

Multi-sectoral Approach for Stunting Reduction Project (MASReP)

Baseline Assessment Report

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Abbreviations and Acronyms

AfDB	African Development Bank
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
ARI	Acute Respiratory Infection
BMI	Body Mass Index
BSc	Bachelor of Science
CI	Confidence Interval
CSV	Comma Separated Value
DALYs	Disability-adjusted life-years
DDS	Dietary Diversity Score
EDHS	Ethiopian Demographic and Health Survey
EPHI	Ethiopian Public Health Institute
FAO	Food and Agricultural Organization
GAM	Global Acute Malnutrition
GIZ	German Society for International Co-operation
H/A	Height for Age
HH	Households
IGAs	Income Generating Activities
ILO	International Labor Office
IQR	Inter-Quartile Range
IRB	Institutional Review Board
ISCO	International Standard Classification of Occupations
IYCF	Infant and Young Child Feeding
KAP	Knowledge, Attitude, and Practice
LMIC	Low- and Middle-Income Countries
MASReP	Multi-sectoral Approach for Stunting Reduction Project
MDD-W	Minimum Dietary Diversity for Women
MSc	Master of Science
MUAC	Mid-Upper Arm Circumference
NACS	Nutritional Assessment, Counseling and Support
NFNS	National Food and Nutrition Strategy
NNP	National Nutrition Program
NSA	Nutrition Sensitive Agriculture
ODK	Open Data Kit
ORDA	Organization for Rehabilitation and Development of Amhara
ORS	Oral Rehydration Solution
PDU	Program Delivery Unit
PLW	Pregnant and Lactating Women

SAM	Sever Acute Malnutrition
SD	Seqota Declaration
SD-FPDU	Seqota Declaration Federal Program Delivery Unit
SWPER	Survey-based Women's empowerment index
UNICEF	United Nations Children's Fund
UNISE	Unified Nutrition Information System for Ethiopia
W/A	Weight for Age
W/H	Weight for Height
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WRA	Women of Reproductive Age

Summary

Background: The government of Ethiopia is committed to intervene in the improvement of nutrition conditions in the country, primarily to reduce and end child stunting under the age of two by 2030 through a commitment named Seqota declaration (SD). Multi-sectoral approach for stunting reduction project (MASReP) is one of the nutrition intervention projects to support the actualization of SD goal that is being implemented in selected districts of Amhara and Tigray regions. The project is financed by the African Development Bank (AfDB) and the Ethiopian Government.

Objective: This baseline assessment was aimed at providing baseline estimates of MASReP indicators among the intervention districts in the Amhara region.

Methods: A community and facility-based cross-sectional survey was conducted from April to June 2022 among eight SD districts in the Amhara region where the full intervention packages of MASReP are planned to be implemented. The survey employed a multi-stage cluster-random-sampling technique and a total of 776 households participated. Children 0-59 months (n=540) and women of reproductive age (n=846) were the study population while Food and Nutrition implementing sectors (Health, Education, Agriculture, and Water) among the study districts were included for the facility-based survey. Data were collected using standard and adapted tools. Statistical analyses were done using STATA version 16.

Results: The prevalence of stunting was 43% among children 0-59 months while it was 39% among children 0-23 months. The prevalence increases with age from the lowest 29% among 0-5 months children up to the highest 53% among children 24-35 months. A higher prevalence of stunting was found among children whose mothers' had no ANC visit (47%) than children whose mothers' had four or more ANC visits (41%). A high prevalence of wasting (11%) and underweight (29%) was also found among children under-fives.

Almost all (99.5%) children 0-23 months have been breastfed at some point in their life. Nearly three-fourths (73%) of children under 6 months were exclusively breastfed and 93% of 12-23 months children continued breastfeeding. However, complementary food was introduced for 36% of children 6-8 months. About one out of twenty (5%) of children 6-23 months met the

minimum dietary diversity (MDD), while only 4% of the children met the minimum acceptable diet (MAD). In the three months preceding the survey, coverage of growth monitoring services was 19% in terms of weight, 10% (height), and 53% (mid-upper arm circumference (MUAC)). Nearly two of five (39%) children were born at home.

One-fourths (25%) of women of reproductive age (WRA) and one-fifths (20%) of lactating women were found underweight. Low proportion of WRA and pregnant and lactating women (PLW) (0.5%) achieved the minimum dietary diversity for women (MDD-W). Less than half (46%) of women who gave birth in the five years before the survey had at least four antenatal care (ANC) visits during their most recent pregnancy. One-fifths (21%) of the women took iron folate for 90 days or more.

Regarding knowledge of PLW, about 88% and 81% knew that a baby should be given only breast milk up to 6 months and start complementary foods at 6th month respectively. However, only 17% of PLW reported that they ever heard about child stunting. Concerning attitude of PLW, about 78%, 92%, and 91% of PLW agree that children, pregnant women, and lactating mothers should consume a diversified diet, respectively. But less proportion (40%) of PLW agree that colostrum should be discarded.

Fasting was widely practiced among PLW. About 89% and 81% of WRA reported that they do not consume animal source foods (ASF) during fasting times in the course of their recent pregnancy or lactation, respectively. Likewise, it was reported that 53% of children 6-59 months do not consume ASF during fasting times.

The overall prevalence of food insecurity was 77% with moderate food insecurity (50%) and severe food insecurity (28%). Forty-three percent of households had limited drinking water service (access from an improved source in more than 30 minutes of collection time) while 36% have basic service (access from an improved source within 30 minutes of collection time). Around one-fifths (22%) use unimproved toilet facilities and about two-thirds (63%) of the total households practice open defecation.

Few (10%) households engaged in backyard gardening of vegetables and fruits. As for field crop production, cereals were widely produced (77%) while vegetables and fruits were produced by only 7% of the households. Nutrient-dense crops were produced by 8% of households and only

10% of the producers consumed them. Few households produced eggs (27%), chicken (32%), and milk (13%), and 76%, 35%, and 98% of them consumed the eggs, chicken, and milk they produced respectively. Seven percent (7%) of households with agricultural land had access to livestock or poultry support in the year before the survey.

According to the facility-based assessment, only 7% (1% female and 6% male) of health workers attended training on nutritional assessment, counseling, and support (NACS). None of the districts implement the unified nutrition information system for Ethiopia (UNISE) and only 4% of kebeles were implementing community-lab-led nutrition initiatives. About 13% of primary schools were equipped with school feeding facilities. Moreover, around one-fifths (22%) of school children (11% female and 11% male) benefited from nutrition-friendly schools (a combination of school gardens, school meals, and school nutrition clubs).

Implications: Despite improvements made over four years of SD intervention, under nutrition, specifically stunting, among children 0-59 months remained prevalent with a very high public health significance indicating a need for sustainable nutrition intervention. Breastfeeding practices are encouraging against global and national targets. A considerable proportion of children 6-23 months, WRA and PLW failed to meet the recommended dietary practices, in light of the high prevalence of food insecurity. This demands support for diversified production including fruits and vegetables and ASFs tailored with gender-sensitive behavioral change communication (BCC). Nutrition-specific interventions namely growth monitoring, ANC, and delivery require systemic support such as building the capacity of health facilities and awareness creation to increase services coverage. Agricultural practices and productivity must also be encouraged through livelihood support and training to promote diet diversity. To achieve good nutrition results, access to improved water, sanitation, and hygiene services should advance supported with infrastructure development/maintenance and community participation. Sanitation coverage and the status of already functioning latrines should also be improved to minimize the possible negative effect of poor sanitation and open defecation on nutrition. Moreover, food and nutrition implementing sectors among the MASReP intervention districts are also in need of system strengthening and capacity-building support for better nutrition intervention services delivery.

1. Introduction

Malnutrition is a global health challenge that affects every country in the world. Children, women, and adolescents are the most vulnerable and a significant burden is experienced by children under-five (1). Globally, 22% of under-five children are stunted, 7% are wasted and 6% are overweight (2). Similarly, malnutrition is a major public health problem in developing countries. In 2020, it was estimated that about 31% of children under five were stunted and 6% were wasted in Africa (3). It is the cause of more than 300,000 deaths of under 5 children every year while it is the third leading cause of death in Sub-Saharan Africa (4). Under-nutrition, which includes stunting, wasting and underweight, is also the underlying cause for about half of under 5 children mortality in low and middle-income countries (LMIC) (1). Stunting, severe wasting, and intrauterine growth restriction together are responsible for 21% of disability-adjusted life-years (DALYs) for under 5 children (5).

The progress toward achieving global nutrition targets, particularly stunting, is not promising(4). The COVID-19 pandemic is also expected to affect the progress in which it was estimated to increase stunting cases by 1.6 million from 2020 up to 2022 globally (6). Over the past two decades (2000 - 2018), the prevalence of stunting declined by 11%, i.e. from 46% to 35% in East Africa (7). In Ethiopia, the prevalence of stunting, wasting, and underweight was 37%, 7%, and 21% respectively in 2019 (8). Nationally, even though the prevalence of stunting has been reduced from 52% in 2000 to 37% in 2019 (8,9), the magnitude is still classified as ‘very high’ public health significance category (10) with considerable geographical variations in rural (41%) and urban (26%) areas (8). It is even worse in some parts of Ethiopia like the Tekeze river basin located in the Tigray and Amhara regions. The area is prone to drought due to severe land degradation, deforestation, and low soil fertility. In 2018, the area was identified by a high prevalence of stunting among under-fives (48%) with a slight difference in Amhara (50%) and Tigray region (47%) (11).

The social, medical, developmental, and economic impacts of under nutrition are serious and lasting for individuals, families, communities, and countries (1). Undernourished children are prone to dying from common infections and they are at higher risk of severity and frequency of

these infections. Further, chronic under nutrition (stunting) is also associated with reduced cognitive ability and school performance and less economic productivity (12,13).

The first 1000 days - from conception to the second birthday of a child's life - is a critical period for a child's health, growth, and development (14). Inappropriate feeding practices during this time often lead to growth faltering, delay in development, and repeated infection (15). In developing countries, 25–50% of infant mortality is attributed to suboptimal infant and young child feeding (IYCF) practices, and achieving optimum IYCF practices is a major challenge. In eastern and southern Africa, less than half (42%) of children 0-5 months are exclusively breastfed which is less than the global target. Additionally, the median consumption of minimum acceptable diet (MAD) is at 9% among 32 countries in the WHO African region (16). In Ethiopia, almost four out of 10 children 0-5 months (41%) were not exclusively breastfed. The proportion of children who achieved MAD was low. According to 2016 Ethiopian Demographic and Health Survey (EDHS), only 7 % of children 6-23 months met MAD (8,17). Even if a better share of children in Amhara (85%) and Tigray (71%) region SD woredas were exclusively breast fed, the proportion of children who achieved MDD and MAD were insignificant, less than 2%, in both regions.

Food insecurity is also a major contributor to child undernutrition. Children living in food-secure households had a lower prevalence of stunting (17.5%) than children from moderately (21.7%) and severely food insecure (26.7%) households in Addis Ababa, Ethiopia. The odds of being stunted is 1.4 times higher among children from severely food-insecure households than children from food-secure households (18). SD woredas were known for a higher prevalence of food insecurity. In 2018, it was found that only 34% of households in Tigray and 29% in Amhara were food secure. About 21 and 25% of households were severely food insecure in Tigray and Amhara region SD woredas, respectively (11).

Health care facilities provide nutrition-related services including growth monitoring, nutrition rehabilitation as well as nutrition counseling, and education. Hence, access to health care has a role in preventing under nutrition. A study conducted in Rwanda showed that travel time to a health facility was associated with stunting (19). Access to complete or incomplete ANC services was observed to contribute to a large (0.23 to 0.25) point reduction in malnutrition in Colombia

(20). In Ethiopia, according to the 2019 EDHS report, 74% of women who gave birth within 5 years before the survey had at least one ANC visit. About half of them had four or more ANC visits for their recent pregnancy (8). In SD areas, the ANC coverage (four or more visits) was around 60% in both regions (11).

Evidence has shown that water, sanitation, and hygiene (WASH) have an important contribution to improving child under nutrition. WASH contributes to broader infectious diseases such as diarrheal diseases which in turn increases the risk of under nutrition (21). In Ethiopia, it was reported that only about half (52%) of the population had access to safe and clean drinking water and about a quarter (28%) to improved sanitation services (22). Despite this progress, in 2018, only 36% and 41% of households have access to safe and clean water while 70% and 45% practiced open defecation in Tigray and Amhara region SD woredas, respectively (11).

Programs intended to reduce under-nutrition need to integrate nutrition-specific interventions such as breastfeeding, dietary diversity, nutritional supplementation, maternal health, and nutrition with nutrition-sensitive activities. The interventions are also recommended to be implemented using a multi-sectoral approach with the involvement of different sectors and stakeholders like agriculture and education to address the contributing factors (23,24). Nutrition-sensitive agriculture (NSA) is one of the approaches that focus on the production of a variety of nutritious foods recognizing the nutritional value of food for good nutrition, health, and productivity. Studies in Asia indicated that NSA programs such as homestead gardens, production of targeted nutrient-rich crops, production of feasible animal source foods (ASF), and diversification of the agricultural production towards fruits and vegetables and aquaculture can potentially improve nutrient intake and nutrition outcomes. This is true especially when they are coupled with BCC and carefully designed to empower women (24,25).

School feeding is also another approach in the education sector to prevent under nutrition. Especially, in food-insecure areas, it has been shown that children benefitting from school feeding programs had significantly higher dietary diversity scores (DDS) and nutritional status (26). Income-generating activities are being used in different countries as one of the interventions to improve socioeconomic status and prevent under nutrition. In a study conducted in rural Bangladesh, a 2-year IGA program was found to be effective in improving the

socioeconomic status of households, food quality, and quantity. Moreover, the prevalence of stunting declined from 40% to 33% among under 5 children and their mother's nutritional status also improved significantly (27). Another systematic review of studies conducted in different low and middle-income countries including Ethiopia also demonstrated a positive effect of cash-based interventions on stunting reduction (28).

In Ethiopia, over the past decade, different sectors and programs have been putting efforts in a fragmented way to reduce under-nutrition. Hence, the government of Ethiopia demonstrated its high level of political commitment to end child under nutrition by 2030 by launching a program named S (SD) in 2015 (29). SD is a coordinated multi-sectorial nutrition intervention approach that promised to address previous gaps and barriers that limited the progress made in fighting child under-nutrition. It is managed under the National Food and Nutrition Program I and II (NNP-I and II) and is being implemented by the different governmental sectors in collaboration with non-governmental developmental organizations. A program delivery unit (PDU) that oversees the periodic execution of the project has been established at the national (under the Ministry of Health-Ethiopia) and regional-levels (29). The SD was proposed to be implemented in three phases, namely, innovation phase (learning by doing from 2016-2020), expansion phase (to reach more vulnerable communities from 2021-2025) and national scale-up phase (2026-2030). Implementation of the first (innovation) phase has been conducted since 2018 in 40 target woredas of Amhara and Tigray regions in the Tekeze river basin (29,30).

The AfDB, one of the major partners in basic social services provision in Ethiopia, is in a position to support the actualization of the SD goal. The AfDB is financing a 4-year nutrition intervention project named Multi-sectorial Approach for Stunting Reduction Project (MASReP) planned to be implemented in selected SD woredas of Amhara and Tigray regions. The intervention package includes 1) Climate-smart infrastructure development/maintenance (water supply and irrigation schemes, health, education, and agriculture facilities), 2) Livelihood support, production and promotion of nutritious food crops and livestock, 3) System/capacity strengthening activities and 4) Project coordination and management. The full intervention package will be implemented in 17 selected SD woredas, 9 in Amhara regions, and 8 in Tigray. Intervention woredas were selected based on agreed criteria including the level of need for food and nutrition intervention and water development potential (31). The monitoring and evaluation

component of the MASReP needs research integration at least as a baseline to benchmark for start-up and end-line assessments-for project effect/impact evaluation. This baseline assessment aimed to collect data on the levels of key indicators which will serve as a benchmark to judge the results of the interventions. The resources will also be prioritized and used efficiently based on the findings from the baseline assessment. To this end, the Ethiopian Public Health Institute (EPHI) intended to conduct the baseline assessment of MASReP in selected intervention woredas of the Amhara region.

