shows that the diarrhea prevalence among under-fives is very high at 29%. It is highest in Leik Tho with 35% of children having had diarrhea in the two weeks prior to the survey.

¹⁹ http://apps.who.int/iris/bitstream/10665/43840/1/9789241596435_eng.pdf

Figure 3.20 Diarrhea prevalence in children U5 – by sub-Township

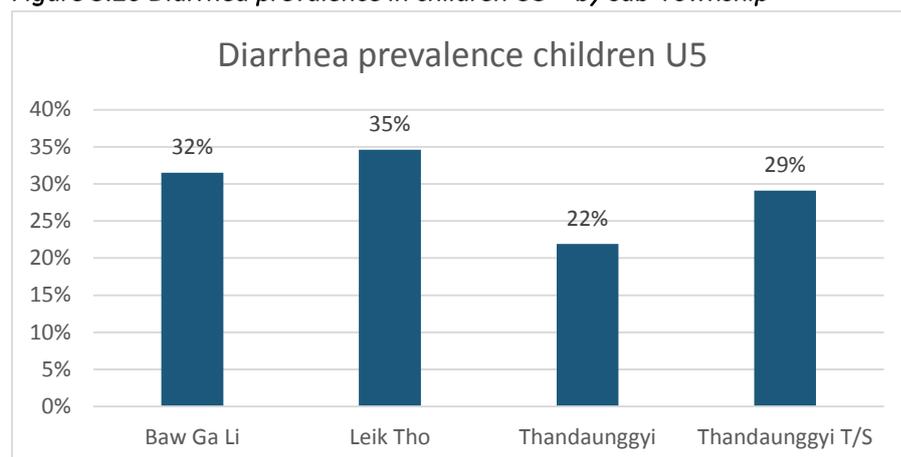
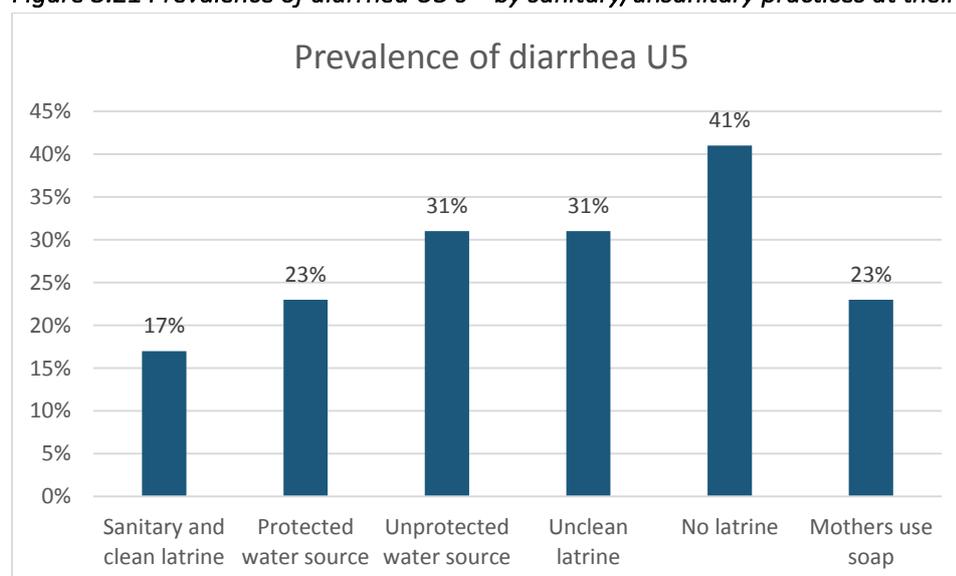


Figure 3.21 below shows prevalence of diarrhea of under-five children in households with sanitary latrine, protected or unprotected water course, unclean latrine, no latrine or with mothers who use soap when washing their hands.

Figure 3.21 Prevalence of diarrhea U5's – by sanitary/unsanitary practices at their household



The total percentage of children with diarrhea (Figure 3.20) is 29%. Figure 3.21 above shows that if households had a sanitary and clean latrine, only 17% of children had diarrhea. Households using a protected water source, also reduced diarrhea prevalence to 23% of the children. Similarly, if mothers used soap when washing their hands after cleaning the babies' bottom, diarrhea prevalence was also reduced to 23%.

Combining these sanitary practices even further reduced diarrhea rates; e.g. only 14% of children from households using a protected water source and mothers using soap had diarrhea.

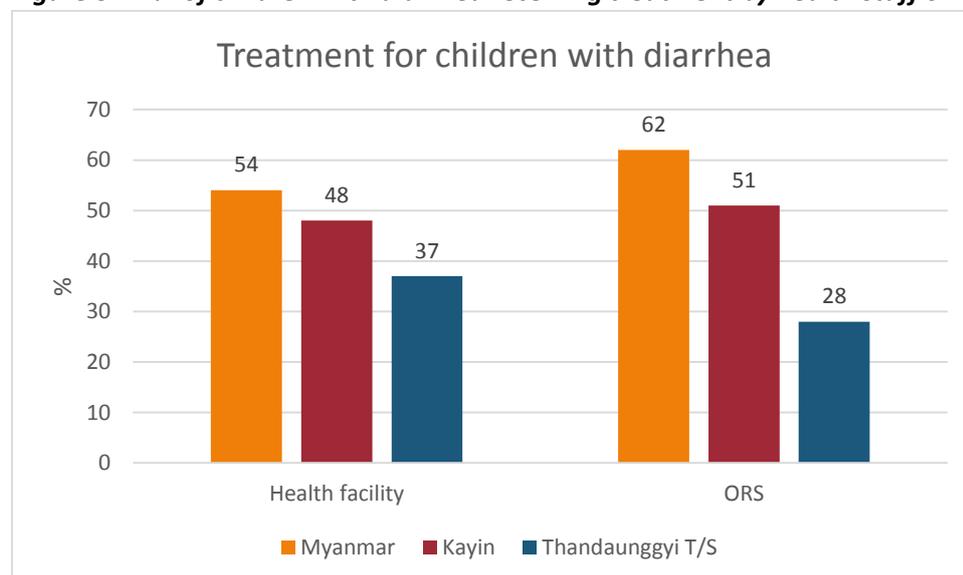
On the other hand, prevalence of diarrhea was slightly higher for children of households using an unprotected water source or using an unclean latrine: both at 31%. The highest prevalence was for children from households without any latrine; out of those children 41% had diarrhea.

Out of all children under five years of age with diarrhea, 59% was stunted, compared to 51% of all children under five years of age who did not have diarrhea. Furthermore, out of all stunted children, 32% had diarrhea as compared to 26% of children who were not stunted. In other words, children with diarrhea were more likely to be stunted and stunted children were more likely to have diarrhea. Other programs and surveys also have found that repeated episodes of diarrhea contribute to under-nutrition by hindering the absorption of nutrients. While children who are undernourished are at higher risk of suffering more frequent and severe episodes of diarrhea, creating a vicious cycle.

Diarrhea Treatment

Figure 3.22 below presents treatment for diarrhea among children under the age of 5, comparing national level average, with Kayin state level and Thandaunggyi.

Figure 3.22 % of children with diarrhea receiving treatment by health staff or receiving ORS



Some 37% of caregivers sought help from health workers when their child had diarrhea in the past two weeks, while 63% either cures the child themselves or asks family or friends for support. This is lower than the national or state level average as shows above. It should be noted that in Thandaunggyi, health workers were mostly community health workers or private health providers. None of the caregivers mentioned they had taken the child to a health facility.

ORS is one of the recommended treatments for diarrhea and is unfortunately only used by 28% of the caregivers in Thandaunggyi, which is substantially lower than other parts of Myanmar or even Kayin. The use of ORS was found to be equal among the three sub-townships (either 27 or 28% per sub-township).

Nearly half of caregivers (49%) gave medicine to the child –either with or without ORS- which include injections, pills, antibiotics, paracetamol, or vitamins. Nearly a third gave traditional medicines (29%) to their child. Another 7% says never to give treatment at all.

3.8 SEASONAL CALENDAR

The seasonal calendar was developed with the community members. It highlights the seasonality of home gardening (mostly in the rainy season from June to October), the high prevalence of diarrhea in 8 months each year, and high prevalence of dengue fever in the rainy season. Furthermore, the workload of women seems to be high in every month as they are involved in many different livelihood activities. It should be noted that women's responsibilities as caregivers and fetching water have not even been included.

| H=High M=Medium L=Low U=Unknown | Months of the Year (January to December) | | | | | | | | | | | |
|----------------------------------------|------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|
| | J | F | M | A | M | J | J | A | S | O | N | D |
| Utilisation of Water Sources | | | | | | | | | | | | |
| Protected Spring | L | L | L | L | L | L | L | L | L | L | L | L |
| River | L | L | M | M | M | L | L | L | L | L | L | L |
| Own Water Points | L | L | L | L | L | L | L | L | L | L | L | L |
| Communal Water Point | H | H | H | H | H | H | H | H | H | H | H | H |
| Unprotected Spring | H | H | L | L | L | H | H | H | H | H | H | H |
| Protected Dug Well | L | L | L | L | L | L | L | L | L | L | L | L |
| Rain Water Storage | M | M | L | L | L | M | M | M | M | M | M | M |
| Unprotected Dug Well | L | L | L | L | L | L | L | L | L | L | L | L |
| Stream/Waterfall | H | H | H | H | H | H | H | H | H | H | H | H |
| Unprotected Canal | L | L | H | H | H | L | L | L | L | L | L | L |
| Home gardening Harvests | | | | | | | | | | | | |
| Fruits | L | L | L | L | M | H | H | H | H | H | M | L |
| Vegetables | L | L | M | M | M | H | H | H | H | H | M | L |
| Paddy | L | L | L | L | L | H | H | H | H | H | L | L |
| Cardamom | L | L | L | L | L | H | H | H | H | H | L | L |
| Turmeric | L | L | H | H | H | L | L | L | L | L | L | L |
| Banana | L | L | L | L | L | H | H | H | H | H | L | L |
| Ground Nut | L | L | L | L | L | H | H | H | H | H | L | L |
| Betel Nut | L | L | L | L | L | H | H | H | H | H | L | L |
| Long Bean | L | L | L | L | L | H | H | H | H | H | L | L |
| Pumpkin | L | L | L | L | L | H | H | H | H | H | L | L |
| Prevalence of Diseases | | | | | | | | | | | | |
| Diarrhoea | M | L | L | H | H | H | H | H | H | H | L | H |
| Flu | L | L | L | L | L | L | L | L | L | L | H | H |
| Fever | L | L | L | L | M | M | M | M | M | M | L | H |
| Dengue | L | L | L | L | H | H | H | H | H | H | L | L |
| Gendered Workload | | | | | | | | | | | | |
| Harvesting/Selling Coffee/Betel Leaves | H | H | H | U | H | U | U | U | U | U | H | H |
| Harvesting/Planting/Selling Cardamom | U | U | U | U | U | H | H | H | H | H | U | U |
| Sell garden products | H | H | H | M | H | M | H | H | H | H | H | H |
| Selling/Harvesting Dog Fruits | U | U | U | U | U | U | H | H | U | U | U | U |
| Farming Labour | H | H | H | M | M | H | H | H | M | M | H | H |
| Paddy & Peanut Harvesting/Cultivation | H | U | U | U | H | U | H | H | U | U | U | U |
| Over Workload in Forest | H | U | U | U | H | U | H | H | U | U | H | U |

4 IDENTIFYING RISK FACTORS & PATHWAYS

Methodology of the participatory exercise to identify causal pathways

The objective of the 'identifying risk factors' step is to conduct a scientific and grey literature review and key informant interviews, prepare the field study and finally hold a technical expert²⁰ consultation at township level to review and agree hypothesized risk factors and pathways to be tested.

Following the literature reviews, the hypothesized nutritional causal pathway for under-nutrition was developed (Figure 4.1) below.

The hypothesized nutritional causal pathway –as presented in Figure 4.1 - was then shared with the technical experts to gain consensus on the pathway. As per the hypothesized pathway, the risk factor table was developed with lists of 24 different risk factors pertaining to under-nutrition and grouped into six thematic groups namely: Food Security, IYCF practices & maternal nutrition, health infrastructures and service utilization, water sanitation and hygiene, cultural, religious taboos affecting malnutrition and seasonal and local landscape situations.

The risk rating table was shared during the **initial technical expert consultation** (participatory workshop #1). The technical experts were requested to consider the 24 different risk factors and rated these on a scale of 1 to 5 – whereby five illustrated a major effect on under-nutrition while one illustrated minimal/no effect on under-nutrition.

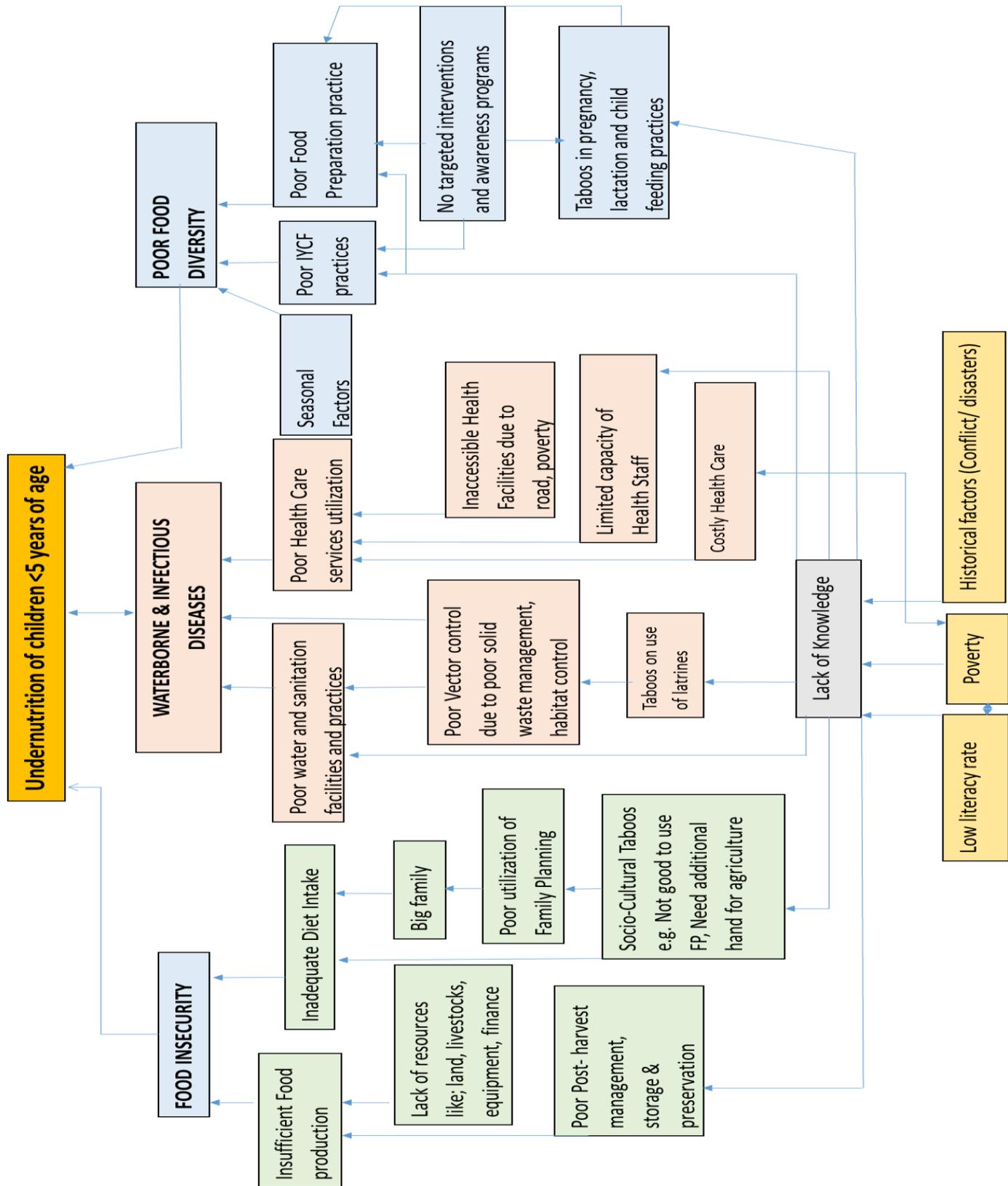
During the qualitative inquiry, **community participants** in the FGDs were asked to rate risk factors they perceived as contributing or exacerbating under-nutrition (participatory workshop #2). They were asked to score 1 to 5 akin to the way the experts at the workshop did for the preliminary ratings. However, the FGDs participants were not provided with the same pre-drafted list of risk factors as the experts. Instead they were asked to share what affects malnutrition in their households from their experiences. Once all the individual factors were shared the mean score for each factor were calculated and the top five were ranked accordingly with a score of '5' representing the major threat to nutrition perceived by the community. A score of '1', was considered still important since the given issue was raised during the discussions, but did not necessarily affect all of the households involved.