2. Objectives

2.1. General objective: this baseline assessment aimed at providing baseline estimates of MASReP indicators among the intervention woredas

2.2. Specific objectives:

- To determine the prevalence of stunting among children 0-59 months.
- To assess the dietary diversity and ASF consumption during fasting season among children 6-23 months and PLW.
- To assess the production of diverse and nutritious food crops and livestock among households.
- To assess the knowledge, attitude, and practice (KAP) of PLW and caregivers of under two children towards feeding, care, and hygiene.
- To explore the coverage of ANC service among pregnant women and growth monitoring among 0-59 months children.
- To assess access to safe water, sanitation, and hygiene services among households.
- To assess the prevalence of food insecurity.
- To determine the proportion of women of reproductive age (WRA) supported with income-generating activities.
- To determine the number of health, education, water, irrigation, and agriculture facilities among districts.
- To assess the functionality of multi-sectorial coordination mechanisms among districts.

3. Materials and Methods

3.1. Study Design and Period

The assessment focused on community-level maternal and child nutritional status indicators and sector-level assessment for nutrition-sensitive and nutrition-specific interventions. Accordingly, a community-based cross-sectional survey was conducted among households. Additionally, a facility-based assessment was done among Food and Nutrition implementing sectors including health, education, agriculture, and water offices in the districts. Both the community and facility-based surveys were conducted from April – June 2022.

3.2. Study Area and Setting

The study was conducted in eight SD woredas (districts) from the Amhara regional state of Ethiopia where the full intervention packages of MASReP are planned to be implemented.

The MASReP interventions include 1) Climate-smart infrastructure development/maintenance (water supply and irrigation schemes, health, education, and agriculture facilities), 2) Livelihood support; production and promotion of nutritious food crops and livestock, 3) System/capacity strengthening activities, and 4) Project coordination and management. Among the 27 SD districts in the Amhara region, the full package interventions will be implemented in 9 selected SD districts while SBCC and system/capacity strengthening activities will be implemented in the 9 MASReP districts as well as in the remaining 18 districts in the region.

Table 1: Districts for baseline assessment of MASReP in Amhara region of Ethiopia, 2022

Region	Zone	Woreda
Amhara	North Gonder	Beyeda
		East Belesa
		West Belesa
	South Gonder	Lay Gayint
		Waghimra
	North Wello	Dahina
		Gazgibla
		Seqota Zuria
		Gazo

3.3. Study population

The study populations were women of reproductive age, live births in the last five years, households for the community-based survey, and Food and Nutrition implementing sectors of the study districts (Health, Education, Agriculture, and Water) for the facility-based survey.

All children under-five and/or WRA in the selected households who were permanent members or lived for six months in the study area were included in the study. On the other hand, WRA, caregivers/mothers of children under five, or household heads with significant cognitive impairment or illness that might interfere with the ability to participate in the interviews were excluded. Moreover, children 0-59 months or WRA with a deformity that limits taking anthropometric measurements were excluded only for anthropometric measurement.

3.4. Sample Size Determination

The sample size was determined using two-population proportion formula for detecting absolute percentage change of indicators over years of intervention. It was calculated for key project indicators: stunting among children 0-59 months and MDD among children 6-23 months and PLW. Finally, the sample size calculated for MDD among PLW was taken for giving the larger sample size.

$$n_i = \frac{\left[Z_{1-\alpha/2} \sqrt{2\bar{P}(1-\bar{P})} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)} \right]^2}{(P_1 - P_2)^2}$$

Where:

- n_i = required minimum sample size for PLW
- $P = (P_1 + P_2) / 2$
- $P_1 = 0.1$ - the hypothesized proportion of PLW who met the recommended MDD during the baseline assessment for the proposed project interventions(11)
- $P_2 = 0.2$ - the expected proportion of PLW to achieve the recommended MDD at the end-line of the proposed project interventions
- $Z_{\alpha/2} = 1.96$ - corresponding Z-score to the confidence-level of 95%
- $Z_{\beta} = 0.842$ (80% statistical power to detect magnitude change, if occurred)

- Non response rate = 5%
- n = 209 for (minimum sample size of PLW)

A design effect of stunting from EDHS 2019 that is 1.362 for the Amhara region was used (8). The number of households needed to get 209 PLW was calculated using the average number of PLW per household (0.3579) from the SD baseline survey (11) as a conversion factor. Finally, a sample size of 795 was obtained as the sample size computed for PLW was divided by the average number of PLW per HH.

Table 2: Summary of sample size calculation for MASReP baseline assessment in the Amhara region of Ethiopia, 2022

Indicator	Amhara		
	P1 (Prevalence at baseline)	P2 (Expected prevalence at end-line)	Sample size (HHs)
Stunting among under-five children	49.7%	37.7%	736
Dietary diversity among 6-23 months old children	0.6%	10.0%	694
Dietary diversity among PLW	10.0%	20.0%	795
Production of nutrient-dense crops among HHs	2.1%	10.7%	180

3.5. Sampling Procedure

A multi-stage cluster-random-sampling technique was employed. The eight full-package intervention districts of SD were included in the study. From each district, four kebeles were randomly selected. Each kebele was represented by a gote (lowest community-level administrative unit). Delineation and household listing were conducted in selected gotes and sampling frames with the list of eligible households (HHs with women and/or children under five) were developed. Then, 25 HHs were selected randomly from each gote.

For the facility-based survey, the assigned nutrition focal person or a representative in the NNP implementing sectors (health, education, agriculture, water, irrigation, and energy) among the eight districts were interviewed using a check-list added with document review.

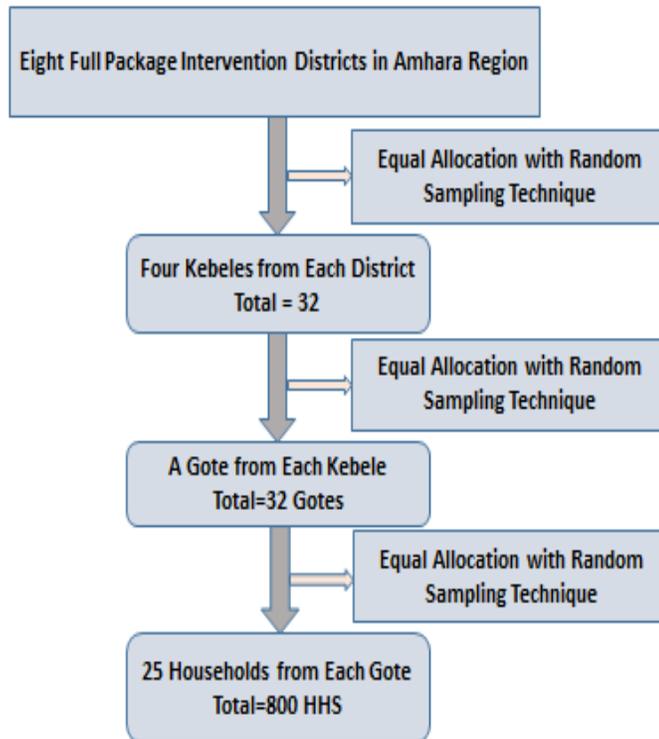


Figure 1: Diagrammatic presentation of the sampling procedure

3.6. Variables

Nutritional status (stunting, wasting, and underweight) of under 5 children, socio-demographic information (age, sex, education, occupational status, and marital status), socioeconomic status, WASH (access to safe water supply, and improved sanitation and hygiene), food insecurity, women dietary diversity, nutritional status of women, ANC services, IYCF practices (breastfeeding, complementary feeding and dietary diversity), growth monitoring, agricultural practices (crops and ASF production, irrigation and home gardening), number of health, education, water, and agriculture facilities, and availability of functional multi-sectoral coordination.

3.7. Data Collection Tools and Methods

For the community-based survey, questionnaires were adopted and customized for use following standard guidelines. Age was estimated using different techniques such as document/registration, mothers recall, or local events calendar. IYCF indicators were assessed using 2021 WHO IYCF guide based on a 24-hour recall (32). Weight and height measurements were conducted and child nutritional status indicators such as H/A, W/H, and W/A for children under five years of age were determined based on 2006 WHO growth standards (33). MUAC measurement was also done to identify acute malnutrition status among children 6-59 months of age (34).

The dietary diversity of WRA and PLW was assessed with the application of an open 24-hour recall qualitative technique using the 2021 FAO MDD-W guide (35). Questions for pregnancy-related information and ANC service utilization were developed based on the WHO ANC guideline (36). Moreover, women's empowerment levels were assessed using the Survey-based Women's empowerment (SWPER) index (37).

Food insecurity status was assessed using the FAO food insecurity experience scale that allowed household heads to recall food insecurity related experiences of members of the respective household over 12 months (38). Further, household WASH conditions were assessed using an adapted questionnaire from the WHO/UNICEF 2018 WASH guideline (39).

Socio-demographic information, agriculture practices, growth monitoring, and Knowledge and Attitude of PLW on IYCF, maternal nutrition, and stunting were measured using questions adopted from previous similar studies. Knowledge of PLW was assessed using questions about IYCF with possible response options. The questions were “*How long after birth should a baby start breastfeeding?*”, “*At what age (age in months) should a baby first start to receive foods in addition to breast milk?*” and the like. Response options for the respective question were only used by the data collectors to document the responses of the participants in a pre-coded format. On the other side, the attitude of PLW was assessed using statements about child and maternal nutrition and stunting with an agreement, neutrality, or disagreement response options. The attitudinal statements were “*Poor diet during pregnancy and the first two years of child age can cause child stunting*”, “*Colostrum (the "first yellowish milk") is not good for the baby and should be discarded*”, “*Lactating mother should eat a variety of foods more often (5 times a day*

including two additional meals)” and the likes. Scoring for knowledge and attitude was done independently for each of the knowledge questions or attitudinal statements. Also, results were reported for each of the questions used to assess knowledge and the statement used to assess attitude.

Facility-based data were also collected using a checklist adapted from the project indicators and previous studies on multi-sectoral coordination.

3.8. Data quality assurance

Procedures followed during the design and implementation of the survey to ensure the data quality are outlined below:

Development and translation of tools: the questionnaire for the household survey was originally designed in English and translated to Amharic with a back translation to English for consistency check. A checklist for the facility-based survey was also developed in English and translated into Amharic. The questionnaire was programmed in open data kit (ODK) using pre-coded responses to minimize errors as well as internal checks that require data input before advancing to another question.

Tool pre-test: the questionnaire was pre-tested in a non-study district by the survey team before the enumerator's training. A pilot test was also done on 5% of the total sample size in the non-study district after training and final edits were made to the data collection tool.

Recruitment and Training of Enumerators and Supervisors: Twenty-three data collectors with a minimum of BSc degree in Nutrition/Health science/Food Science and three supervisors with a minimum of MSc/MPH degree in Nutrition/Public Health/Food Science and previous experience in data collection/survey supervision were recruited. Enumerators and supervisors were trained on the study objectives, research ethics, cluster delineation, household listing, sampling procedure, interview techniques, data collection tools, and anthropometric measurements. Supervisors were also equipped on how to do monitoring of the survey for quality data. As the data collection tool was programmed using ODK, training was given on how to use ODK for data collection and send data to the central server.

Data collection follow-up: data collection was strictly supervised by supervisors and field team coordinators. Supervisors conducted random house-to-house checks of the data collection process. Both the supervisors and field team coordinators also reviewed the data collected each day before sending it to the server. After the data was sent to the server, the principal investigator and survey coordinator regularly review it, monitor frequencies of key variables including anthropometric measurement, and communicated feedback timely to the field team for corrections.

Data cleaning and preparation: The data downloaded from the server in a csv format were imported to STATA software version 16 and data cleaning activities were performed. Preliminary descriptive statistical analysis, for frequencies and percentages, was performed to assess data agreement between interdependent variables. These also helped to determine and document the number of participants to be reported for the respective indicators. All variables were re-labeled for ease of understanding. Data were checked for ID duplicates and IDs were re-assigned. Variables with open responses were coded and/or categorized accordingly. Data on crop and livestock production were re-organized using separate cleaning STATA commands to fit them with the respective study objective to address. Scores for food group consumption practice of WRA and children 6-23 months were checked against the list of food items documented because they were reported consumed by the respective woman or mother/caregiver of a child, and mismatches were corrected accordingly. Outliers of child nutritional status indicators (<-6 or >6 for HAZ, <-6 or >5 for WAZ, and <-5 or >5 for WHZ) were also excluded from the analysis according to WHO-UNICEF 2019 recommendations on Anthropometry analysis (33).

3.9. Data analysis

Data analysis was done using STATA software version 16. Descriptive analyses of observations were performed by calculating frequencies, percentages, and confidence intervals of the discrete variables. Means and standard deviations for symmetrically distributed continuous variables or medians and interquartile ranges for continuous variables with non-symmetrical distribution were also calculated. Results for all project indicators were calculated based on standard guidelines and previous similar studies. Disaggregation of results into male-headed and female-

headed households or boys and girls for children was considered based on applicability and relevance.

3.10. Strengths and limitations of the study

The inclusion of almost all the full package intervention districts, addressing the basic indicators of MASReP, integration of maternal and child nutrition, and coverage of a wide range of nutrition-sensitive and specific interests can be considered as strengths of the current study. Additionally, the use of standardized data collection tools also adds value.

The timing of the survey which was a post-instability period in the study area might have affected some of the results. The results on dietary diversity of children 6-23 months and WRA determined using a single day 24-hour recall may not reflect their usual dietary pattern. Moreover, the data were collected during a non-fasting season and fasting practices were assessed on a recall basis. The lack of qualitative analysis to support the quantitative findings can also be considered as a limitation of the study.

3.11. Ethical clearance

Certificate of ethical approval, Ref No EPHI 613/833, was obtained from the institutional review board (IRB) of EPHI. Regional, zonal, district, and kebele administrators were communicated and permission letters were secured before the start of data collection. Written informed consent was also obtained from adult participants and caregivers of children under-five and the confidentiality of every respondent was guaranteed.

4. Results

4.1. Household-level characteristics

4.1.1. Socio-demographic characteristics of household heads

Key findings

- **Household headship:** three-fourth (75%) of households were male headed while the remaining one-fourth (25%) were female headed.
- **Educational status:** almost half of the household heads (47%) never attended formal education and could not read and write while more than a quarter (28%) attended school from grades one up to eight.

A total of 776 households participated in the survey with a response rate of 98%. Three-fourths (75%) of the household heads were male and married or living together. Nearly all (98%) of the household heads reported that they are orthodox religion followers. Most (78%) of the household heads were 25 to 55 years old. Regarding their educational status, almost half of the household heads (47%) never attended formal education and could not read and write while more than a quarter (28%) attended school from grades one up to eight. Occupation of the household heads was grouped based on the international standard classification of occupations (ISCO) developed by the international labor office (ILO) (40) and accordingly, nearly three-fourths (74%) of the household heads reported occupations were under the skilled agricultural, forestry and fishery workers category (Annex-1).

4.1.2. Family size and livelihood of households

Key findings

- **Main livelihood:** Self-produced field crops were the main livelihood or income source for about 75% households followed by own business including commerce (13%)

The mean \pm SD of family size among all households was 4.2 ± 1.8 . Figure 2 below indicates the means of livelihood and income sources of households that participated in the baseline assessment. Self-produced field crops and own businesses including commerce were the main

means of livelihood or income source for about 75% and 13% of households, respectively. Livestock rearing was the optional or other means of livelihood for one out of three (32%) households.