Using all of the above gathered evidence from qualitative and quantitative datasets, a **final consultation of experts** was held whereby they reviewed the findings from field investigations (workshop #3).

²⁰ Technical experts included focal points from the local implementing partners KMSS, KKBA, BMB, RK, consortium organization with experience and expertise in the areas of nutrition, health, food security, agriculture, water, sanitation and hygiene (WASH) sectors

Figure 4.1. Hypothesized causal Pathway for under nutrition

Nutrition Causal Analysis



Initial technical expert workshop

The outcome of the preliminary rating with the experts (workshop #1) is presented in Table 4.1. The technical experts included focal points from the local implementing partners KMSS, KKBA, BMB, RK, consortium partners with experience and expertise in the areas of nutrition, health, food security, agriculture, water, sanitation and hygiene.

The experts were asked to rate the risk factors on a scale from 1 to 5 with 1 being 'not a major cause of malnutrition in Thandaunggyi' to 5 being 'a major cause of malnutrition'.

The experts discussed which risk factors they thought to be the most important in the Thandaunggyi context. They thought that **lack of knowledge on IYCF** (Infant and Young Child Feeding practices) was the most important cause of malnutrition (rated 5).

Other important causes of malnutrition (all rated 4) included: big family, poor IYCF practices, poor food diversity, no targeted interventions and awareness programs, poor health care services, inaccessible health facilities due to poor roads, poor water and sanitation facilities and practices, poor vector control due to poor solid waste management and taboos in pregnancy, lactation and child feeding.

This shows that the experts were of the opinion that several nutrition, health, wash and cultural risk factors are all important causes of malnutrition in the north of Kayin.

Table 4.1: Risk factors and preliminary ratings from initial technical expert Key Factors

| RISK FACTORS FOR UNDER NUTRITION | Preliminary Median Rating from Initial Consultation | Preliminary Mean Rating from Initial Consultation |
|----------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------|
| A. FOOD SECURITY | | |
| i. Inadequate Diet Intake | 3 | 3.38 |
| ii. Insufficient Food Production | 3 | 3.23 |
| iii. Lack of resources: land, livestock, equipment, finance | 3 | 2.92 |
| iv. Poor post-harvest management, storage & preservation | 2 | 2.38 |
| v. Lack of knowledge on agriculture, home gardening | 3 | 3.46 |
| vi. Poor Food Diversity in Production | 3 | 3.4 |
| vii. Big Family | 4 | 3.54 |
| B. IYCF PRACTICES & MATERNAL NUTRITION | | |
| i. Poor IYCF Practices | 4 | 4.38 |
| ii. Poor food diversity in consumption (MDD-W) | 4 | 4.15 |
| iii. No targeted interventions and awareness programmes | 4 | 4 |
| iv. Lack of knowledge on IYCF | 5 | 4.54 |
| C. HEALTH INFRASTRUCTURE & SERVICE UTILISATION | | |
| i. Poor healthcare services | 4 | 3.77 |
| ii. Costly healthcare | 3 | 3.23 |
| iii. Inaccessible health facilities due to road poverty | 4 | 4.15 |
| iv. Limited capacity of health staff | 3 | 3.15 |
| D. WATER, SANITATION & HYGIENE | | |
| i. Waterborne and infectious Diseases | 3 | 3 |
| ii. Poor water and sanitation facilities and practices | 4 | 4.15 |
| iii. Poor Vector control due to poor solid waste management, habitat control | 4 | 3.62 |
| E. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION | | |
| i. Socio-Cultural Taboos e.g. Not good to use FP, Need additional hand for agriculture | 3 | 2.77 |
| ii. Poor utilization of family planning | 3 | 3.15 |
| iii. Taboos in pregnancy, lactation and child feeding practices | 4 | 4.08 |
| iv. Taboos on use of latrines | 3 | 3.38 |
| F. LOCAL LANDSCAPE/SITUATIONS | | |
| i. Seasonal Factors | 3 | 2.54 |
| ii. Historical factors(Disasters, Conflict) | 3 | 3.23 |

Focus Group Discussions in the community



During the qualitative inquiry participants in the FGDs were asked to rate risk factors they perceived as contributing or exacerbating under-nutrition with a score of 1 to 5 akin to the way the experts at the workshop did for the preliminary ratings.

In Table 4.2 these local perceptions are compared to the preliminary ratings from the expert. Some factors which were not as prominent in the preliminary risk factor rating among experts, were more pronounced in the local perceptions. This signals that lived experiences might differ in those particular areas compared to the general Kayin situation. However, there were also some instances where the disparity between the expert ratings and the community ratings diverged due to lack of knowledge and awareness within the communities about what is important for them in order to prevent under-nutrition. For example, 'Poor Food Diversity' was given little importance amongst community ratings, although the dietary diversity scores among women and children was very low. Also, it is universally accepted that good nutrition relies on quality diets and dietary diversity.

Community members thought that the following factors were most important causes of malnutrition: **Lack of resources such as land, livestock, equipment and finances** (rated 5) and **inaccessible health facilities due to road poverty** (rated 5 as well).

Other important causes of malnutrition according to community members (rated as 4) include: **no targeted interventions and awareness programs, poor health services, costly health care, poor water and sanitation facilities and practices and seasonal factors**.

Comparing the opinion of the community with the experts opinion, there is a clear division in the risk factors under food security; the experts consider big families to be a major cause, while the community rated lack of resources (land, livestock, equipment, finance) as the major cause of malnutrition and food insecurity.

Table.4.2: Risk Factor Ratings of Causes of Under-nutrition with combined Community Ratings²¹

| RISK FACTORS FOR UNDER NUTRITION | Preliminary Median Rating from Initial Consultation | Rating based on Median Community Perceptions from FGDs | Rating Based on Field Investigation findings |
|----------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|----------------------------------------------|
| A. FOOD SECURITY | | | |
| i. Inadequate Diet Intake | 3 | 3 | IMPORTANT |
| ii. Insufficient Food Production | 3 | 3 | IMPORTANT |
| iii. Lack of resources: land, livestock, equipment, finance | 3 | 5 | MAJOR |
| iv. Poor post-harvest management, storage & preservation | 2 | 3.5 | IMPORTANT |
| v. Lack of knowledge on agriculture, home gardening | 3 | 2.5 | IMPORTANT |
| vi. Poor Food Diversity in Production | 3 | 1 | IMPORTANT |
| vii. Big Family | 4 | 3.5 | IMPORTANT |
| B. IYCF PRACTICES & MATERNAL NUTRITION | | | |
| i. Poor IYCF Practices | 4 | 3 | MAJOR |
| ii. Poor food diversity in consumption (MDD-W) | 4 | 1 | MAJOR |
| iii. No targeted interventions and awareness programmes | 4 | 4 | MAJOR |
| iv. Lack of knowledge on IYCF | 5 | 2 | IMPORTANT |
| C. HEALTH INFRASTRUCTURE & SERVICE UTILISATION | | | |
| i. Poor healthcare services | 4 | 4 | MAJOR |
| ii. Costly healthcare | 3 | 4 | MAJOR |
| iii. Inaccessible health facilities due to road poverty | 4 | 5 | MAJOR |
| iv. Limited capacity of health staff | 3 | 0 | UNTESTED* |
| D. WATER, SANITATION & HYGIENE | | | |
| i. Waterborne and infectious Diseases | 3 | 2 | IMPORTANT |
| ii. Poor water and sanitation facilities and practices | 4 | 4 | MAJOR |
| iii. Poor Vector control due to poor solid waste management, habitat control | 4 | 3 | IMPORTANT |
| E. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION | | | |
| i. Socio-Cultural Taboos e.g. Not good to use FP, Need additional hand for agriculture | 3 | 2 | MINOR |
| ii. Poor utilization of family planning | 3 | 3 | IMPORTANT |
| iii. Taboos in pregnancy, lactation and child feeding practices | 4 | 2 | MINOR |
| iv. Taboos on use of latrines | 3 | 2 | MINOR |
| F. LOCAL LANDSCAPE/SITUATIONS | | | |
| i. Seasonal Factors | 3 | 4 | IMPORTANT |
| ii. Historical factors(Disasters, Conflict) | 3 | 2 | MINOR |

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²¹ The ratings from field investigations were formulated based on both quantitative and qualitative findings. Limited health capacity of health staff remained untested as the study pertained to demand side issues more than supply side ones which is beyond the scope of possible future interventions by the consortium of NSAs.

The study demonstrated a number of key factors that contribute to acute under-nutrition; some of which did not always correspond to the preliminary rating from the initial experts' consultation. Whilst we have discussed the main risk factors, a prominent risk factor from qualitative field investigations was income poverty and more importantly women work overload. Both of these risk factors were not included in the risk factor list which was discussed with the experts and community, but should be included in the causal pathway.

After the experts and community consultations, ratings from field investigations were formulated, based on both the quantitative (household survey) and qualitative findings.

Using all of the above gathered evidence from qualitative and quantitative datasets a final consultation of experts was held whereby they reviewed the findings from field investigations and revised their own preliminary risk factor ratings based on the criteria presented in Table 4.3.

Table 4.3: Risk Factor Categories, definitions and criteria

| Rating | Meaning | Criteria |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Major risk factor | The risk factor is interpreted as a major contributor to under-nutrition prevalence | Prevalence of risk factor is classified as [+++] AND strength of association from literature review is classified as [++] or [+++] AND majority of [++] or [+++] for all other sources of information |
| Important risk factor | The risk factor is interpreted as an important contributor to under-nutrition prevalence | Prevalence of risk factor is classified as [++] AND strength of association from literature review is classified as [++] or [+++] AND majority of [++] or [+++] for all other sources of information |
| Minor risk factor | The risk factor is interpreted as a limited or sporadic contributor to under-nutrition prevalence | Prevalence of risk factor is classified as [+] or [++] AND strength of association from literature review is classified as [+] or [++] AND majority of [+] for all other sources of information |
| Rejected risk factor | When there is consensus on rejecting the risk factor because it is interpreted as irrelevant to the context or as a marginal contributor to under-nutrition prevalence. | Prevalence of risk factor is classified as [-] AND Majority of [-] or [+] for all sources of information |
| Untested risk factor | When there is consensus that there is not enough information to rate the risk factor | Information gathered not complete or not available |

Table 4.4: Summary of Major Risk Factors to Causes of Acute Under-nutrition

| RISK FACTORS FOR UNDER NUTRITION | Preliminary Median Rating from Initial Consultation | Rating based on Median Community Perceptions from FGDs | Rating Based on Field Investigation findings | Rating change based on Deliberation in Final Consultation |
|----------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------|
| A. FOOD SECURITY | | | | |
| i. Inadequate Diet Intake | 3 | 3 | IMPORTANT | 3.3 (IMPORTANT) |
| ii. Insufficient Food Production | 3 | 3 | IMPORTANT | 3.0 (IMPORTANT) |
| iii. Lack of resources: land, livestock, equipment, finance | 3 | 5 | MAJOR | 3.6 (MAJOR) |
| iv. Poor post-harvest management, storage & preservation | 2 | 3.5 | IMPORTANT | 3.0 (IMPORTANT) |
| v. Lack of knowledge on agriculture, home gardening | 3 | 2.5 | IMPORTANT | 3.0 (IMPORTANT) |
| vi. Poor Food Diversity in Production | 3 | 1 | IMPORTANT | 3.4 (IMPORTANT) |
| vii. Big Family | 4 | 3.5 | IMPORTANT | 3.5 (IMPORTANT) |
| B. IYCF PRACTICES & MATERNAL NUTRITION | | | | |
| i. Poor IYCF Practices | 4 | 3 | MAJOR | 4.4 (MAJOR) |
| ii. Poor food diversity in consumption (MDD-W) | 4 | 1 | MAJOR | 4.15 (MAJOR) |
| iii. No targeted interventions and awareness programmes | 4 | 4 | MAJOR | 4.5 (MAJOR) |
| iv. Lack of knowledge on IYCF | 5 | 2 | IMPORTANT | 4.1 (MAJOR) |
| C. HEALTH INFRASTRUCTURE & SERVICE UTILISATION | | | | |
| i. Poor healthcare services | 4 | 4 | MAJOR | 4.4 (MAJOR) |
| ii. Costly healthcare | 3 | 4 | MAJOR | 4.1 (MAJOR) |
| iii. Inaccessible health facilities due to road poverty | 4 | 5 | MAJOR | 4.3 (MAJOR) |
| iv. Limited capacity of health staff | 3 | 0 | UNTESTED* | 0.5 |
| D. WATER, SANITATION & HYGIENE | | | | |
| i. Waterborne and infectious Diseases | 3 | 2 | IMPORTANT | 3.0 (IMPORTANT) |
| ii. Poor water and sanitation facilities and practices | 4 | 4 | MAJOR | 4.0 (MAJOR) |
| iii. Poor Vector control due to poor solid waste management, habitat control | 4 | 3 | IMPORTANT | 3.3 (IMPORTANT) |
| E. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION | | | | |
| i. Socio-Cultural Taboos e.g. Not good to use FP, Need additional hand for agriculture | 3 | 2 | MINOR | 2.4 (MINOR) |
| ii. Poor utilization of family planning | 3 | 3 | IMPORTANT | 3.0 (IMPORTANT) |
| iii. Taboos in pregnancy, lactation and child feeding practices | 4 | 2 | MINOR | 3.3 (IMPORTANT) |
| iv. Taboos on use of latrines | 3 | 2 | MINOR | 2.7 (MINOR) |
| F. LOCAL LANDSCAPE/SITUATIONS | | | | |
| i. Seasonal Factors | 3 | 4 | MAJOR | 3.7 (MAJOR) |
| ii. Historical factors(Disasters, Conflict) | 3 | 2 | MINOR | 1.4 (MINOR) |
| G. GENDER PERSPECTIVE | | | | |
| High Workload of Women | | 4 | MAJOR | 4.5 (MAJOR) |

By combining the gathered quantitative and qualitative information, the causal pathway was adjusted as presented in Figure 4.2 on the next page.

The household survey showed that very few women and children had an acceptable dietary diversity, limited consumption of a variety of nutritious foods (meat, fish, eggs, nuts, dairy, iron-rich and vitamin A rich foods) as well as inadequate infant and young child feeding practices. This shows that **inadequate dietary intake** is a major immediate cause of the high malnutrition rates.