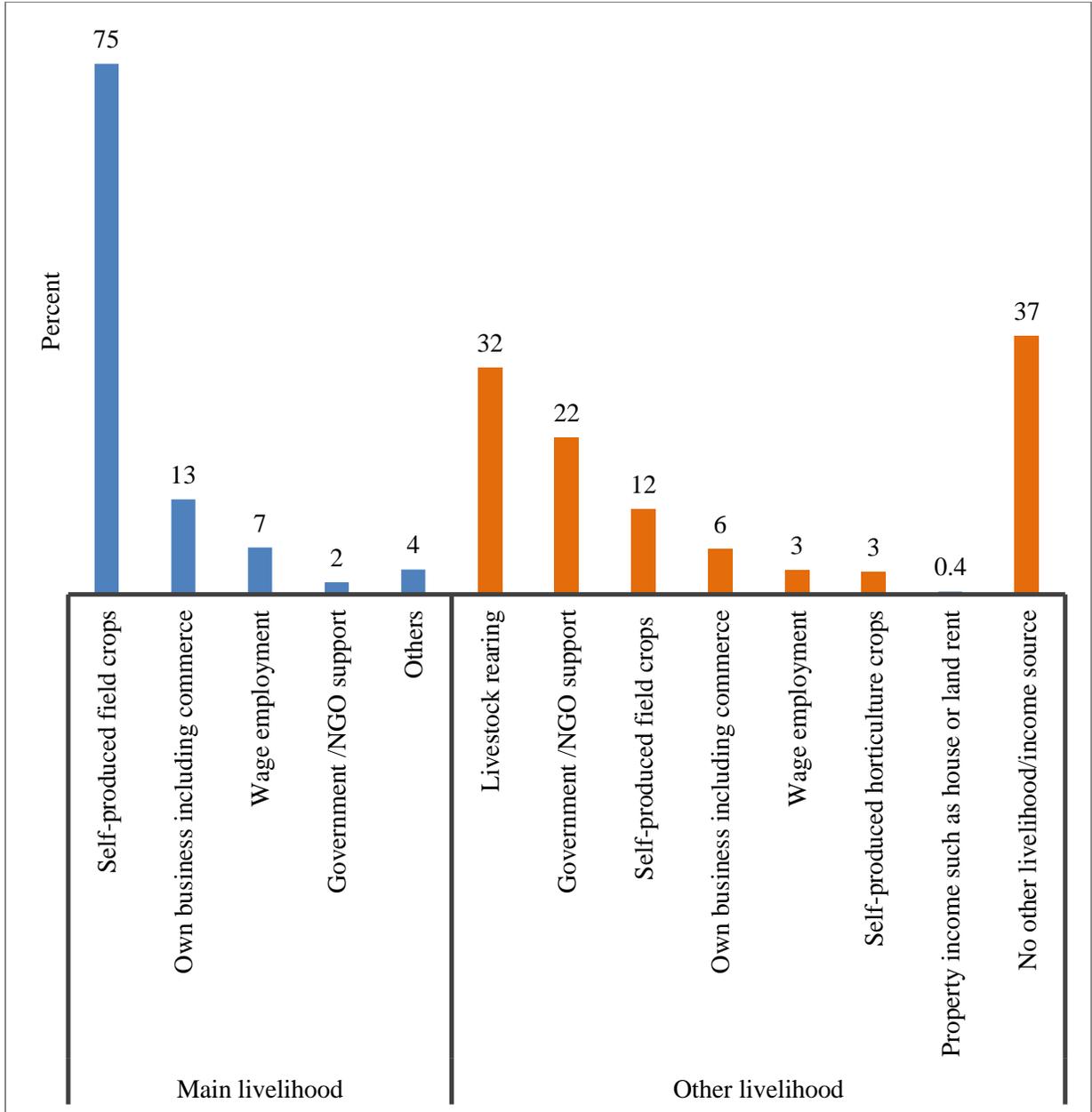


Figure 2: Main and other livelihood or income sources of households among MASReP intervention districts in Amhara region of Ethiopia, 2022

4.2. Food insecurity

Key findings

- **Food insecurity:** the overall prevalence of food insecurity was 77% with 50% moderate and 28% severe food insecurity.

Food insecurity was assessed using the FAO food insecurity experience scale and the result is presented using Figure 3 below. The prevalence of moderate and severe food insecurity among the study areas was 50% and 28%, respectively. Overall, the majority (77%) of the population was found to be moderately or severely food insecure.

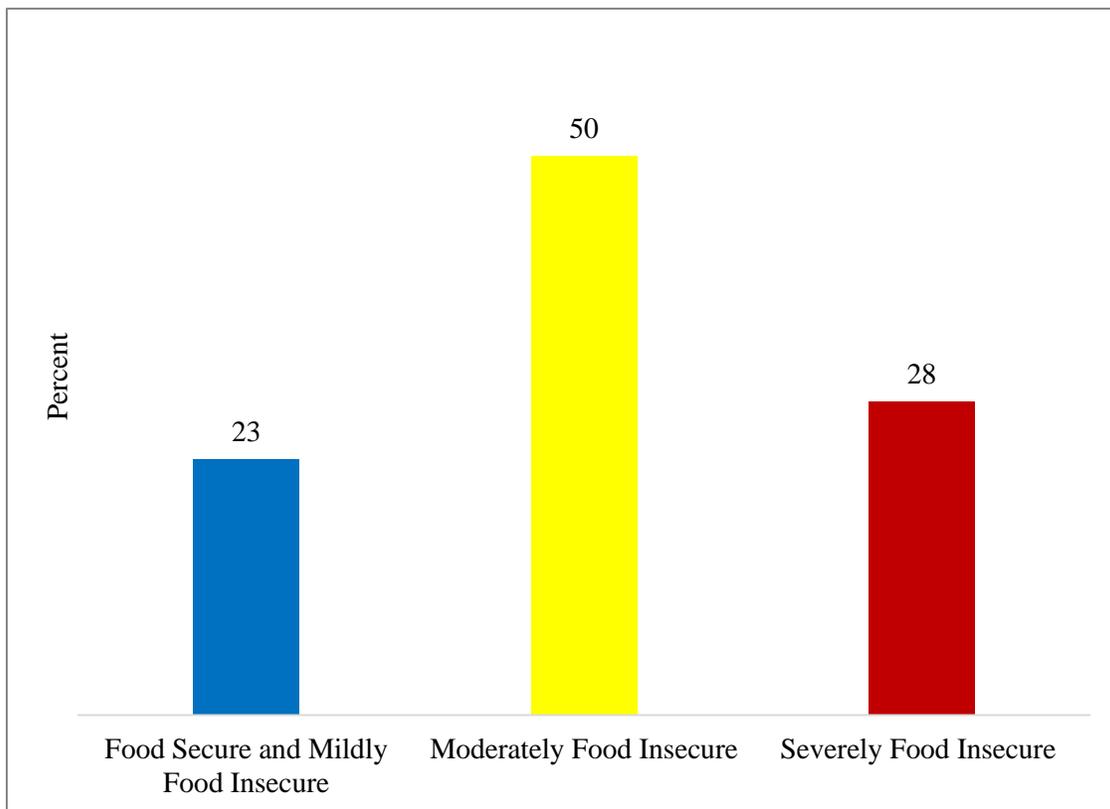


Figure 3: Percentage distribution of food insecurity status of households among MASReP intervention districts in the Amhara region of Ethiopia, 2022

4.3. Water, sanitation, and hygiene

Key findings

- **Drinking water:** About 43% of households had limited drinking water service while 36% had basic service.
- **Sanitation:** About two-thirds (63%) of households practiced open defecation and around one-fifths (22%) use unimproved toilet facility.
- **Hygiene:** More than a quarter (28%) of households had no hand washing facility whereas 65% had limited hand washing facility.

According to the WHO/UNICEF, joint monitoring program for water supply, sanitation, and hygiene, drinking water source is considered basic if it is fetched from an improved source, provided collection time is not more than 30 minutes for a round trip, including queuing. On the other side, it is considered limited if it is fetched from an improved source for which collection time exceeds 30 minutes for a round trip, including queuing (39). Table 3 is with household-level water, sanitation, and hygiene conditions. About 43% of the households accessed drinking water from limited sources and about 36% got it from basic sources. The result is comparable among female-headed and male-headed households.

Sanitation facilities are considered unimproved if the households use pit latrines without a slab or platform, hanging latrines, or bucket latrines. Open defecation is the disposal of human feces in fields, forests, bushes, open bodies of water, beaches, or other open spaces, or with solid waste. About two-thirds (63%) of the households practiced open defecation while about one-fifth (22%) of the households use unimproved toilet facilities which are almost equivalent among male and female-headed households. Moreover, the use of improved toilet facilities that are not shared with other households is defined as basic while improved facilities shared between two or more households are named as limited (39). In this study, the remaining 7% and 8% of the total households use limited and basic sanitation facilities respectively.

In the study areas, basic hand washing facility was found in 7% of the total households, female-headed households or male-headed households. A hygiene facility is considered basic if a hand washing facility is available on the premises with soap and water. More than a quarter (28%) of

the total households and 27% of male-headed and 33% of female-headed households were found with no hand washing facility. A higher proportion of male-headed (67%) and about 61% of female-headed households had limited hygiene facilities. Hygiene facility is considered limited if a hand washing facility is available on the premises without soap and/or water (39).

Table 3: Water, sanitation, and hygiene condition of households among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Indicator (N=776)	Male-headed		Female-headed		Total	
	Percent	95%CI	Percent	95%CI	Percent	95%CI
Drinking water						
Basic	36	[27.8, 45.1]	34.7	[24.7, 46.3]	35.7	[27.6, 44.7]
Limited	42.5	[33.6, 52]	42.5	[31.2, 54.6]	42.5	[33.8, 51.8]
Unimproved	17.3	[11.2, 25.8]	14.5	[6.9, 28]	16.6	[10.5, 25.4]
Surface Water	4.1	[2.1, 8]	8.3	[3.4, 18.9]	5.2	[2.6, 9.9]
Sanitation services						
Basic	9.3	[6.3, 13.5]	6.7	[3.7, 12.2]	8.6	[6.1, 12.1]
Limited	7	[4.4, 11.1]	5.2	[2.72, 9.7]	6.6	[4.3, 10]
Unimproved	21.3	[15.9, 27.8]	22.3	[14.6, 23.4]	21.5	[16.3, 27.9]
Open defecation	62.4	[53.7, 70.5]	65.8	[54.2, 75.8]	63.3	[54.8, 71]
Hygiene						
Basic	6.7	[4.2, 10.6]	6.7	[2.7, 16]	6.7	[4, 11]
Limited	66.6	[57.7, 74.4]	60.6	[48.9, 71.2]	65.1	[55.9, 73.9]
No facility	26.8	[18.7, 36.8]	32.6	[22.8, 44.4]	28.2	[19.8, 38.5]

As presented in Table 4 below, nearly all (95%) of the households practice none of the drinking water treatment options. About half (48%) of households dispose of solid waste on the street or open space while 28% of the households burn it. Among households that have livestock, about half (49%) use confined space or “*beret/gata*” to keep the livestock while one-thirds (32%) of poultry-owning households use cage or “*kote*” to keep poultry. Out of the 368 PLW, most of them practice hand washing before eating (85%), before preparing food (83%), and before serving a meal (80%). However, less than half of (47%) the PLW practice hand washing after visiting the toilet.

Table 4: Water treatment, solid waste disposal, domestic animal keeping, and hand washing practices of households and PLW among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Characteristics	Frequency	Percentage
Drinking water treatment practice (N=776)		
No treatment	740	95.4
Strain through cloth	14	1.8
Add bleach chlorine	12	1.5
Others	10	1.3
Households provided with water filtration tool (N=776)	31	4
Primary solid waste disposal mechanism (N=776)		
Dumped on street/open space	371	47.8
Burned	217	28
Disposed in the compound	99	12.8
Buried	65	8.4
Others	24	3.1
Use of confined space among HHs who have livestock(N=552)	377	48.6
Use of cage/“kote” among HHs who have poultry (N=522)	248	32
Hand-washing practice among pregnant and lactating women (N=368)		
Before eating	311	84.5
Before preparing food	305	82.9
Before serving a meal	294	79.9
After touching dirty things	245	66.6
After visiting toilet	172	46.7
After cleaning home	151	41
Before feeding a child	125	34
After cleaning child’s bottom	67	18.2

4.4. Child nutrition and health

A total of 540 children 0-59 months' have participated in this study. Among them, slightly more than half (53%) of the children were boys and nearly one-thirds (28%) were between the ages of 6-23months while about 11% were 0-5 months (Annex-2).

4.4.1. Nutritional status of children 0-59months

Key findings

- **Stunting:** the prevalence of stunting was 43% among children 0-59 months and 39% among children 0-23 months. Stunting was more prevalent among boys (46%) than girls (39%) and increases with age from 29% among children 0-5months up to the highest 53% among children 24-35 months.
- **Wasting:** about 11% of children 0-59 months were wasted and the highest prevalence was found among children 6-11 months (15%).

The prevalence of stunting which is a sign of chronic under nutrition was 43% among the overall children 0-59 months and 39% among 0-23 months while severe stunting was 20%. Stunting was more prevalent in boys (46%) than in girls (39%) and it increased with age from 29% among 0-5 months children up to the highest 53% among 24-35 months children (Table 6). Moreover, a higher prevalence of stunting was found among children whose mothers had no ANC visit (47%) than among children whose mothers had four or more ANC visits (41%). Similarly, stunting prevalence was also higher in children with mothers who were married before they were 21 years old (43%) than children with mothers who were married at the age of 21 or more (40%) (Annex-3).

Wasting represents acute undernutrition. As it is presented in table 6 below, the prevalence of wasting among children 0-59 months was 11% while severe wasting was 3%. Unlike stunting, wasting was slightly higher in girls (12%) than in boys (10%) while severe wasting was more prevalent in boys (4%) than in girls (3%). The highest prevalence of wasting was also found among children 6-11 months (15%).

On the other hand, underweight reflects both acute and chronic undernutrition in which 29% of children 0-59 months were underweight and 8% were severely underweight. The prevalence was higher among boys (30%) than girls (27%) and children aged 12-23 months (34%) (Table 5).

Table 5: Prevalence of stunting, wasting, and underweight from MASReP intervention districts in the Amhara region of Ethiopia, 2022

Background characteristic	Stunting			Wasting			Underweight		
	Stunting	Severe Stunting	N	Wasting	Severe wasting	N	Underweight	Severe Underweight	N
	% [95% CI]	% [95% CI]		% [95% CI]	% [95% CI]		% [95% CI]	% [95% CI]	
Sex									
Boys	46.1[39.3,53.0]	22.7[17.3,29.2]	282	10.4[7.6,14.0]	3.9[2.2,6.9]	279	30.3[25.8,35.3]	8.7[5.8,13.0]	287
Girls	38.5[31.2,46.3]	16.6[11.5,23.3]	247	11.9[8.3,16.8]	2.5[1.2,5.1]	244	27.4[21.5,34.1]	6.3[3.8,10.5]	252
Age in months									
0-59	42.5[37.4,47.8]	19.8[16.2,24.1]	529	11.1[8.6,14.1]	3.3[2.0,5.2]	523	28.9[25.1,33.1]	7.6[5.5,10.4]	539
0-5	29.1[16.4,46.3]	16.4[7.7,31.4]	55	10.2[4.4,22.0]	4.1[1.0,15.8]	49	16.7[9.3,28.0]	3.3[0.7,13.6]	60
6-11	30.9[19.6,45.1]	14.5[8.7,23.3]	55	14.5[7.3,27.0]	3.6[0.9,13.9]	55	18.2[10.0,30.8]	3.6[0.8,14.6]	55
12-23	48.9[36.3,61.7]	25.5[16.5,37.2]	94	10.6[5.4,20.0]	5.3[2.3,11.7]	94	33.7[24.0,45.0]	7.4[3.6,14.4]	95
24-35	52.7[40.9,64.3]	22.7[14.8,33.3]	110	9.2[5.0,16.3]	4.6[2.0,10.4]	109	32.4[21.5,45.6]	8.1[4.2,15.2]	111
36-47	47.4[37.2,57.8]	19.8[14.1,27.2]	116	10.3[6.5,16.0]	1.7[0.4,6.6]	116	32.5[24.9,41.1]	13.7[8.6,21.0]	117
48-59	33.3[23.0,45.6]	16.2[9.9,25.2]	99	13[7.9,20.7]	1[0.1,6.9]	100	29.7[22.9,37.6]	5[2.3,10.5]	101

Figure 4 also illustrates acute malnutrition among children 6-59 months based on MUAC measurement. The prevalence of Global Acute Malnutrition (GAM) (MUAC<125 mm) was 9% while Severe Acute Malnutrition (SAM) was 1%. Comparable to wasting, as both of them are signs of acute under nutrition, GAM was more prevalent in girls than boys (11% vs. 7%) and among 6-11 months children (18%).