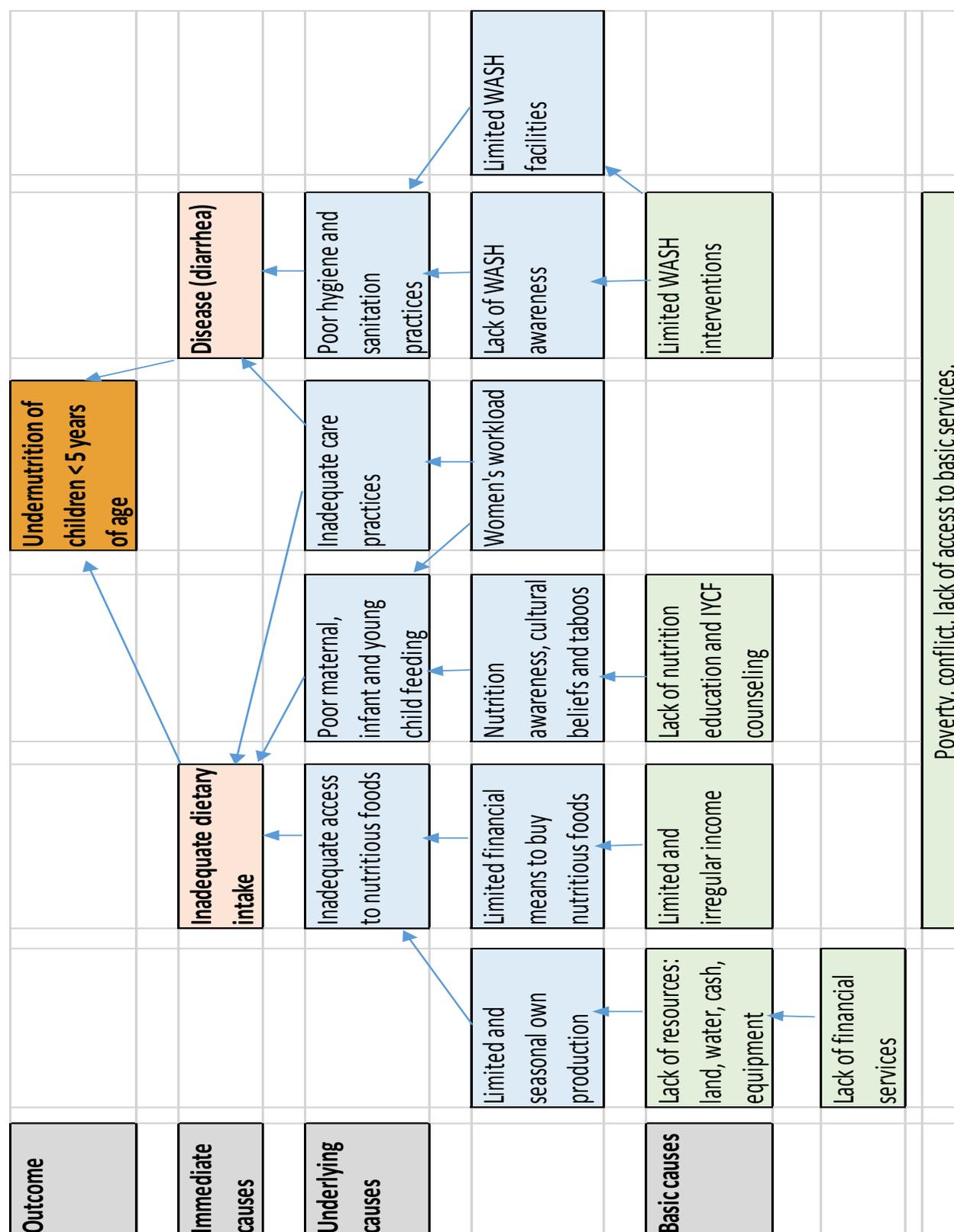
Waterborne and infectious diseases were not rated as a very important cause of malnutrition by neither the experts nor the community. However, in the seasonal calendar, mothers rated diarrhoea as 'high' in eight out of 12 months per year. Also, the household survey found high prevalence of diarrhoea as well. Other surveys in the target area which were done in recent years during other seasons also found high diarrhoea prevalence. In combination with the highly insufficient water and sanitation facilities and practices (highlighted by both experts and community, as well as confirmed by household survey), **diarrhoea** is expected to be an important cause of malnutrition.

Food security on the other hand (initially defined as important cause of malnutrition in the hypothesized causal pathway) did not come out strongly as a major cause; neither by the experts, nor by the community consultations. **Financial limitations to access nutritious food** however, has been identified as an important risk factor, by the community as well as by the quantitative results of the household survey. With a majority of the food being bought from markets, this is an important factor to include in the causal pathway. Limited financial means to purchase nutritious food leads to inadequate dietary intake and has therefore been included as an underlying cause.

Furthermore, **women's workload** was identified as an important cause of malnutrition due to its impact on child feeding practices and caring practices.

It is recognized that access to health facilities is limited due to poor road conditions. Access to basic health services -such as immunization, vitamin supplementation, and health staff being present during delivery- is accessible for a majority of mothers and children, although mostly through community health workers. Furthermore, prevalence of other diseases (besides diarrhoea) were not confirmed; e.g. malaria prevalence was substantially reduced in recent years. The combination of these findings therefore was sufficient to take out 'poor utilization of health services' of the local causal pathway. (Additionally, improving access to health facilities could not have been addressed within this project as well.)

Figure 4.2 Local Causal Pathway – Thandaunggyi Township, Kayin



5 DISCUSSIONS & CONCLUSIONS

MALNUTRITION PREVALENCE

Prevalence of malnutrition in Thandaunggyi Township is very high with 53.7% of children being stunted, 15.1% wasted and 33.3% under-weight. Stunting levels are very high in all sub-townships (above 40%) and are equally high among both boys and girls. Wasting levels are very high (> 15%) in Baw Ga Li and Thaundaunggyi sub-townships, while they are medium (between 5-9%) in Leik Tho. Stunting and wasting levels are high among all age groups; even among infants under 6 months. Wasting is more prevalent among the two poorest income categories, while stunting is high among all income categories.

High malnutrition among infants under six months suggest that in-utero growth (during pregnancy) is not optimal, which could be due to inadequate maternal health and nutrition during pregnancy. Issues such as early age of first pregnancy, limited family planning (particularly having many children in a relative short period of time) and malnutrition among adolescent girls could be related. High malnutrition among infants < 6 months of age might be further due to suboptimal breastfeeding practices – particularly initiation and exclusive breastfeeding – or inadequate health and nutrition among lactating women.

High malnutrition among infants and young children 6- 59 months indicate suboptimal infant and young child feeding practices. Furthermore, high stunting rates suggest that other factors, such as repeated diseases, unclean drinking water, inadequate sanitary or caring practices further deteriorate nutrition status.

IMMEDIATE CAUSES OF MALNUTRITION

Immediate causes of malnutrition are ‘inadequate dietary intake’ and ‘disease’ (UNICEF causal framework), which will therefore be discussed first.

Inadequate dietary intake

Only one out of five women (21.8%) in Thandaunggyi Township have an acceptable minimum dietary diversity (MDD). Comparing the sub-townships, slightly less women in Leik Tho (19.8%) and slightly more women in Thandaunggyi sub-township (23.5%) were able to achieve an acceptable MDD. This means that nearly 80% of women in the whole of Thandaunggyi Township are more vulnerable to micronutrient deficiencies.

A minority of women do eat green leafy vegetables (42.0%) of which many are rich in iron. To a lesser extent, women also consume vitamin A rich fruits and vegetables (34.9%). Less common is the consumption of eggs, pulses, dairy and nuts/seeds. It should be noted that consumption of specific fruits and vegetables is seasonal. Women did confirm they daily eat rice, chili, vegetables and fish paste. Consumption of meat, fish, eggs, nuts/seeds is less regular (some mothers specified it as once or twice a week) and depends on availability of cash in the household.

Based on this information, protein intake (and particularly high-quality protein from animal based products) is expected to be insufficient. Furthermore, a majority of women is expected to consume insufficient levels of vitamin A, iron, B vitamins and potentially other vitamins.

Similar to the mothers, the percentage of children 6-23 months achieving a Minimum Dietary Diversity (MDD) was low at 28.9% for the whole of Thandaunggyi Township. Again, the lowest percentage was found in Leik Tho (24.7% of children reaching MDD) and the highest in Thandaunggyi sub-township (34.9%). Although these results are slightly better than the mothers, still 71% of children 6-23 months did not have an acceptable MDD and are thus expected to be more vulnerable to micronutrient deficiencies.

It was noted that the percentage of children achieving the MDD was similar for boys and girls in Baw Ga Li and Thandaunggyi sub-townships. In Leik Tho however, there was a substantial difference with only 17% of girls and 33% of boys reaching an acceptable MDD. This could indicate gender-biased practices whereby boys are given a more diverse diet than girls.

The food groups eaten by the children are very similar to those consumed by their mothers; rice, vegetables, and some fish paste daily, while eggs, meat/fresh fish, legumes, nuts, dairy were consumed less regular by the children.

Early initiation of breastfeeding was good with 78.1% of all newborns being breastfed within one hour after birth. Exclusive breastfeeding up to six months is very low as over half of infants received honey, other milk, rice, castor oil or water. Furthermore, 85.2% of children are breastfed for more than 6 months, which means that around 15% of children are not breastfed for the recommended period of 6 months when they should only receive breastmilk. Continued breastfeeding up to two years is not good either as only 12.5% is breastfed for two years (or more).

The above results clearly indicate inadequate dietary intake for both mothers and children due to; inadequate dietary practices among mothers, suboptimal breastfeeding practices and inadequate complementary feeding practices.

Disease

In addition to inadequate dietary practices, diseases can be another important immediate cause of malnutrition.

According to mothers, the most common disease is diarrhea. The mothers mentioned that diarrhea prevalence is high from April to October and then again high in December. This was confirmed by two surveys done in the area; one by CDN which found 49% of children under five had diarrhea (June 2015). The NCA found that as many as 29% of children under five had diarrhea in the two weeks prior to the survey (November-December 2017). In the 2017 survey, diarrhea prevalence was slightly lower in Thandaunggyi sub-township (22%) and higher in Leik Tho sub-township (35%).

Out of all children under five years of age with diarrhea, 59% was stunted, compared to 51% of children who did not have diarrhea. Furthermore, out of all stunted children, 32% had diarrhea, compared to 26% of children who were not stunted. In other words, children with

diarrhea were more likely to be stunted, while stunted children were more likely to have diarrhea. Diarrhea contributes to under-nutrition by hindering the absorption of nutrients. Repeated episodes of diarrhea throughout the year will worsen this situation. Undernourished children are more at risk to suffer more frequently and more severe episodes of diarrhea due to lower immune system, creating a vicious cycle.

According to the mothers, malaria was not a major issue which is also confirmed by other secondary source data. The mothers did mention that dengue was high in the rainy season from May to October. Furthermore, flu was particularly high in the cool season, in November and December.

UNDERLYING CAUSES OF MALNUTRITION

To understand why women and children have inadequate dietary intake as well as why there is such high prevalence of diarrhea, we need to assess the potential underlying causes which include; inadequate access to food, inadequate care for mothers and children, insufficient health services or unhealthy environment.

Inadequate access to food

Some 8% of all households had a mother or a child who were hungry in the four weeks preceding the survey (November/December 2017). However, most of them experienced this only once or twice in the past four weeks. It should be noted however, that the time of data collection is in fact the best season in terms of food security, as it is right after the harvest.

Agricultural production mainly focuses on cash crops, such as cardamom, betel nut and coffee. Less than one third of the surveyed households grow rice, which means that a majority of households need to buy their staple food. While 60% of households have a home garden, production is highly seasonal and limited mostly to the rainy season.

As a result of limited and seasonal own production of fresh (and nutritious) foods, households depend heavily on local markets to buy food and on the forest to collect food. This dependency on markets is confirmed by the baseline survey which found that 68% of fresh food came from the market, while 27% was from own production and 5% from the forest. Also, 95% of households spend the majority of their income on food. Furthermore, 83% of households took out a loan, whereby the number one reason for taking a loan was to buy food.

Mobile markets (on motorbike to each village) sell a variety of foods including a range of different vegetables and tubers which changes per season. Fruits are less available through the mobile markets as they are more difficult to transport. The local market also has a variety of animal products including pork, chicken, beef, dried and fermented fish, fresh fish as well as wild forest meat. In the village, people can buy eggs as well.

The availability of mobile markets in the villages has increased the availability of a range of nutritious foods. Vegetables are fairly cheap (150-700 MMK/viss) while meat and fresh fish are more expensive (4,000-9,000 MMK/viss). The average self-reported income of on-farm and off-farm work was 967,434MMK per household per year. This would result in 2,687 MMK

per day. For a family of five, a menu of rice, vegetables and some meat or fish (only 80 gram per person) would add up to around 3,000 or 4,000 MMK. It is clear that people cannot afford this every day, why they spend most of their income on food and why they need to take out loans to buy food for their families.

These results indicate that a good variety of fresh foods are locally available, but that many households lack the financial means to buy them regularly. This is in line with what mothers mentioned (in all three sub-townships); 'I am not in a good financial position to provide diverse nutritious foods for my children'. The survey found that particularly animal products (meat, fresh fish, and eggs) and nuts are expensive; mothers mentioned that if they had more cash, they would buy more of those.

Access to high-quality protein is limited as animal products (meat, fish, and eggs) are expensive. People do have pigs (60.4% of hh) but keep them for cultural events or as an insurance. Furthermore, poultry are less common (18.6% of hh) and chicken are kept mostly for their meat, rather than eggs as owners want to keep as many as chicken as possible. They did mention that diseases among chicken is a problem and sometimes kills all the chicken they have.

Inadequate care for mothers and children

Mothers mentioned that they know breast milk is the best for their child and that it provides all the nutrients the child needs. However, mothers need to work outside the home to support the family income. This makes it more difficult for them to breastfeed their children exclusively up to six months or to continue breastfeeding up to two years, as recommended. Some mothers can only breastfeed at night if they are working outside during the day. Some mothers are able to either take their child to the field or to return home to breastfeed the child. Women's responsibilities and work load are clearly limiting appropriate feeding and caring for infants and young children.

Furthermore, there are some misconceptions, cultural beliefs and taboos as well, such as avoiding some specific nutritious foods (such as fruits, vegetables) during pregnancy and lactation, and even more so in the one month after delivery. Some nutritious foods were also avoided when people are sick, or are avoided all together as they are believed to cause sickness. Other healthy foods (such as papaya or beans) are considered not good for small children. Interestingly, younger mothers said that elderly would mention to them to consume or to avoid specific foods during pregnancy or lactation. However, they said that young mothers did not listen to the elderly anymore as they are reluctant to avoid foods. This might mean that these cultural beliefs and taboos are changing with the new generation.

Insufficient health services

As many as 92% of mothers had health staff assisting during their last delivery; including Traditional Birth Attendants, doctor, nurse and/or midwife. Still, 90% of mothers delivered at home while only 7.4% delivered at the government hospital.

Furthermore, 81.4% of children under five were immunized while 64.6% had received vitamin A supplements. It seems that the majority of children were able to access these basic health services.

The above results are in line with the village mapping exercise which found that 22 out of 35 core villages (63%) always had one (or more) community health workers present in the village. An additional four villages (11%) had health workers visiting while 9 villages (26%) did not have any health worker at all.

While basic health services seem to be available to a majority of mothers and children, health care at a health center or hospital in case of more serious illnesses is not easily accessible. Mothers mentioned they do trust the health service providers but they are too far away. To visit a health center can take hours of travel time, which is why caregivers only take their child if he/she is seriously ill.

Only 16.5% of mothers had received counseling on infant and young child feeding practices. When discussing about breastfeeding practices, mothers mentioned that they never got any information about breastfeeding from health care providers. Nutrition education and particularly on infant and young child feeding practices seems to be hardly available.

Unhealthy environment

Only one third of households have a sanitary latrine (34%), however nearly half of these (48.6%) were rated as unclean. That would bring the total number of households with a sanitary and clean latrine back to 16%. As many as 31% of all households do not have any latrine at all and practice open defecation.

Diarrhea was highest among children from households with unsanitary practices; 41% of children from households without a latrine, 31% from households using an unprotected water source and 31% of children from households with an unclean latrine had diarrhea. Diarrhea was lowest among children from households with sanitary practices; 17% of children from households with a sanitary and clean latrine had diarrhea. Only 14% of children coming from households that used a protected water source and whose mothers used soap after cleaning the babies' stool were found to have had diarrhea. This is substantially lower than the 29% average.

Although it is commonly acknowledged that open defecation, unsafe water and unsanitary practices are usually main causes of diarrhea, some other causes should not be overlooked. Food safety could be an issue, particularly if people re-use leftover foods and do not have refrigerators. Prevalence of worms could be high, particularly for children playing outside, many free-roaming pigs in the villages and if de-worming is low.

Drinking water was mostly fetched from communal water points, streams, waterfalls, springs, rain water storage, or ponds. Many households however use a combination of protected and unprotected drinking water sources. In the rainy season, a minority of 16.5% of households used only protected water sources, while in the dry season this was further reduced to only 10.8%. The high number of people using unprotected drinking water sources might be the reason why 97.4% of households affirmed to boil the water before drinking. A majority of

households use a container with cover to store their water, although still 32.7% of households do not have covered containers for their water.