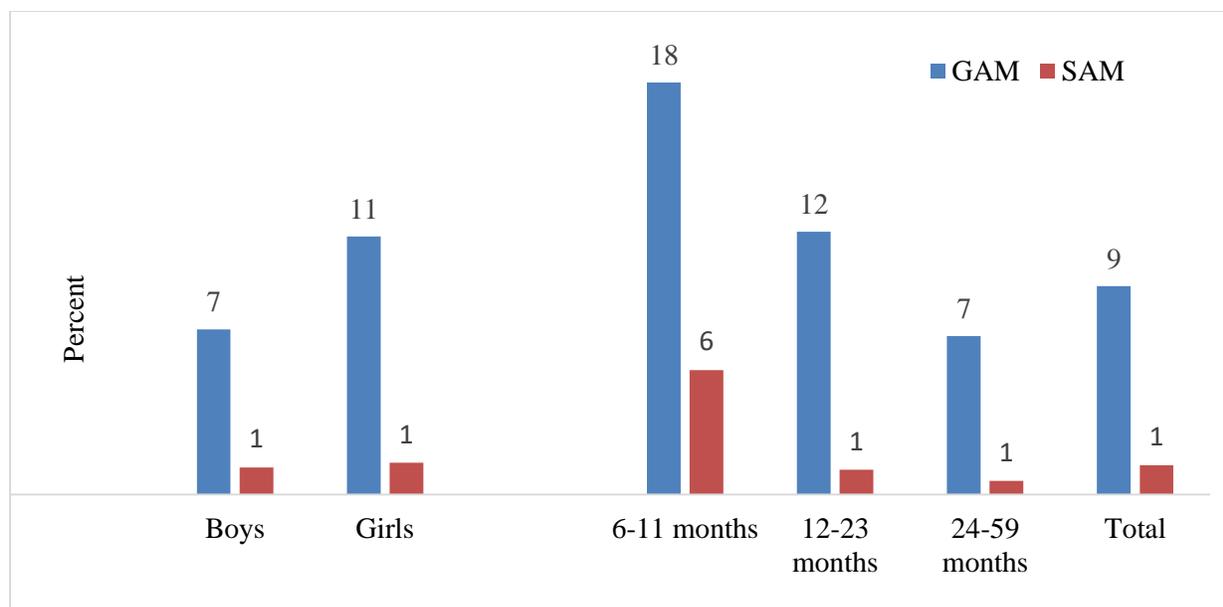


Figure 4: Prevalence of acute malnutrition (MUAC) among children 6-59 months from MASReP intervention districts in the Amhara region of Ethiopia, 2022

4.4.2. Infant and young child feeding practices

4.4.2.1. Breastfeeding

Key findings

- **Ever breastfed:** almost all (99.5%) children 0-23 months have been breastfed at some point in their life.
- **Exclusive breastfeeding:** the prevalence of exclusive breastfeeding under 6 months was 73% and it was slightly higher in boys (75%) than in girls (72%)

Almost all (99.5%) children 0-23 months in the study area have been breastfed at some point in their life. Breastfeeding is recommended to be initiated immediately after birth (within one hour) and 70% of the children were put to the breast according to the recommendation. Exclusive breastfeeding for the first two days after birth was 87%. Furthermore, the prevalence of exclusive breastfeeding for the first 6 months was 73% and it was slightly higher in boys than in girls (75% vs. 72%) respectively. In MASReP study districts, mixed milk feeding under 6 months (feeding formula and/or animal milk in addition to breast milk) was not widely practiced which was only 3% (0% in boys and 6% in girls). About 93% of children continued breastfeeding 12-23 months

and the prevalence was higher among boys (95%) than in girls (88%). The magnitude of bottle feeding was 10% among 0-23 months children (Table 6).

Table 6: Breastfeeding practices among 0-23months children from MASReP intervention districts in the Amhara region of Ethiopia, 2022

Indicator	Boys	Girls	Total	N
	% (CI)	% (CI)	% (CI)	
Ever breastfed (0-23m)	100	98.9[92.6,99.9]	99.5[96.5,99.9]	210
Early Initiation of BF (0-23m)	69.8[57.9,79.6]	70.2[58.2,79.9]	70[61.2,77.5]	210
Exclusively breastfed, first two days	87.1[78.8,92.4]	86.2[77.5,91.9]	86.7[81.3,90.7]	210
Exclusively breastfed (0-5 m)	75 [56.3,87.5]	71.9[53.5,85.0]	73.3[61.3,82.7]	60
Mixed milk feeding (0-5 m)	-	6.3[1.4,23.6]	3.3[0.8,13.5]	60
Continued breastfeeding (12-23m)	95.1[85.6,98.4]	88.2[71.1,95.8]	92.6[85.7,96.4]	95
Bottle feeding (0-23m)	8.6[4.7,15.3]	10.6[6.0,18.1]	9.5[6.5,13.7]	210

4.4.2.2 Complementary feeding

Key findings

- **Minimum dietary diversity:** only 5% of children 6-23 months met the MDD and the proportion is higher in boys (6%) than in girls (3%).
- **Minimum meal frequency (MMF):** 41% (44% boys and 37% girls) children consumed foods the minimum number of times in the previous day and night before the survey.
- **Minimum acceptable diet:** only 4% of children met MAD which is higher in boys than

Table 7 below describes complementary feeding indicators among children 6-23 months. Complementary foods (solid, semisolid, and soft foods) should be introduced at the age of 6 months. However, only 36% (40% boys and 33% girls) of children 6-8 months were introduced solid, semisolid, or soft foods timely. According to the 2021 WHO IYCF guideline, MDD is defined as consumption from at least five food groups out of eight (32). Based on this, only 5% of children 6-23 months met the MDD and the magnitude is higher among boys (6%) than in

girls (3%). Most of the children (93%) consumed breast milk during the previous day followed by ‘grains, roots, and tubers’ and ‘pulses/legumes’, 79% and 65% respectively (Figure 5).

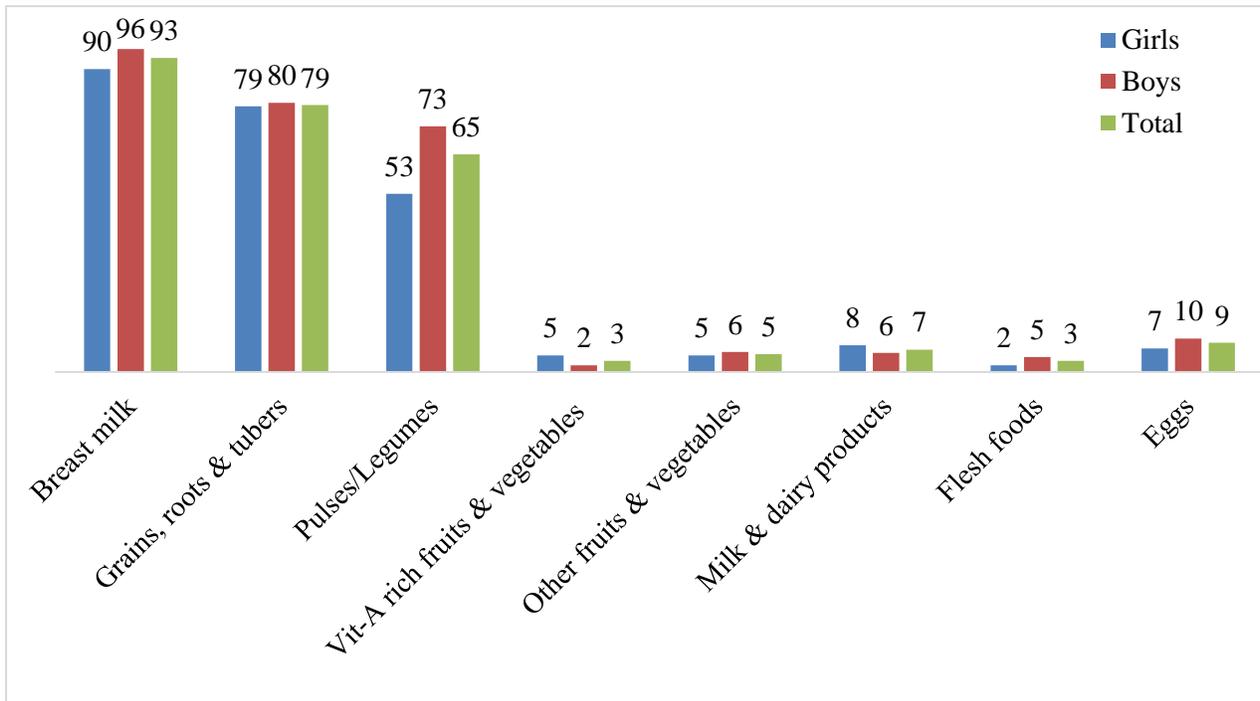


Figure 5: Proportion of Children 6-23 months consumed different food groups among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Concerning the MMF, 41% of children consumed foods the minimum number of times in a day which is higher in boys (44%) than girls (37%). MAD is a composite indicator of MDD and MMF. Overall, only 4% of children met MAD which is higher in boys than in girls. Regarding ASF consumption, only 11% of 6-23 months children consumed egg and or flesh foods (14% boys vs. 8% girls). On the other hand, about 91% of children 6-23 months did not consume any vegetable or fruit in the 24 hours before the survey. Sweet beverages and unhealthy foods such as chips, sweet biscuits, and fried dough (*‘kokor’*, *‘bonbolino’*...) are not advised for infants and young children. In the study area, sweet beverages and unhealthy foods consumption was 26% and 6% among children 6-23 months respectively (Table 7).

Table 7: Complementary feeding practice among children 6-23 months from MASReP intervention districts in the Amhara region of Ethiopia, 2022

Indicators	Boys (N=88)	Girls (N=62)	Total (N=150)
Introduction of solid semisolid or soft foods 6-8months (N=25)	40[12.8,75.2]	33.3[10.7,67.6]	36[15.0,64.2]
Minimum Dietary Diversity (> 5)	5.7[2.0,14.8]	3.2[0.8,12.1]	4.7[1.9,10.9]
Minimum meal frequency	44.3[34.3,54.8]	37.1[25.3,50.7]	41.3[32.8,50.4]
Minimum acceptable diet (MAD)	4.5[1.7,11.4]	3.2[0.8,12.1]	4[1.7,9.4]
Egg and/or Flesh foods consumption	13.6[7.0,24.8]	8.1[2.9,20.4]	11.3[6.6,18.7]
Sweet beverage consumption	25[15.1,38.4]	27.4[18.2,39.0]	26[18.2,35.7]
Unhealthy food consumption	6.8[3.11,14.3]	4.8[1.6,13.9]	6[3.2,11.0]
Zero vegetable and fruit consumption	92.1[84.0,96.2]	90.3[82.1,95.0]	91.3[85.6,94.9]

4.4.3. Nutrition and health service utilization

Key findings

- **Growth monitoring:** about 19%, 10% and 53% of children under five had their weight, height and MUAC measurements taken in 3 months before the survey respectively.
- **Institutional delivery:** majority of the children (60%) were born in health facility while 39% of the children were born at home.

Coverage of growth monitoring service was assessed 3 months before the survey and weight and height measurements were conducted for 19% and 10% of the children respectively. Besides, slightly more than half (53%) of children 6-59 months were screened for acute malnutrition using MUAC (Table 8).

About one-fifths (20%) of 0-59 months children were weighed at birth. Moreover, the majority of children were born in health facilities (53% in the health center and 7 in the hospital) while a considerable number (39%) were born at home (Table 8).

More than two-thirds (69%) of children 6-59 months received vitamin A supplement in the six months before the survey. During the same period, 42% of children 24-59 months were dewormed. Likewise, 10% of the children received multiple micronutrient supplements in the month prior to the survey (Table 8).

Table 8: Growth monitoring and other Nutrition and health service utilization among 0-59months children from MASReP intervention districts in the Amhara region of Ethiopia, 2022

Nutrition and Health Services	Frequency	Percent
Growth monitoring in 3 months		
Weight measured	103	19.1
Height measured	55	10.2
MUAC measured	288	53.3
Weighed at Birth	106	19.6
Place of birth		
Home	208	38.5
Health Center	285	52.8
Public Hospital	39	7.2
Others	8	1.5
Vitamin A supplementation	332	69.2
Multiple Micronutrient supplementation	46	9.6
Deworming	140	42.4

4.4.4. Common childhood illnesses and treatment seeking behavior

Key findings

- **Diarrhea:** about one-fifths (20%) of children reported to have diarrhea 2 weeks before the survey while more than half of them (56%) sought advice or treatment.
- **Fever:** 29% of children had fever in the 2 weeks prior to the survey and nearly half of them (48%) received treatment for it.
- **Symptoms of Acute Respiratory Infection (ARI):** it was reported that 11% of children had symptoms of ARI with 57% of them receiving treatment.

The prevalence of common childhood illnesses (diarrhea, fever, and ARI) and treatment-seeking behavior were assessed among children 0-59months. About one-fifths (20%) of children reported having diarrhea 2 weeks before the survey while more than half of them (56%) sought advice or treatment. About 80% and 44% of children reported receiving oral rehydration solution and zinc for the treatment of diarrhea respectively. Whereas 29% of children had a fever in the 2 weeks prior to the survey and nearly half of them (48%) received treatment for it. Symptoms of ARI include cough accompanied by short, rapid breaths or difficulty of breathing, and it was reported among 11% of children while 57% of them sought treatment. Most (about 80-90%) of the

children sought advice/treatment from a government health center for the three (diarrhea, fever, and ARI) while the remaining sought treatment from a government health post (Table 9).

Table 9: Prevalence of common childhood illnesses and health-seeking behavior among 0-59months children from MASReP intervention districts in the Amhara region of Ethiopia, 2022

Characteristics (N=540)	Frequency	Percent
Had Diarrhea Last 2 weeks	110	20.4
Seek advice/treatment for Diarrhea	61	55.5
Place where diarrhea was treated		
Government health center	51	83.6
Government health post	8	13.1
Government or Private hospital	2	3.3
Type of treatment received for diarrhea		
Received ORS	49	80.3
Received Zinc	27	44.3
Received Homemade fluid	15	24.6
Had Fever Last 2 weeks	158	29.3
Seek advice/treatment for Fever	76	48.1
Place where fever was treated		
Government health center	68	89.5
Government health post	8	10.5
Had symptoms of ARI in the past 2 weeks	57	10.6
Seek advice/treatment for ARI symptoms	34	59.6
Place where symptoms of ARI were treated		
Government health center	27	79.4
Government health post	6	17.6

4.5. Women's Nutrition and Health

4.5.1. Socio-demographic characteristics of women

Key findings

- **Education:** more than half of WRA (53%) never attended formal education and could not read and write.
- **Age at first marriage:** about one-fifths (20%) of WRA were married before they were 15 years old. Whereas, majority (72%) had their first marriage between the ages of 15 to 20 years.
- **Age at first pregnancy:** more than one-thirds (37%) had their first pregnancy before their 18th year's birthday while more than half (56%) had their first pregnancy when they were 18 to 23 years old.

A total of 846 WRA were included in the study, of these, more than half (56%) were between 15 to 30 years old. Almost all (98%) of them were Orthodox religion followers and nearly two-thirds (65%) of the women were married or living together. Regarding women's educational status, slightly more than half of the women (53%) never attended formal education and could not read and write, while only 4% of them attended college and above. Concerning occupation, nearly two-thirds (64%) of the women had no occupation.

About one-fifths (20%) of the women had their first marriage before their 15th birthday whereas the majority (72%) of them had their first marriage when they were 15 to 20 years old. Besides, more than half (56%) of the women had their first pregnancy when they were 18 to 23 years old. However, 37% of them had their first pregnancy before their 18th birthday (Annex-5).

4.5.2. Nutritional status of women

Key findings

- **Underweight:** based on BMI classification, one-fourths (25%) of the overall WRA and one-fifths (20%) of lactating women were underweight.
- **Acute malnutrition:** 17% of WRA and 33% PLW were found to be acutely malnourished according to MUAC measurement classification.

Table 10 below describes the nutritional status of WRA and PLW. Based on BMI classification, one-fourths (25%) of WRA and one-fifths (20%) of lactating women were underweight. A high proportion of WRA (17%) and PLW (33%) were found to be acutely malnourished according to MUAC measurement classification.

Table 10: Nutritional status of women of reproductive age, lactating mothers, and pregnant women among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Indicator		%(95%CI)	N
Women of Reproductive Age			
Body Mass Index	Underweight	25(21.1, 29.4)	751
	Normal	72.6(68.6, 76.3)	751
	Overweight	2.3(1.4, 3.6)	751
	Lactating Women		
	Underweight	20.3(15.3, 26.4)	291
	Normal	78.4(72.6, 83.2)	291
	Overweight	1.4(.53, 3.6)	291
Acutely malnourished (MUAC)	Women of reproductive age	17.1 (13.7, 21)	844
	Pregnant and lactating women	32.6 (26.6, 39.4)	383

4.5.3. Minimum dietary diversity for women (MDD-W)

Key findings

- **Minimum Dietary Diversity for Women:** only 0.5% of WRA or PLW achieved MDD-W. More than two-thirds (71%) of WRA or PLW consumed from 2 food groups out of 10.

Both WRA and PLW had limited consumption of a diversified diet. Almost all of the PLW reported consumption of cereals (100%) and pulses (93%) on the day before the survey. Whereas, the consumption of dark green leafy vegetables (2%), other vitamin A-rich fruits and vegetables (1), and other fruits (0.3%) were found to be minimal (Figure 6).

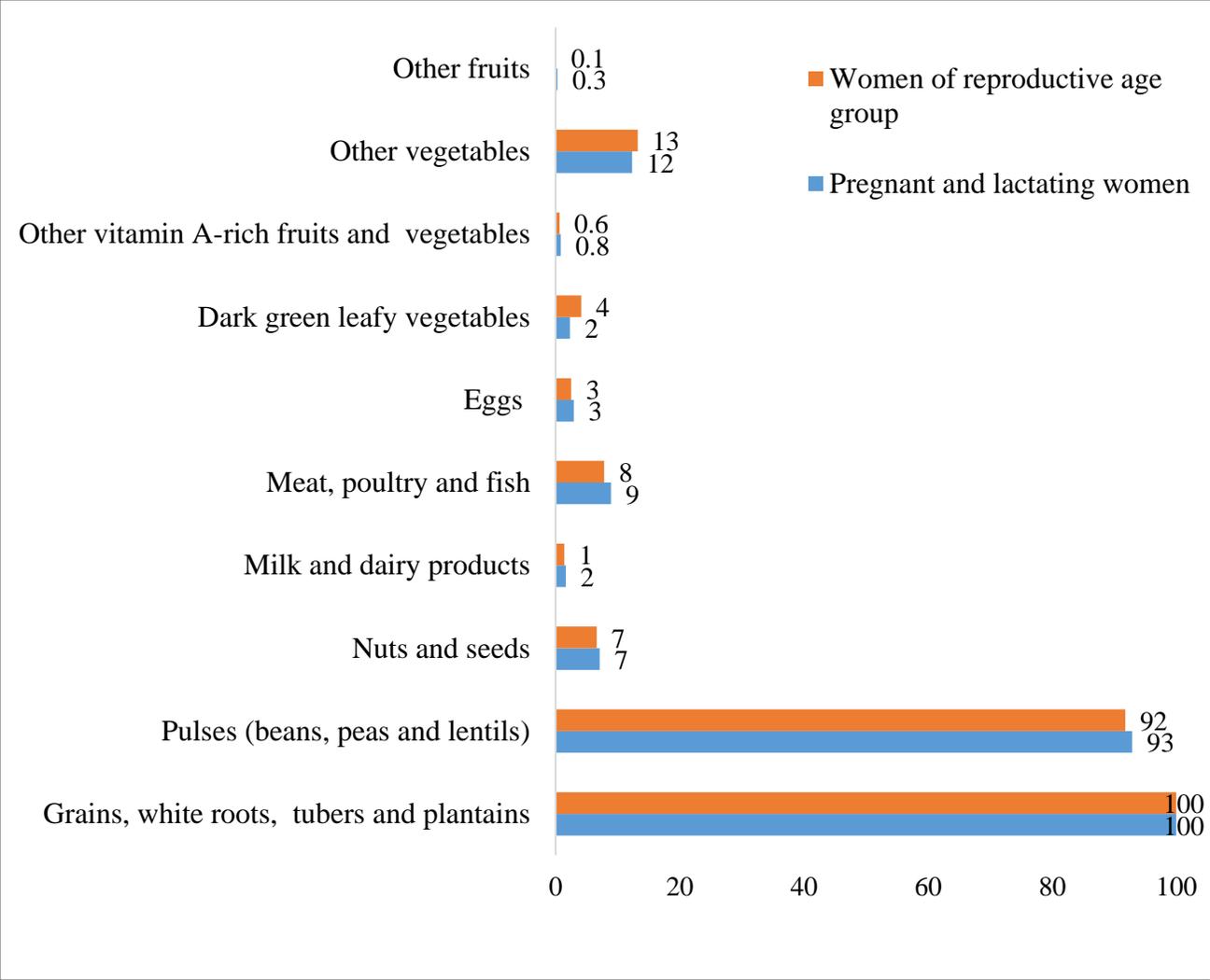


Figure 6: Food groups consumption practice of pregnant and lactating mothers and women of reproductive age among MASReP intervention districts of Amhara region of Ethiopia, 2022

The study showed that WRA’s and PLW’s food consumption is based on a dichotomous diet. More than two-thirds (71%) of WRA or PLW was consumed from only two food groups. Only about 5% of WRA or PLW was consumed from four food groups out of the ten recommended food groups. Overall, only 0.5% of WRA or PLW achieved MDD-W (consumed ≥ 5 food groups out of the ten) the previous day and night (Figure 7).

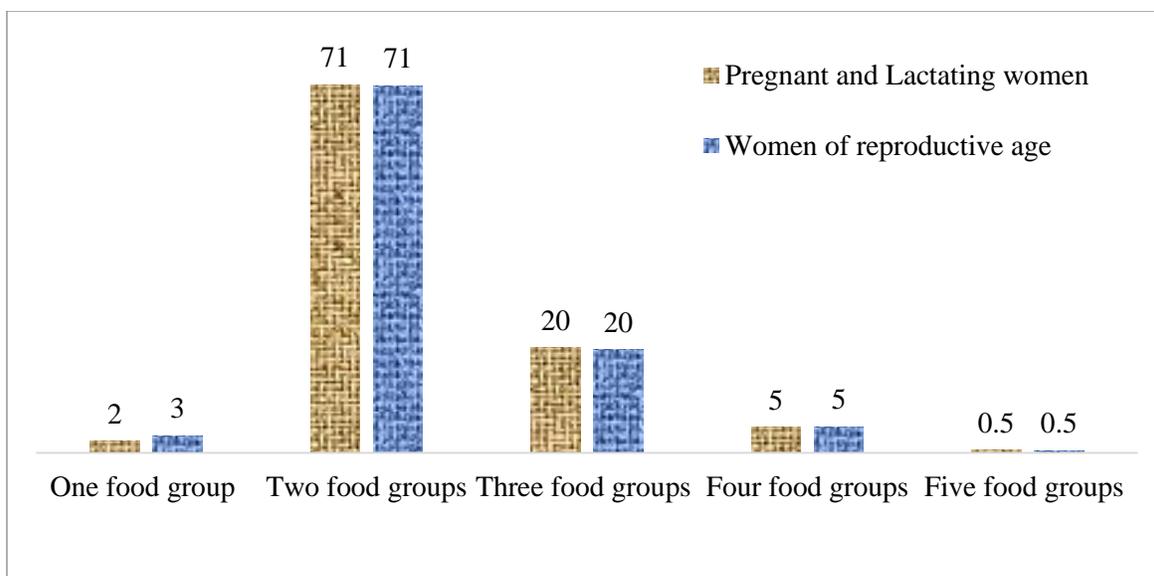


Figure 7: Dietary diversity of pregnant and lactating women and reproductive-age women among MASReP intervention districts in the Amhara region of Ethiopia, 2022

4.5.4. Antenatal and postnatal service utilization

Key findings

- **ANC:** 46% of women who gave birth in the last five years had at least 4 ANC visits during their most recent pregnancy.
- **Iron folate:** one-fifths (21%) of women took Iron folate for the recommended 90 plus days during their most recent pregnancy.

Almost half of the women (46%) had at least 4 ANC visits according to the Focused Antenatal Care approach during their most recent pregnancy (41,42). Nearly all of them (99.8%) received ANC services from government health facilities. Out of those who attended ANC, most (86%) had their blood pressure measured, 86% TT vaccinated, and 71% counseled about nutrition. One-fifths (21%) of the women who gave birth in the last five years took iron-folate for the recommended 90 days or more. In contrast, more than one-fourths (27%) of women didn't take any iron-folate during their most recent pregnancy. Out of the total women who gave live birth during the five years before the survey, less than half (43%) of them were counseled about breastfeeding, and 39% of the women were observed while breastfeeding by health care provider during the first two days after delivery (Table 11).

Table 11: Antenatal and postnatal service utilization of women who gave birth in the five years before the survey among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Antenatal and Postnatal Services	Frequency	Percent
Number of ANC Visit (N=446)		
4 or more visits	203	45.5
1-3 visits	172	38.6
No ANC visit	71	15.9
Place of ANC Follow-up (N=375)		
Government hospital	18	4.8
Health Center	307	81.9
Health post	49	13.1
Private facility	1	0.3
Services received during ANC follow-up (N = 375)		
Take a blood sample	324	86.4
Counseled about which foods to eat while pregnant	265	70.7
Counseled about how often to eat while pregnant	240	64
Counseled about how much weight the women should get	136	36.3
Counseled about breastfeeding	188	50.1
TT vaccination	323	86.1
Weighed once or more times during ANC	222	59.2
Number of days Iron Folate taken (N = 446)		
90 days and above	93	20.9
Less than 90 days	222	49.8
Don't know	13	2.9
Didn't took	118	26.5
Source of Iron Folate (N= 328)		
Government facility	321	97.9
Private facility	7	2.1
Dewormed during pregnancy (N=446)	121	27.1
Outcome of recent pregnancy (N=446)		
Live birth	440	98.7
Still birth	6	1.3
Postnatal Care Services received (N = 440)		
Counseled about breastfeeding	191	43.4
Observed while breastfeeding	172	39.1
Counseled about which foods to eat during lactation	151	34.3
Counseled about frequency of eating during lactation	137	31.1

4.5.5. Knowledge and attitude towards child and maternal nutrition

Key findings

- **Knowledge:** About 88% and 81% of PLW recognized that a baby should be given only breast milk up to 6 months and start complementary foods at 6th month respectively.
 - ✓ Only 17% of PLW ever heard about child stunting
- **Attitude:** About 78%, 92% and 91% of PLW believed that children, pregnant and lactating women should consume a meal from different food groups respectively.
 - ✓ About 40% of PLW believed that colostrum should be discarded or should not be given to the baby.

More than three-fourths (77%) of PLW stated that a baby should start breastfeeding immediately after birth. About 88% of them recognized that a baby should be given only breast milk and nothing else for up to 6 months. Likewise, more than three-fourths (81%) of PLW identified that a child should begin eating soft, semisolid, or solid foods and other liquids in addition to breast milk at the age of 6th month. Only 17% of PLW ever heard about child stunting while most of those who ever heard about stunting (84%) were aware of the consequences of stunting and more than half (56%) knew the age at highest risk of becoming stunted (Table 12).

Table 12: Knowledge about infant and young child feeding and stunting among pregnant and lactating women and mothers of children 0-23 months among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Knowledge about IYCF and Stunting	Frequency	Percent
When to start breastfeeding after birth (Within one hour of delivery)	284	77.2
Exclusive breast feeding (Up to six months)	324	88
Frequency of breast feeding for a child below six months (On demand)	330	89.7
Amount to feed a sick child (More than usual)	99	26.9
Frequency of feeding a child during illness (More frequently than usual)	125	34
Age to start complementary feeding		
At 6th month	297	80.7
Before 6 months	15	4.1
After 6 months	34	9.2
Don't know	22	6
Ever heard of child stunting (N=368)	61	16.6
Aware about the age at highest risk of becoming stunted (At the first two years of life) (N=61)	34	55.7
Aware of consequences of stunting (N=61)	51	83.6

Table 13 describes the attitude of PLW towards child and maternal nutrition. Slightly more than half (55%) of PLW had a positive attitude towards giving colostrum to a baby, whereas 40% of PLW believed that colostrum should be discarded or should not be given to the baby. Most of them (85%) agreed that a baby should be given only breast milk and no other foods or liquids for the first 6 months. About three-fourths (78%) of PLW believed that infants and young children should consume a meal from different food groups. Moreover, most of the PLW (92%) and lactating mothers (91%) had a positive attitude towards eating a meal from different food groups during pregnancy and lactation, respectively.

Table 13: Attitude towards child and maternal nutrition among pregnant and lactating women and mothers of 0-23months children among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Statements for Agreement or Disagreement (N = 368)	Agree	Neutral	Do not agree	Do not know
Poor diet during pregnancy and the first two years of child age can cause child stunting (N=61)	95.1	1.6	1.6	1.6
Colostrum (the "first yellowish milk") is not good for the baby and should be discarded	38.9	0.8	54.6	5.7
It is good to give a baby only breast milk and no other foods or liquids for the first six months	85.3	1.4	10.9	2.4
If a child is sick (for example has fever/diarrhea) breastfeeding must be stopped	25.3	-	72.6	2.2
A child should eat eggs, cow milk, or meat even on fasting days	89.1	0.3	9	1.6
Eating a meal from different food groups is not necessary until children are old enough to go to school	17.1	1.4	78	3.5
It is good to feed a two years child at least four times each day	92.9	1.4	1.6	4.1
A woman should eat a variety of foods more often during pregnancy (4 times a day including one additional meal)	91.8	1.6	3	3.5
A woman should go to health facility (seek advice) when she is pregnant even if she is not sick	94.6	1.4	1.9	2.2
A woman should consume iodized salt during pregnancy	80.4	1.4	6.5	11.7
Lactating mother should eat a variety of foods more often (5 times a day including two additional meals)	91	1.9	3.3	3.8

4.5.6. Women's empowerment and livelihood support

Key findings

- **Women empowerment:** nearly half of married women were in low level of empowerment concerning social independence and attitude to violence (47% and 44% respectively). Whereas, almost two-thirds (62%) were empowered to the medium-level with regard to decision making, while 38% fall in high level of empowerment.
- **Livelihood support:** ASF production support accounted for merely 7% of the total PLW. Further, about 3% of PLW took training in backyard gardening of fruits and vegetables and 8% engaged in it.