While 84.5% of mothers wash their hands after cleaning the stool of their baby, only 51.4% uses soap or detergent. Only a limited number of mothers wash their hands with soap before feeding their child (18.9%), before preparing food (18.6%) or after working outside (22.3%).

BASIC CAUSES OF MALNUTRITION

Lack of financial services, limited & irregular income and lack of resources (land, water, equipment) are basic causes of malnutrition as they limit own production of nutritious foods as well as the purchase of nutritious foods.

Lack of nutrition and WASH interventions, including access to government services, are basic causes of malnutrition because due to their absence people lack awareness on nutrition, on infant and young child feeding practices and on appropriate hygiene and sanitation facilities and practices.

The political situation and the ongoing conflict have contributed to poverty, lack of access to basic services and lack of access to livelihoods. This unstable situation, in combination with natural disasters and climate change, has potentially resulted in a mindset of practicing low-input, low-risk production.

6. RECOMMENDATIONS

The immediate causes of malnutrition were found to be: inadequate dietary intake and high disease burden, particularly of diarrhea. To improve dietary intake and reduce prevalence of disease, and in particular diarrhea, the following actions are recommended:

- ⇒ ***Provision of nutrition education, hygiene and sanitation to the larger community.***
Encourage participation of fathers, elderly, (religious) leaders to ensure mothers are supported. To improve local interest and active participation, tailor sessions to the people's interests, local context, beliefs and practices, rather than following generic training modules. Furthermore, make it a special occasion with fun and participative activities addressing clear and specific topics. Use IEC materials with many visuals and less narrative, narrative in local language, organize cooking sessions, cooking competitions, games, or role plays. Invite people ahead of time. With communities and particularly mothers being busy, it is better to organize fewer very well organized sessions (e.g. quarterly) than many less interesting sessions. Potential topics: basic nutrition awareness and locally available/nutritious foods, nutrition needs of PLW and infants & young children, hygiene and sanitation, cultural beliefs and taboos, importance of basic health services (ANC, immunization, supplementation, de-worming), food safety, importance of nutrition-sensitive agriculture and discussing motivators – de-motivators – barriers – enablers of changing behaviors. Invite and cooperate with existing community health workers, WASH related volunteers or other relevant community members.
- ⇒ ***Community-led Total Sanitation (CLTS) and/or Participatory Hygiene and Sanitation Training (PHAST):*** to reduce the high levels of diarrhea, communities need to be supported to identify causes of diarrhea, to understand the importance of hygiene and sanitation and to identify and implement practical local solutions. CLTS focuses on eliminating open defecation and to make the whole community open defecation free. PHAST is a 7-step process to community planning for the prevention of diarrhea: 1. Problem identification, 2. Problem analysis, 3. Planning for solutions, 4. Selecting options, 5. Planning for new facilities and behavior change, 6. Planning for monitoring and evaluation, 7. Participatory evaluation. For both approaches, it is important to have large community participation. Any inputs, particularly latrine materials, should be only provided after the community has done their own discussions and planning to solve the issue.
- ⇒ ***Establishment of mother-to-mother groups:*** setting up smaller groups of 10-12 mothers who live near to each other helps to support peer-to-peer education. All mothers who are pregnant or who have children under five should be invited to join. Mother groups will focus on the 1,000 days and on improving maternal, infant and young child feeding practices. Mother group focal points will be trained on how to advice women and how to lead and plan mother group sessions. Specific and relevant topics can be discussed using practical examples; e.g. importance of ANC, IYCF, optimal breastfeeding practices, which

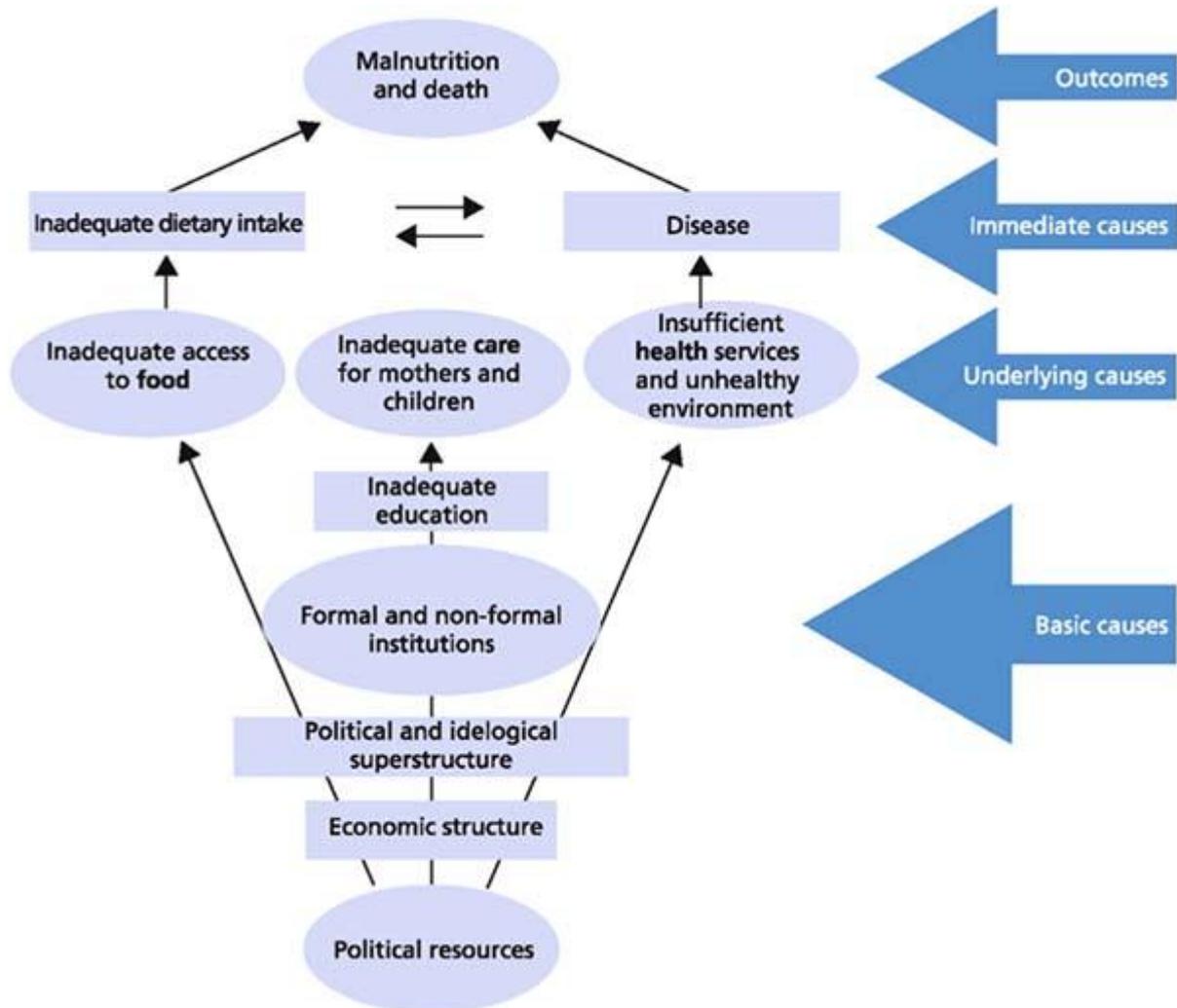
foods are suitable as complementary feeding and how to prepare them, how to prevent illnesses, baby WASH, how to feed a sick child, age appropriate early child stimulation, cultural beliefs & taboos and other topics that mothers are interested in. To improve dietary diversity, specific sessions on protein, iron, vitamin A, and vitamin B1 could be organized, explaining the causes and effects of these deficiencies as well as discussing local solutions.