Women empowerment statuses were assessed for married women or women living together with their male partner using the SWPER index from social independence, decision-making, and attitude to violence dimensions (43). According to the result from the social independence perspective, nearly half (47%) and more than one-thirds (37%) of the married women were found to be in a low and medium level of empowerment respectively. Almost two-thirds (62%) of the married women were empowered to the medium level concerning decision-making, while 38% fell to the high empowerment level. From the attitude to violence domain, nearly four out of ten married women were in low (44%) or high (38%) empowerment level (Figure 7).

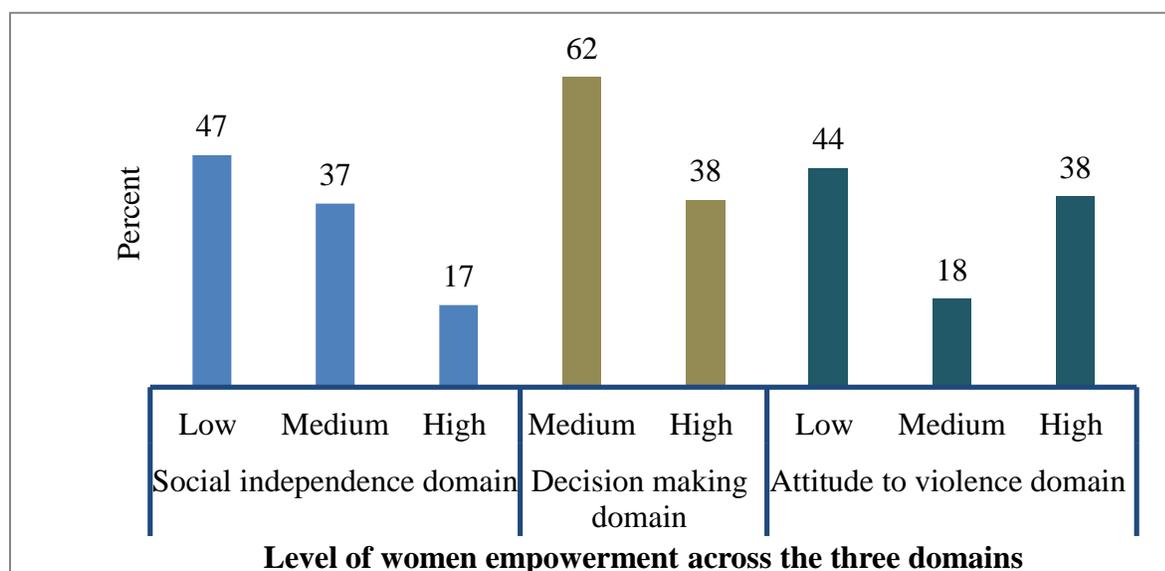


Figure 8: Empowerment status of married women among MASReP intervention districts in the Amhara region of Ethiopia, 2022

About 3% of PLW took training in backyard gardening of vegetables and fruits. Consequently, only 8% of them engaged in backyard gardening of vegetables and fruits. ASF production support accounted for 7% of the total PLW (Table 14).

Table 14: Livelihood support for pregnant and lactating women among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Livelihood support	Frequency	Percent
Engage in backyard gardening of vegetables and fruits(n=383)	29	7.6
Took training in backyard gardening of vegetables and fruits (n=383)	12	3.1
Received Animal Food Production Support (N = 383)	27	7
Type of animal food production support (N = 27)		
Milk goat and cow	8	29.6
Other livestock	3	11.1
Improved varieties of poultry	18	66.7
Fruit and vegetable seeds	3	11.1
Farm and irrigation tools	5	18.5
Other	1	3.7
Support Provider (N=27)		
Seqota declaration	8	29.6
Ameld (OREDA)	8	29.6
Safety net	3	11.1
GIZ, Concern, World Bank & UNICEF	5	18.5
Don't know	2	7.4
Others	1	3.7
Participated in poultry production supported by poultry hatchery center (N =383)	2	0.5
Attended cooking demonstration in the last six months in the community (N=368)	33	9

4.6. Fasting Practices among children 6-59 months and pregnant and lactating women

Key findings

- **Fasting:** More than half (53%) of children 6-59 months did not consume ASF during fasting days or seasons. Similarly, most of the women who gave birth in five years before the survey also reported that they did not consume ASF while they were pregnant (89%) and lactating (81%).

Any fasting and ASF consumption practice of children 6-59 months and PLW is presented in Figure 9 below. It was reported that more than half (53%) of children 6-59 months did not consume ASF during fasting days or seasons. Among women who gave birth in the five years before the survey, 61% and 49% of them reported that they practiced fasting during their recent pregnancy and/or lactation respectively. Furthermore, almost nine out of ten (89%) of the women did not consume ASF during their recent pregnancy while eight out of ten (81%) did not consume ASF during lactation on fasting days or seasons (Figure 9).

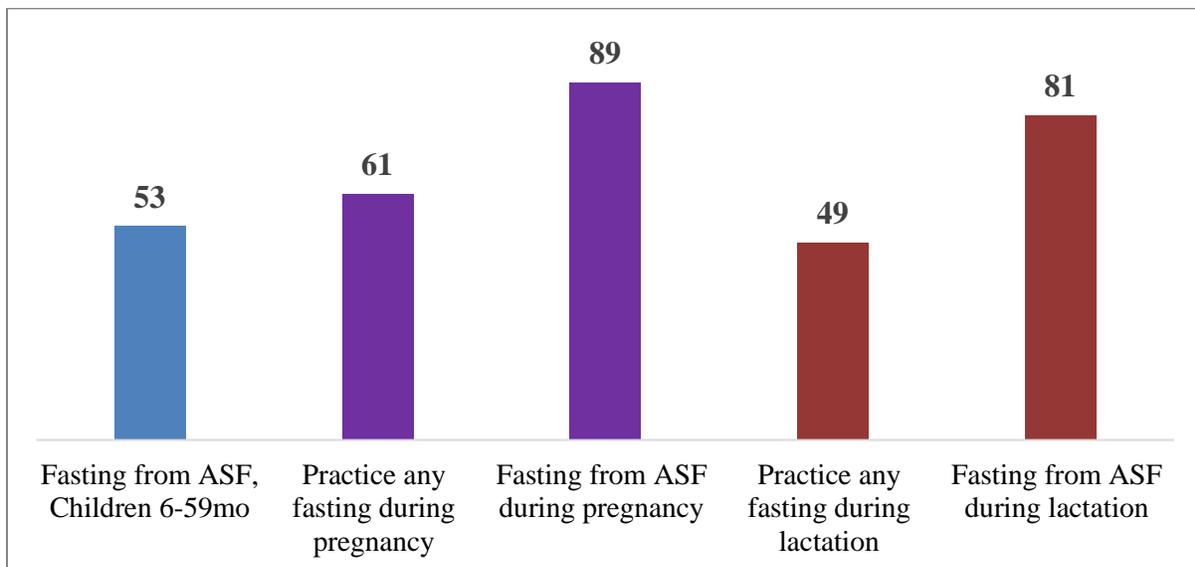


Figure 9: Fasting practice among children 6-59 months and WRA during pregnancy and lactation from MASReP intervention districts in the Amhara region of Ethiopia, 2022

4.7. Agriculture

4.7.1. Agricultural land ownership and agricultural practices

Key findings

- **Agricultural land ownership:** Majority (82%) of the households owned agricultural land with median (IQR) of 0.5 (0.3, 1) hectares size.
- **Irrigation practice:** practiced by 5% of agricultural land owning households.
- **Backyard gardening of vegetables and fruits:** practiced by 10% of households.
- **Use of fertilizers:** Animal manure (71%), other sources of fertilizers (70%) and crop rotation (77%) were the major practices
- **Practices to reduce soil erosion:** practiced by majority of the households (82%) and the common practices were terracing (92%) and use of drainage system (72%).

Table 15 below presents household-level agricultural land ownership and agriculture-related practices disaggregated by household headship. The majority (82%) of the households owned agricultural land with a median (IQR) of 0.5 (0.3, 1) hectares size. More than two-thirds (68%) of the agricultural lands were owned by a member of the respective households while 21% were rented. More proportion of male-headed households(90%) owned agricultural land than female-headed households (58%). Only 5% of agricultural land-owning households practiced irrigation of which less proportion of female-headed households (1%) practiced it than male-headed households (6%).

One out of ten (10%) households practiced backyard gardening of vegetables and fruits. The proportion of male-headed households (12%) who practiced backyard gardening of vegetables and fruits was higher than female-headed households (3%). Use of animal manure (71%), use of other sources of fertilizers (70), and crop rotation (77%) were the major practices used by crop-producing households to increase crop yield. However, as it is indicated in Table 15 below, less proportion of female-headed households practiced the activities for crop yield increment than male-headed households. The majority of the agricultural land-owning households (82%) took an action to reduce soil erosion and the commonest activities practiced to reduce soil erosion were terracing (92%) and the use of drainage systems (72%).

Table 15: Agricultural land ownership and agricultural practices of households among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Agricultural land ownership and agricultural practices	Male headed		Female-headed		Total	
	Percent	N	Percent	N	Percent	N
HHs those owned agricultural land	90.4	583	57.5	193	82.2	776
Type of agricultural land ownership						
Owned by HH member	71.5	527	56.5	111	67.8	638
Rented by HH member	26.6	527	2.1	111	20.5	638
Owned or rented by someone outside the HH	5.5	527	-	111	4.1	638
HHs those irrigated their agricultural land in the last one year	6.3	527	0.9	111	5.3	638
Backyard gardening of vegetables and fruits	12.2	583	3.1	193	9.9	776
Use animal manure	73.3	465	58.8	85	71.1	550
Use any other source of fertilizer	74.8	465	44.7	85	70.2	550
Irrigate crops	6.2	465	1.2	85	6.7	550
Rotate crops	79.4	465	62.4	85	76.7	550
Practice intercropping	22.2	465	12.9	85	20.7	550
Harvest water during the rains	8.2	465	3.5	85	7.5	550
Took any action to reduce soil erosion	84.1	527	72.1	111	82	638
Type of actions taken to reduce soil erosion						
Plant trees or shrubs	20.8	443	15	80	19.9	523
Terracing	93.2	443	86.3	80	92.2	523
Use drainage system	71.6	443	73.8	80	71.9	523

4.7.2. Crop production and consumption

Key findings

- **Cereals:** were the widely produced crops, by 77% of households, and 99% of the producers consumed them.
- **Vegetables and fruits:** produced by 7% of households while almost all consumed them.
- **Nutrient dense crops*:** produced by 8% of households. However, they were consumed by only 10% of the producers.

**For this report, the crops considered nutrient-dense were orange-fleshed sweet potato, quality protein maize, camelin, mung bean, common bean, quinoa, cowpea, pigeon pea, and amaranth.*

A household is considered as a household that produced or consumed nutrient-dense crops if it produced at least one of the mentioned nutrient-dense crops or consumed from the produced nutrient-dense crops.

Cereals were the widely produced (77%) and widely consumed (99%) crops followed by legumes (43% production and 89% consumption). In contrary, only 7% of the households produced fruits and vegetables while almost all (98%) of the producers consumed from the fruits and vegetables they produced. Less proportion of households (8%) produced at least one of the nutrient-dense crops and 10% of them consumed from the production (Figure 10). Overall, the proportions of female-headed households those produced respective crops was less than the proportion of male-headed households (Annex-7).

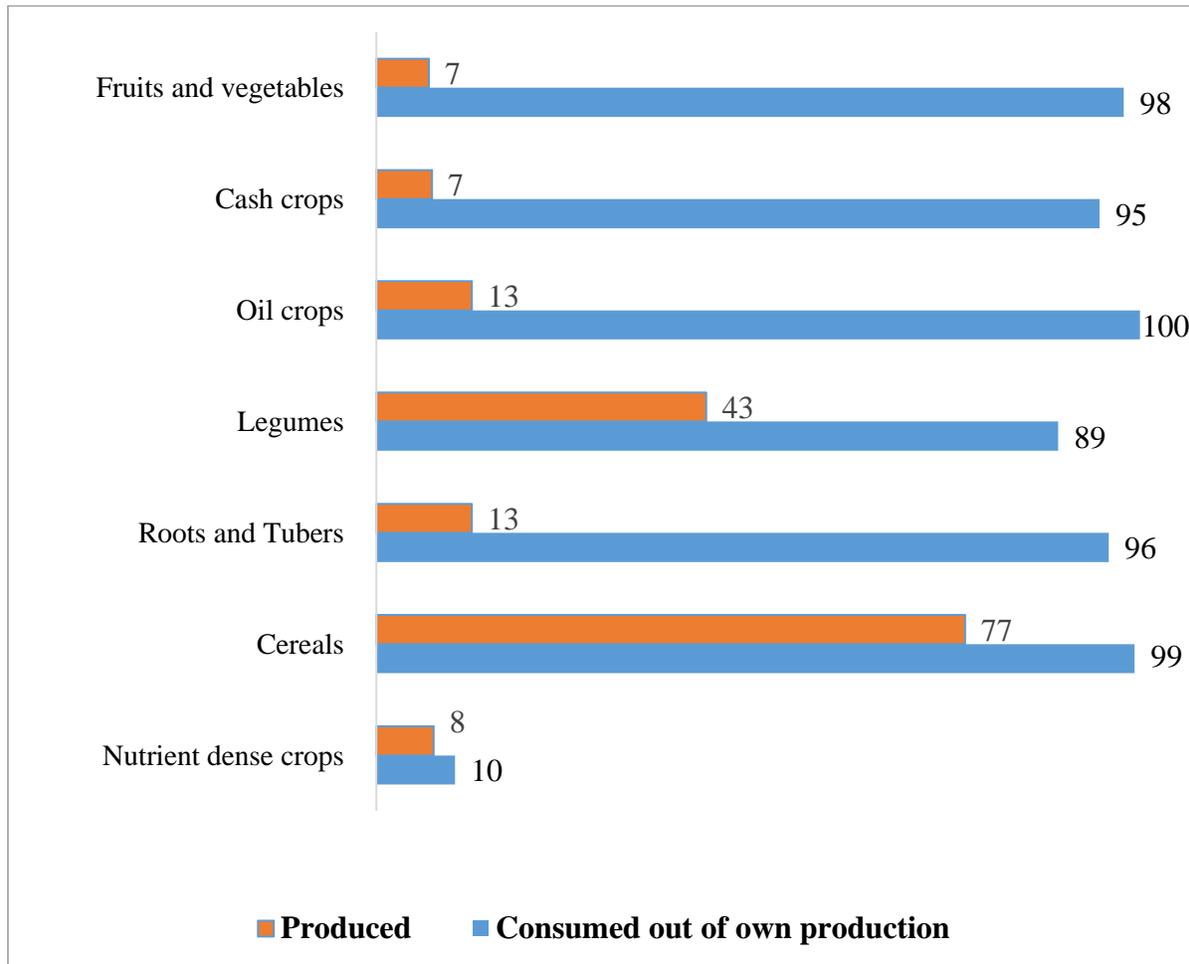


Figure 10: Crop production and consumption practice of households among MASReP intervention districts in the Amhara region of Ethiopia, 2022

4.7.3. Animal source food production and consumption

Key findings

- **Chicken and Eggs:** Eggs (27%) and chicken (32%) were produced by nearly one-thirds of the households. Eggs were consumed by most (76%) of egg producing households.
- **Milk:** produced by 13% of the households and consumed by nearly all (98%) of the producers.