- ⇒ **Behavioral change and Counseling:** To ensure mothers are able to make actual changes, it is important that mother group focal points are trained on behavioral change and counseling. Counseling is a two-way communication where the mother is able to discuss problems or barriers she faces to implement the recommended practices. Mother group leaders should be supported and supervised by WCM staff to improve her knowledge and skills. Related to this, it would be beneficial to do a barrier analysis to feed into the BCC approach.
- ⇒ **Growth monitoring:** Monthly growth monitoring of children under 5 can be used as a participatory monitoring tool by the mothers. Growth monitoring is typically used to identify under-nourished children and to ensure they receive appropriate treatment. Treatment of moderate and severe acute malnutrition is not available in the target area. Discussions with local health authorities and non-government health actors need to be held to advocate for treatment services.
- ⇒ **Improve production of nutritious foods:** Nutrient needs are increased during pregnancy, lactation and young children due to growth and development processes. The common daily diet (rice, vegetables, fish paste and chili) and low dietary diversity show the need to improve consumption of (high-quality) protein, micro-nutrients and potentially essential fatty acids. Particularly, consumption of iron-rich, vitamin A rich and vitamin B1 rich foods are recommended as consumption of these foods is low in the target area which is expected to result in deficiencies. A variety of locally available and locally produced foods which include the above nutrients have been identified. Selection of crops has been furthermore based on local acceptability, suitability for small children and low maintenance as women have limited time available. In addition, products that would potentially be good cash crops were prioritized as well. Local production of: sweet potato, yard long bean, pumpkin, water cress, mustard leaf, carrot, papaya, mango, banana, tomato, durian, coconut, and avocado could be promoted.
- ⇒ **Moringa trees** are locally available and would be a good addition to the above list. ICCO is working on a research to identify delicious and acceptable recipes within Myanmar that use parts of the Moringa tree. Their focus is on recipes that would be suitable for the 1,000 days period.
- ⇒ **Animal source foods:** the inclusion of animal source foods in the diet is an important food-based strategy for improving nutrition outcomes. Animal products not only supply high-quality and readily digested protein and energy, but also readily absorbable and bio-available micronutrients. They are rich sources of iron, zinc, riboflavin, vitamin A, vitamin B12 and calcium. Poultry is already locally available and mostly used for meat

consumption. It would be worthwhile to identify ways to improve poultry production, egg production and reduce vulnerability to disease. As meat and eggs are considered expensive, it would be useful to increase and improve local poultry production. Helen Keller International (HKI) has done research in several Asian countries and found that the combination of home gardens and poultry production was able to improved dietary diversity, household income and reduction of anemia among pre-school children.

- ⇒ **Fortified foods:** Fortified rice is available in Myanmar and is a culturally appropriate solution to reduce micronutrient deficiencies. Fortified rice includes important vitamins and minerals such as iron, vitamin B1, vitamin A, and zinc. Cooperation with PATH to introduce fortified rice in the target area could be explored.
- ⇒ **Nutritious products:** Nutritious soup produced by Fedwell is another culturally appropriate solution to improve protein and micronutrient consumption. The soup includes lentils, chickpeas and millet which are locally and organically produced by small-holder farmers. Possibilities to cooperate with Fedwell either to produce ingredients (such as turmeric or other spices) or to introduce nutritious soup in the target area could be explored.
- ⇒ **Improve financial access to nutritious foods:** To improve financial access to nutritious foods, the program could explore (i) maternal cash grants, (ii) linking to the saving and loan groups of the LIFT program and (iii) linking to value chain component of the LIFT program.
- ⇒ **Maternal cash grants** could be a useful strategy in Thandaunggyi to improve access to nutritious foods and to health services, particularly since many mothers expressed they cannot afford to buy nutritious foods even when they are available. The Ministry of Social Welfare has planned to roll out maternal cash grants to pregnant women and to households with children under two years of age. Based on current population data of the core villages, there are an estimated 80 pregnant women and 570 children under two, which totals 650. Providing 10 USD per month to 80 pregnant women adds up to 9,600 USD per year. Providing 10 USD per month to 570 children adds up to 68,400 USD per year. Possibilities to include maternal cash grants for pregnant women could be explored.
- ⇒ **Link to saving and loan groups:** The program intends to set up saving and loan groups to improve resilience. Within villages, groups of 10-15 people will be organized as one saving and loan group. In the initial proposal, these saving and loan groups are linked to Crop Producer Groups. It might be worthwhile to explore if Mother to mother groups could be included as well, particularly since they will also be involved in food production.
- ⇒ **Link to value chain component:** The value chain component could explore which nutritious foods would be best suited to improve incomes. Mother to mother groups then could produce nutritious foods which also could improve their livelihoods and incomes as well besides improving local access to the food itself.
- ⇒ **Improve year-round access to nutritious foods:** explore food processing methods that improve year-round access; e.g. dried fruits such as dried mango or dried pineapple.

ANNEX 1 UNICEF CAUSAL FRAMEWORK



REFERENCES

- Ajao, K.O., Ojofeitimi. E. O., et al. (2010). Influence of family size, household food security status, and child care practices on the nutritional status of under five children in Ile-Ife, Nigeria. *African Journal of reproductive health*, 14(4). Available online at: <http://www.bioline.org.br/pdf?rh10072>
- Davis, W. W., Mullany, L. C., et al. (2015). Health and Human Rights in Karen State, Eastern Myanmar. *PloS one*, 10(8). Available online at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4550474/>
- Eggersdorfer, M., Kraemer, K., Ruel, M., Van Ameringen, M., Biesalski, H. K., Bloem, M., & Mannar, V. (2013). The Road to Good Nutrition. *Ann Nutr Metab*, 63(3), 179-268.
- Food and Agriculture Organisation of the United Nations (2008). Food security information for action. Practical guides. Rome: EC - FAO Food Security Programme.
- Ministry of Health (Myanmar). (2013). National Strategic Plan Newborn Child Health Development (2015-2018). Retrieved January 10, 2017. Available online at: [https://www.unicef.org/myanmar/NSP_for_Newborn_and_Child_Health_Dev\(Final\).pdf](https://www.unicef.org/myanmar/NSP_for_Newborn_and_Child_Health_Dev(Final).pdf)
- National Plan of Action for Food and Nutrition 2011-16 (NPAFN)
- Neiman, A., Soh, E., et al. (2008). Karen Cultural Profile. Available online at: <https://ethnomed.org/culture/karen/karen-cultural-profile>
- Pruss-Ustun, A., Bos, R., et al., (2008). Safe water, better health: costs, benefits and sustainability of interventions to protect and promote health. World Health Organisation, Geneva.
- Spears D (2013) How much international variation in child height can sanitation explain? The World Bank, Sustainable Development Network, Water and Sanitation Program. Available online at: <http://sanitationdrive2015.org/wp-content/uploads/2013/09/sanitation-height.pdf>
- UNCHR, (2014). 'Kayin State Profile'. Myanmar Information Management Unit. Available Online at: http://www.themimu.info/sites/themimu.info/files/assessment_file_attachments/Kayin_State_Profile_-_June_2014.pdf
- UNDP (2011) Integrated Household Living Conditions Survey in Myanmar. Available online at: www.mm.undp.org/content/dam/myanmar/docs/FA1MMRPovertyProfile_Eng.pdf
- UNICEF, Ministry of National Planning and Economic Development (2012). Situation Analysis of Children in Myanmar. Available online at: https://www.unicef.org/eapro/Myanmar_Situation_Analysis.pdf
- UNICEF, WHO & World Bank Group (2015) 'Levels and trends in child malnutrition: UNICEF – WHO – World Bank Group join child malnutrition estimates.
- USAID (2012). Maternal dietary diversity and the implications for children's diets in the context of food security. *Infant & Young Child Nutrition Project*
- USAID. (2015). Demographic and Health Survey: Myanmar 2015-2016. Available online at: <http://dhsprogram.com/what-we-do/survey/survey-display-454.cfm>
- WaterAid. (2015). *Under-nutrition and water, sanitation and hygiene*

World Health Organization. (2008). Indicators for assessing infant and young child feeding practices: part 1: definitions: conclusions of a consensus meeting held 6-8 November 2007 in Washington DC, USA.

WHO (2008) Safer water, better health: Costs, benefits and sustainability of interventions to protect and promote health. Available online at: http://whqlibdoc.who.int/publications/2008/9789241596435_eng.pdf

Zhao, A., Zhang, Y., et al. (2014) 'Prevalence of anemia and its risk factors among lactating mothers in Myanmar'. The American journal of tropical medicine and hygiene, 90(5), 963-967.

http://www.who.int/nutgrowthdb/jme_brochure2016.pdf?ua=1