This baseline study also assessed household-level production and consumption practice of ASF and the results are presented in Figure 11 below. The ASFs considered in the assessment were eggs, chicken, goat/sheep, milk, and dairy products other than milk. Half of the households (53%) produced at least one of the ASFs. Out of the households that produced ASFs, also half of them (53%) consumed from their production. Eggs (27%) and chicken (32%) were produced by nearly one-third of the households. Milk was produced by one-tenth (13%) of the households. Eggs (76%) and milk (98%) were widely consumed by households that produced them. A quarter (25%) of the households produced goat or sheep, and nearly one-third (35%) of goat or sheep-producing households consumed them. Dairy products other than milk were the less-produced ASFs (3%) but were widely consumed among the producing households (78%) (Figure 11). Crudely, less proportion of female-headed households produced the respective ASFs than male-headed households (Annex-8).

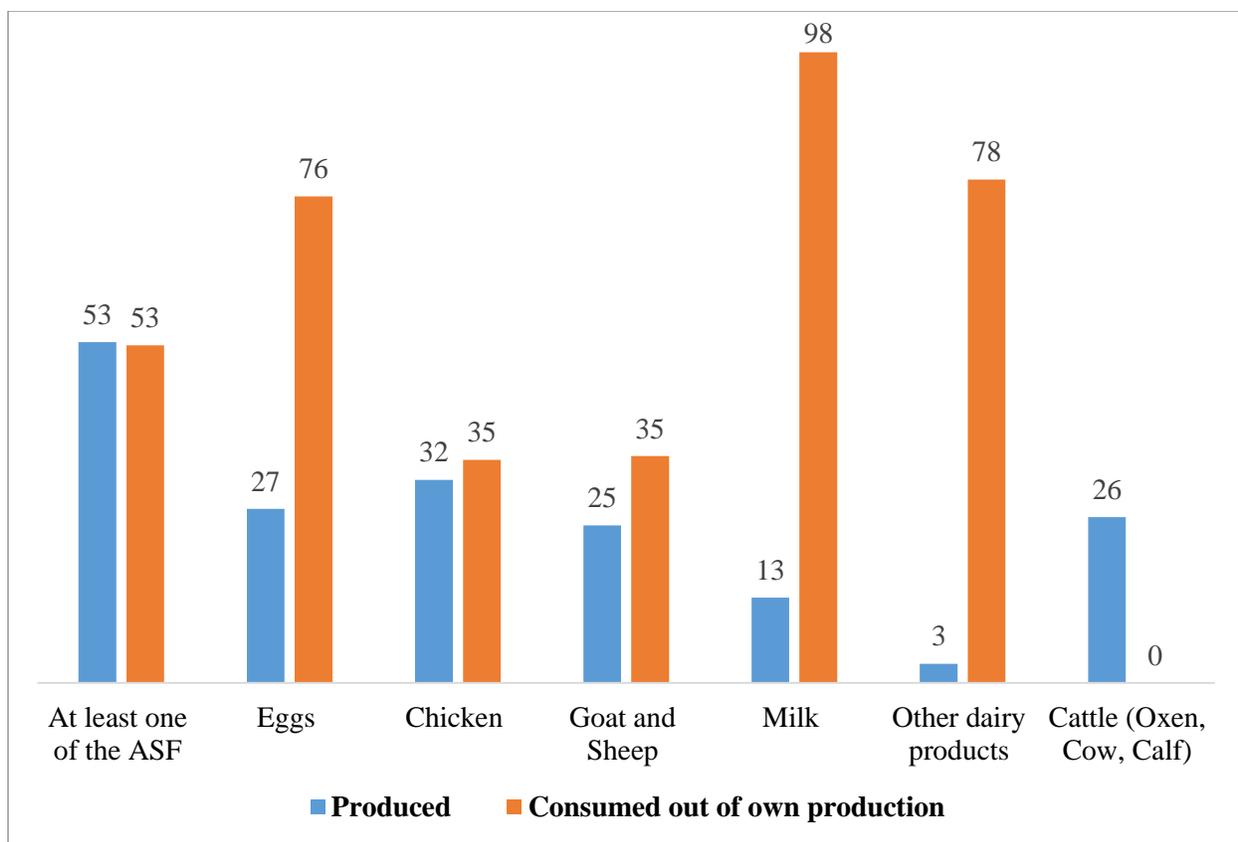


Figure 11: Animal source food production and consumption practice of households among MASReP intervention districts in the Amhara region of Ethiopia, 2022

4.7.4. Agricultural inputs/livestock/poultry provision

Key findings

- Few, 44 out of 638 (7%) of agricultural land owning households received agricultural inputs, livestock or poultry supports

Table 16 presents agricultural inputs, livestock, and poultry support provided to the households in MASReP intervention districts. Overall, 44 (7%) of the agricultural land-owning households received agricultural inputs, livestock, or poultry support. Improved varieties of poultry were provided to thirty-six (82%), fertilizers to six (14%), local varieties of livestock to five (11%), and farm tools to four (9%) households.

Table 16: Agricultural inputs, livestock, and poultry supports provided to households in MASReP intervention districts in the Amhara region of Ethiopia, 2022

Provisions	Male headed		Female headed		Total	
	Freq.	%	Freq.	%	Freq.	%
Received agricultural inputs/livestock/poultry support (N=638)	38	7.2	6	5.4	44	6.9
Type of support received (N=38)						
Improved varieties of poultry	31	81.6	5	83.3	36	81.8
Fertilizer	6	15.8	-	-	6	13.6
Local varieties of livestock	5	13.2	-	-	5	11.4
Farm tools (e.g., Hoe, spade)	4	10.5	-	-	4	9.1
Improved variety of crop seeds	3	7.9	-	-	3	6.8
Irrigation equipment	3	7.9	-	-	3	6.8
Local crop seeds	2	5.3	-	-	2	4.5
Improved varieties of livestock	1	2.6	1	16.7	2	4.5
Local varieties of poultry	1	2.6	-	-	1	2.3
Member of the HH received any training(N=638)	21	4	1	0.9	22	3.4
Organization provided agricultural inputs/livestock/poultry (N=38)						
Seqota Declaration Program	11	28.9	-	-	11	25
ORDA: Organization for Rehabilitation and Development of Amhara	8	21.1	3	50	11	25
Safety Net Program	5	13.2	1	16.7	6	13.6
GIZ	3	7.9	1	16.7	4	9.1
Do not Know	10	26.3	1	16.7	11	25
Other	1	2.6	-	-	1	2.3
Targeted HH members to receive Agricultural/Livestock inputs (N=38)						
Pregnant Woman	9	1.5	2	1	11	1.4
Lactating Woman	14	2.4	3	1.6	17	2.2
Under five years child	15	2.6	1	0.5	16	2.1
Reproductive Age Woman	10	1.7	2	1	12	1.5
Youth or Adolescent/elderly/person with a disability	5	0.8	2	1	7	1.0
No Target	1	0.2	1	0.5	2	0.3
Other	2	0.3	1	0.5	3	0.4

4.8. Status of food and nutrition implementing sectors

Key findings

- Only 7% (2% female and 6% male) health workers attended training on nutritional assessment, counseling and support (NACS)
- None of the districts implemented the unified nutrition information system for Ethiopia (UNISE), and only 4% of kebeles were implementing community lab led nutrition initiatives
- About 13% of primary schools were equipped with school feeding facilities
- Around one-fifths (22%) of school children (comparable proportion of female and male, 11%) benefited from nutrition friendly schools (a combination of school garden, school meal and nutrition club)

Institutional system strengthening and capacity-building activities were among the intervention to be performed by MASReP in the selected districts. Accordingly, the baseline survey considered assessing the organization, structure, capacity, and performance of food and nutrition implementing sectors in MASReP intervention districts, and the results are presented below.

Three out of five hospitals (60%) and twenty-five out of forty-five health centers (56%) were with water supply. About 80% of both hospitals and health centers had gender-disaggregated latrines, while slightly more than a quarter (28%) of the health posts had gender-disaggregated latrines. Electric or solar energy source was connected to more than half of the health centers (58%), 15% of the health posts, and 20% of the hospitals. The proportions of hospitals, health centers, and health posts with a nutrition corner for nutrition education were 20%, 56%, and 45%, respectively (Annex-9).

Out of 1686 healthcare workers in all districts, only 7% (female=2% and male=6%) attended training on nutritional assessment, counseling, and support (NACS) aimed at improving antenatal care service and growth monitoring. No district is observed to implement the unified nutrition information system for Ethiopia (UNISE), while 8 of the 213 kebeles (4%) were implementing community lab-led nutrition initiatives (Annex-9).

All of the districts reported that they have a functional district-level nutrition coordination body and technical committee which meets regularly and plans and monitors activities. However, at the kebele level, only about half (52%) of the kebeles were reported to have a functional nutrition committee (Annex-10).

About one-third of the high schools (36%) and less than a quarter (20%) of the primary schools were with water supply. Nine out of ten high schools (94%) and four out of ten primary schools (37%) were with toilet services that were disaggregated by gender. A Nutrition corner was found in 34% of the primary schools and 6% of the high schools. Only sixty-four out of five hundred and six (13%) primary schools were equipped with school feeding facilities. Less than a quarter (22%) of school children [comparable proportion of female and male, 11%) benefited from nutrition-friendly schools (a combination of school garden, school meal and nutrition club) (Annex-11).

The available number of improved crop/fruit/vegetable seed and seedling multiplication centers, irrigation schemes, and farmer training centers were 16, 296, and 144, respectively. Only 3% (5,750 hectares out of 184,684) of the agricultural land was put under irrigation. The number of community water supply schemes available was 2,433 (Annex-12).

5. Discussion

Maternal and child undernutrition in its multiple forms (growth failures, micronutrient deficiencies, underweight, developmental fallacies, and others) are common in Sub-Saharan Africa including Ethiopia. Factors contributing to the highly prevalent undernutrition in the region are multifactorial. It is agreed that interventions to significantly decrease or possibly eradicate undernutrition must be designed and implemented by multiple stakeholders. Accordingly, this survey was conducted to figure out indicators of the multi-sectoral nutrition intervention packages of MASReP in the Amhara region of Ethiopia.

The current survey assessed the prevalence of pertinent nutritional status indicators for children under-five. The prevalence of stunting (43%) was less than the Amhara region's finding (50%) of the baseline assessment of SD that was conducted in 2018 (11). The observed decrement might be subjected to the intervention implemented in the study area by the SD program during the previous four years. However, it is still higher than the national prevalence (37%) and an overall regional estimate (41%) according to EDHS 2019 (8) which could be explained by the chronic and prevalent food insecurity in the study area.

The prevalence of wasting (11%) has increased by more than 4% over the SD baseline assessment finding (7%) in the Amhara region (11). Likewise, it is also higher than the national and regional prevalence, 7% and 8% based on EDHS 2019, respectively (8). Wasting represents acute undernutrition due to inadequate food intake, and illness/infection in a recent time prior to the survey. Hence, the presence of instability in the study areas and the prevalence of common childhood illnesses could have contributed to the increment in the prevalence of wasting.

Underweight (29%) decreased from the SD baseline assessment (32%) by more than 3% (11), while it is still higher than the national prevalence (21%) and overall regional estimate (27%) (8). This can also be explained by the gain over the prevalence of stunting. The observed decrement in the prevalence of stunting might have contributed to the decrement of underweight as underweight is an indicator that combines features of stunting and wasting.

Overall, stunting (46% vs. 30%) and underweight (39% vs. 27%) are more prevalent among boys than girls, respectively. Concerning distribution across different age ranges, stunting increases

with age from 29% among 0-5months up to the highest 53% among 24-35 months children. This result is similar to the findings in EDHS 2016, SD 2018, and EDHS 2019 which could signify the impact of undernutrition in the first thousand days of life (8,11,17). The highest prevalence of wasting is found among children 6-11 months (15%) and underweight in children aged 12-23 months (34%).

Breast milk is the best nutritious food that is naturally designed to meet the nutritional requirements of children for the first six months. It is recommended to feed newborns colostrum (the first breast milk) within the first one hour and continue feeding hind and mature breast milk in the days to follow at least until the second birthday of a child. In line with the recommendation, this survey has addressed important breastfeeding status indicators among children 0-23months. Almost all (99.5%) of the children were ever breastfed and it is slightly higher than national and regional figures (96%) (8) and comparable with the SD baseline estimate (99%) (11). Early initiation of breastfeeding (70%) has increased by more than 13% than the baseline estimate of SD in 2018 in Amhara (56%) and higher than the regional estimate of 2019 EDHS (66%). Furthermore, the prevalence of exclusive breastfeeding under 6 months (73%) is slightly higher than the 2018 finding in Amhara region SD areas (71%) (11) and better than the national figure (59%) and the global target in 2025 (50%) (8).

Dietary diversity is one of the dietary quality indicators and children 6-23 months are recommended to consume a variety of foods including breast milk to meet their nutrient needs daily. The proportion of MDD (5%) is higher than the 2018 SD areas finding (1%) (11) but lower than the national (16% urban and 12% rural) and the overall regional estimate (7%) (8). The proportion of children who achieved MAD was 4% which has shown a slight improvement over the SD result (1%) (11) though lower than the overall regional estimate (6%) (8).

Nutritional status, dietary diversity, and antenatal and postnatal-related parameters were the focuses of the current survey for WRA. The observed prevalence of underweight among WRA (25%) is higher than the national (22%) and regional prevalence (23%) (17). A higher prevalence of acute malnutrition was also identified among PLW (33%) than the WRA (17%). This could be explained by the more vulnerability of PLW because of the nutrition-related burdens that they shoulder than the general WRA added to the insecurity that has been in the area.

WRA are recommended to consume food items from diverse food groups. The proportion of PLW who met MDD-W (0.5%) is much lower than the 2018 finding for Amhara region SD areas (10%) (11). The difference could be subjected to the dietary diversity measure used for this survey, the 2021 FAO MDD-W guide, which uses ≥ 5 food groups cut off out of ten while the former analysis used the 2011 WDDS guide that considers ≥ 4 food groups out of nine. The difference in food lists for the 'other vegetables' food group in the dietary diversity assessment tool used by the current survey could also contribute. Moreover, the recent instability that the community in the survey districts experienced is another possible explanation for the lower proportion of MDD-W.

More proportion (84%) of WRA who gave birth in the five years before the survey attended at least one ANC visit during their recent pregnancy than the national figure (74%) which is equivalent to the Amhara region's SD baseline estimate (84%). However, less than half (46%) of the women had four or more ANC visits during their recent pregnancy. The result is slightly higher than the national finding (43%) but lower than regional findings according to the SD baseline (62%) and EDHS 2019 (51%). The instability in the area in recent years could have largely contributed to the women not going for ANC more frequently. The proportion of women who received iron-folate supplementation during their recent pregnancy (74%) is equivalent to SD's baseline (74%) and EDHS 2019 regional estimate (74%). Additionally, the proportion of women who took iron-folate tablets for the recommended 90 days or more (21%) is higher than EDHS 2019 regional finding (15%) but lower than the SD finding (40%). Sixty percent (60%) of children under-five were delivered at health institutions and the proportion is about 12% higher than the national (48%) and Amhara region SD areas institutional delivery (47%). Similarly, institutional delivery is also higher than the overall Amhara region's estimate according to EDHS 2019 (54%) (8,11).

Considering fasting practices, less proportion of women reported practicing any fasting during their recent pregnancy (61%) or lactation (49%) than the 2018 finding of SD (pregnancy-88% and lactation-81%). However, the proportion of women who reported no ASF consumption during their recent pregnancy (89%) and lactation (81%) showed an increment over the 2018 results (pregnancy-85% and lactation-46%). The difference might be because of the assessment period difference, as in the 2018 SD survey fasting practice was assessed among currently

pregnant or lactating women while in the current survey WRA were interviewed to recall fasting practice during their recent pregnancy or lactation (11).

The prevalence of moderate food insecurity (50%) and severe food insecurity (28%) in the current baseline survey is higher than the prevalence of the 2018 SD baseline finding, which was 36% and 25% respectively. This high level of food insecurity might be attributed to the instability in the area and the difference in the recall period.

As improving WASH conditions is an integral part of nutrition and developmental interventions, assessing the situation for WASH in MASReP intervention districts has been the focus of the current survey. According to the results, about 78% of households use water from improved sources which have increased from the 2018 estimate in the region's SD area (72%) (11) and also higher than the national and overall regional estimate of EDHS 2019 (69% and 65% respectively). However, the percentage of households with basic drinking water services (36%) is lower than the national and regional percentage (57%) in the 2019 EDHS (8). Regarding sanitation services, more proportion of households (63%) practiced open defecation than the proportion (45%) found in the 2018 SD baseline assessment (11). The possible destruction of basic infrastructures and displacement of the community that might happen in the study districts because of the instability might have contributed to the increment of open defecation practice.

Agriculture and food and nutrition security are linked in many ways. The agriculture sector is an engine for inputs of food and nutrition security by supplying adequate, diverse, safe, and nutritious food commodities. In the current study, it was found that the majority of the households involved in small-scale farming activities need scientific/technological support for better productivity. The proportion of households that produced nutrient-dense crops (10%) is higher than the finding in 2018 (2.1%). The gain could be because of the intervention done by SD during the innovation phase and the possible presence of the development partners to work with the communities in the districts for better nutrition. However, the proportion of households rearing/keeping feasible sources of ASF that are goat and sheep (25%) and poultry (32%) is less than the 2018 SD's findings (goat and sheep-41% and poultry-53%) (11).

6. Implications

- Despite improvements made over the four years of SD intervention, the MASReP baseline assessment reiterates that undernutrition, specifically stunting, among children 0-59 months remained prevalent in the districts. This indicates a need for sustainable and coordinated nutrition-specific and sensitive interventions.
- Breastfeeding practices, including exclusive breastfeeding, are encouraging against global and national targets. However, efforts should continue through counseling and nutrition education during health service delivery, social gatherings, and using electronic media.
- A considerable proportion of children 6-23 months, WRA and PLW failed to meet dietary recommendations. This demands support for a diversified production including fruits, vegetables, and ASF tailored with gender-sensitive BCC.
- Coverage of growth monitoring, ANC, and delivery require systemic support such as building the capacity of health facilities and awareness creation to increase service utilization.
- PLW are cognizant of key IYCF messages, but few have awareness about stunting and feeding during illness. Similarly, except for colostrum feeding, the majority had a favorable attitude toward maternal and child nutrition. SBCC interventions shall help mothers to recognize stunting, and appropriate feeding during illness and emphasize the need for colostrum feeding.
- ASF consumption was less practiced during fasting season by children and PLW. Delivering nutrition education during fasting seasons with the consideration of religious leaders' involvement in the intervention may benefit. Further, bottlenecks shall be explored through community labs.
- Agricultural practices and productivity including fruits, vegetables, ASF, and nutrient-dense crops must be encouraged through livelihood support and training to promote diet diversity and improve food security. Despite the slight improvement in production, consumption of nutrient-dense crops is minimal which needs integration of strategies with agricultural interventions to improve their utilization.
- Access to improved water, sanitation, and hygiene services should be supported with infrastructure development/maintenance and community participation. Sanitation coverage

and the status of already functioning latrines should also be improved to minimize the possible negative effect of poor sanitation and open defecation on nutrition.

- Moreover, food and nutrition implementing sectors among the MASReP intervention districts are also in need of system strengthening and capacity-building support for better nutrition intervention services delivery.

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Annexes

Annex-1

Table 17: Socio-demographic characteristics of household heads among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Characteristics		Frequency	Percentage
Sex	Male	583	75.1
	Female	193	24.9
Age in completed years	15-25yrs	75	9.7
	26-35yrs	250	32.2
	36-45yrs	225	29
	46-55yrs	129	16.6
	56-65yrs	68	8.8
	≥ 66yrs	29	3.7
Religion	Orthodox	760	97.9
	Muslim	16	2.1
Marital Status	Never married and never lived together	22	2.8
	Married or living together	583	75.1
	Divorced or Separated	110	14.2
	Widowed	61	7.9
Educational status	No formal education and cannot read and write	364	46.9
	No formal education, but can read and write	81	10.4
	Grades 1-8	214	27.6
	Grades 9-12	81	10.4
	College or above	36	4.6
Occupation	Agriculture	570	73.5
	Craft and related trades workers	94	12.1
	Managers/Professional/Technical	44	5.7
	No Occupation	30	3.9
	Others	38	4.9

Annex-2

Table 18: Socio-demographic characteristics of children 0-59 months among MASReP intervention districts, 2022

Characteristics	Frequency	Percentage
Age		
0-5 months	60	11.1
6-23 months	150	27.8
24-59 months	330	61.1
Sex		
Male	288	53.3
Female	252	46.7

Annex-3

Table 19: Distribution of stunting against maternal characteristics

Maternal characteristics		Child Stunting (0-59 months)
		N (%)
Age at first marriage	<21	199 (42.9)
	≥21	17 (39.5)
Had ANC Visit	Yes	178 (42.0)
	No	36 (46.8)
No. of ANC Visit	4+	94 (41.2)
	1-3	84 (42.9)
	No ANC	36 (46.8)
Received Iron Folate during ANC	Yes	153 (40.8)
	No	61 (48.4)

Annex-4

Table 20: Proportion of children 6-23months consumed different food groups among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Characteristics	Male (N=88)	Female (N=62)	Total (N=150)
Food groups consumed			
Breast milk	95.5[88.9,98.2]	90.3[79.1,95.8]	93.3[87.6,96.5]
Grains, roots and tubers	79.5[68.9,87.2]	79[63.8,89.0]	79.3[69.1,86.8]
Pulses/Legumes	72.7[61.8,81.4]	53.2[40.5,65.5]	64.7[55.7,72.7]
Milk and dairy products	5.7[2.4,13.0]	8.1[3.5,17.7]	6.7[3.9,11.2]
Flesh foods	4.5[1.4,13.8]	1.6[0.2,11.4]	3.3[1.2,8.9]
Eggs or egg-based foods	10.2[4.5,21.6]	6.5[2.5,15.4]	8.7[4.8,15.1]
Vit-A rich fruits and vegetables	2.3[0.6,8.8]	4.8[1.6,13.5]	3.3[1.2,8.7]
Other fruits and vegetables	5.7[2.1,14.3]	4.8[1.6,13.5]	5.3[2.6,10.5]

Annex-5

Table 21: Socio-demographic characteristics of women of reproductive age among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Characteristics		Frequency	Percent
Age in completed years (N=846)	15-19yrs	142	16.8
	20-29yrs	332	39.2
	30-39yrs	249	29.4
	40-49yrs	123	14.5
Religion (N=846)	Orthodox	829	98.0
	Muslim	17	2.0
Marital status (N=846)	Married or living together	553	65.4
	Never married or never lived together	144	17
	Divorced or Separated	127	15
	Widowed	22	2.6
Educational status (N=846)	Not attended formal education and cannot read and write	446	52.7
	Not attended formal education, but can read and write	6	0.7
	Grades 1-8	227	26.8
	Grades 9-12	132	15.6
	College or above	35	4.1
	Woman Occupation(N=846)	Agriculture	174
	Craft and related trades workers	91	10.8
	Managers/Professional/Technical	17	2
	Other	25	3
	No Occupation	539	63.7
Age at first marriage (N=702)	<15yrs	138	19.7
	15-17yrs	290	41.3
	18-20yrs	214	30.5
	≥21yrs	60	8.5
Age at first pregnancy (N=661)	<18yrs	243	36.8
	18-23yrs	369	55.8
	≥24yrs	49	7.4

Annex-6

Table 22: Minimum dietary diversity for women of reproductive age and pregnant and lactating women among MASReP intervention districts in the Amhara region of Ethiopia, 2022

Food groups and minimum dietary diversity for women	Pregnant and lactating women (n=383)	Women of reproductive age group (n=846)
	Frequency (Percent)	Frequency (Percent)
Food groups		
Grains, white roots, tubers, and plantains	383 (100)	846 (100)
Pulses (beans, peas, and lentils)	356 (92.9)	777 (91.8)
Nuts and seeds	27 (7.1)	56 (6.6)
Milk and dairy products	6 (1.6)	12 (1.4)
Meat, poultry, and fish	34 (8.9)	66 (7.8)
Eggs	11 (2.9)	21 (2.5)
Dark green leafy vegetables	9 (2.3)	35 (4.1)
Other vitamin A-rich fruits and vegetables	3 (0.8)	5 (0.6)
Other vegetables	47 (12.3)	112 (13.2)
Other fruits	1 (0.3)	1 (0.1)
Met MDD-W(≥ 5 food groups)	2 (0.52)	4 (0.47)

Annex-7

Table 23: Crop production and consumption practice of households in MASReP intervention districts in the Amhara region of Ethiopia, 2022

Crops	Male-headed			Female-headed			Total		
	Produced (n=583)		Consumed N	Produced (n=193)		Consumed N	Produced (n=776)		Consumed N
	%	%		%	%		%	%	
Nutrient-dense crops	9.6	8.9	56	1	50	2	7.5	10.3	58
Cereals	85.8	99.6	500	50.8	98	98	77.1	99.3	598
Roots and Tubers	14.9	95.4	87	5.2	100	10	12.5	95.9	97
Legumes	50.1	88.7	292	22.3	93	43	43.2	89.3	335
Oil crops	14.6	100	85	5.2	100	10	12.5	100	95
Cash crops	8.9	94.2	52	2.6	100	5	7.3	94.7	57
Fruits and vegetables	7.2	97.6	42	2.6	100	5	6.9	97.9	47

Annex-8

Table 24: Animal source food production and consumption practice of households in MASReP intervention districts in the Amhara region of Ethiopia, 2022

Animal source foods	Male-headed			Female-headed			Total		
	Produced (n=578)	Consumed		Produced (n=189)	Consumed		Produced (n=767)	Consumed	
	%	%	N	%	%	N	%	%	N
At least one of the ASF	59.7	67.2	345	30.7	50	58	53	52.5	403
Eggs	31.1	74.4	180	14.8	82.1	28	27.1	75.7	208
Chicken	37.4	34.4	215	14.3	37	27	31.6	34.7	242
Goat and Sheep	28	38	163	14	18.5	27	24.5	35.3	190
Milk	16.1	98.9	94	4.7	88.9	9	13.3	98.1	103
Other dairy products	3.8	77.3	22	0.5	100	1	3	78.3	23
Cattle (Oxen, Cow, Calf)	31.6	-	-	8.3	-	-	25.8	-	-

Annex-9

Table 25: Status of health facilities in MASReP intervention districts of Amhara region of Ethiopia, 2022

Indicator	Freq(%)	N	
Health facilities with a water supply	Hospitals	3(60)	5
	Health Centers	25(55.6)	45
	Health Posts	42(19.1)	220
Health facilities with sex/gender disaggregated latrines	Hospitals	4(80)	5
	Health Centers	36(80)	45
	Health Posts	62(28.2)	220
Health facilities with electricity/solar power	Hospitals	4(80)	5
	Health Centers	26(57.8)	45
	Health Posts	34(15.4)	220
Health facilities with a nutrition corner	Hospitals	1(20)	5
	Health Centers	25(55.6)	45
	Health Posts	100(45.4)	220
Health professionals trained in Nutrition Assessment Counseling and Support (NACS) to improve antenatal care and growth monitoring	Male	27(1.6)	
	Female	93(5.5)	1686
Number of Water Sanitation and Hygiene Committee (WaSHCO)/Water User group members trained	Male	69(56.1)	
	Female	45(36.6)	123
Districts implementing the Unified Nutrition Information System for Ethiopia (UNISE)	0(0)	8	
Number of target kebeles implementing Community Lab Led nutrition initiatives	8(3.8)	213	

Annex-10

Table 26: Status of nutrition activity administration in MASReP intervention districts of Amhara region of Ethiopia, 2022

Indicator	Freq(%)	N
Number of multi-sector coordination forums supported in the last one year	35	-
Number of kebeles in the districts with a well-functioning nutrition committee:	111(52.1)	213
Presence of functional district coordination body	8(100)	8
Presence of functional district nutrition technical committee	8(100)	8
District administrator monitors nutrition development partners' activity plan & execution	6(80)	8

Annex-11

Table 27: Status of schools in MASReP intervention districts in the Amhara region of Ethiopia, 2022

Indicator	Freq(%)	N
Number of education facilities with a package of water supply	High school	11(35.5) 31
	Primary	101(20.0) 506
Number of education facilities with a package of sex-disaggregated latrines	High school	29(93.5) 31
	Primary	189(37.3) 506
Number of education facilities with a package of electric/solar power	High school	7(22.6) 31
	Primary	30(5.9) 506
Number of education facilities with a package of nutrition corner	High school	2(6.4) 31
	Primary	171(33.8) 506
Number of schools equipped with school feeding structures/facilities	High school	64(12.6) 31
	Primary	16172(10.7) 506
Number of school children benefiting from nutrition-friendly schools (combining school garden, school meal & nutrition clubs)	Male	17228(11.4) 151184
	Female	17228(11.4) 151184

Annex-12

Table 28: Status of agricultural activities and water supply in MASReP intervention districts of Amhara region of Ethiopia, 2022

Indicator	Freq(%)	N
Agriculture Sector		
Number of hectares put under irrigation	5750(3.1)	184684
Number of improved crop/fruit or vegetable seed and seedling multiplication centers available	16	-
Number of irrigation schemes available	296	-
Number of farmer training centers available	144	-
Water and irrigation sector		
Number of community water supply schemes available	2433	-

Annex-13

Table 29: Summary of key findings compared with the 2018 SD baseline survey

Indicator		MASReP (%)	SD 2018 (Amhara) (%)
Nutritional status (0-59 months children)	Stunting (H/A)	43	50
	Wasting (W/H)	11	7
	Underweight (W/A)	29	32
Breastfeeding	Early Initiation of BF (0-23m)	70	56
	Exclusive BF under six months	73	71
	Continued breastfeeding 12-23months	93	90
Complementary feeding	Introduction of solid semisolid or soft foods 6-8 months	36	45
	Minimum Dietary Diversity (≥ 5 FGs)	5	1
	Minimum acceptable diet (MAD)	4	1
	Egg and/or Flesh foods consumption	11	12
	Zero vegetable and fruit consumption	91	94
Growth monitoring coverage (Weight measured in 3 months)		19	9
Institutional delivery	Institutional delivery among live births in the last 5 years	60	47
Minimum Dietary Diversity for Women (PLW)		0.5	10
ANC coverage & Iron folate utilization	Women who attended 4 or more ANC visits	46	62
	Women who took Iron-folate for 90 days or more	21	40
Knowledge of PLW	When to start BF (Within 1 hour of delivery)	77	71
	Exclusive BF (Up to 6 months)	88	84
	Frequency of BF for a child below 6 months (On demand)	90	91
	Age to start complementary feeding (at 6 th month)	81	79
	Awareness about child stunting	17	12
Attitude of PLW	Poor diet during pregnancy and the first 2 years of child age can cause child stunting (Agree)	95	89
	Colostrum is not good for the baby and should be discarded (Do not agree)	55	53
	It is good to give a baby only breast milk for the first 6 months (Agree)	85	82
	A child should eat ASFs even on fasting days (Agree)	89	88
	A diversified diet is not necessary until children are old enough to go to school (Do not agree)	78	77
ASF consumption during fasting season	Pregnancy	89	85
	Lactation	81	46
Food insecurity	Moderate food insecurity	50	36
	Severe food insecurity	28	25
WASH	Access to an improved drinking water source	78	72
	Open defecation	63	45
Agriculture	Nutrient-dense crops production	8	2