



Food and Agriculture  
Organization of the  
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# Project Report

## Integrating the Minimum Dietary Diversity-Women (MDD-W) module into the Household Budget Survey (HBS) in Tajikistan, 2015

**Claudia E. Lazarte, Theodora Mouratidou, Sabir Kurbanov,  
Abduvali Qulov and Warren T.K. Lee**

Nutrition Assessment and Scientific Advice team (ESNA)

Nutrition Division (ESN)

Food and Agriculture Organization of the United Nations (FAO)

Agency of Statistics under the President of the Republic of Tajikistan (AoS)



The project on the Integration of the Minimum Dietary Diversity-Women (MDD-W) into the Household Budget Survey in Tajikistan has been conducted by the Food and Agriculture Organization of the United Nations (FAO) and the Agency of Statistics under the President of the Republic of Tajikistan (AoS), with financial contributions from the European Union and FAO in the framework of the project *“Improved Global Governance for Hunger Reduction”*

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## List of abbreviations

AoS	Agency on Statistics under President of the Republic of Tajikistan
BMI	Body Mass Index
DGLV	Dark Green Leafy Vegetables
DHS	Demographic and Health Survey
ESNA	Nutrition Assessment and Scientific Advice team based in FAO Rome
GBAO	Gorno-Badakhshan Autonomous Oblast
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
HBS	Household Budget Survey
HHIEq	Household Income Equivalent
MDG	Millennium Development Goal
MDD-W	Minimum Dietary Diversity-Women
MoH	Ministry of Health
RRS	Region of Republican Subordination
SFG	Standard Food Groups
SUN	Scaling Up Nutrition movement
WDDS	Women's Dietary Diversity Score

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## 1 Executive summary

**Background:** The Agency on Statistics under the President of the Republic of Tajikistan (AoS) and the Ministry of Health (MoH) requested FAO's technical support on the design and implementation of regular collection of nutrition data at national level. Tajikistan regularly conducts Household Budget Survey (HBS) at the national level; however, it has not yet included any nutrition module at individual level.

**Project aim:** To integrate a nutrition module, i.e. the Minimum Dietary Diversity-Women (MDD-W), into the national HBS in Tajikistan in order to set-up a national food security and nutrition information system for tracking nutrition progress. As part of the integration process, two pilot studies were conducted to test the MDD-W tool in Sughd and Dushanbe regions, the later pilot study included the regions of Gorno-Badakhshan Autonomous Oblast (GBAO) and Regions under Republican Subordination (RRS).

**Project design:** The project was implemented in three phases: 1) a preparatory phase; 2) capacity development and adaptation of the MDD-W questionnaire to the regional Tajik context; 3) design and conduction of pilot studies in the Sughd region and Dushanbe region (including GBAO and RRS).

**Results and discussion:** Two 5-day capacity development courses were delivered: 17 enumerators and 2 trainers were trained in the Sughd, and 22 enumerators and 4 trainers were trained in the Dushanbe regions. The enumerators, trainers and staff of the AoS had acquired the knowledge and practical skills in applying MDD-W in dietary data collection and data management. The MDD-W questionnaires and supporting materials were satisfactorily adapted to the Tajik cultural context, including dietary habits and common foods available in the Sughd and Dushanbe regions. As part of the integration process, two pilot studies were conducted, where the enumerators practiced technical skills in MDD-W data collection. The pilot studies included 286 women in Sughd, 133 in Dushanbe, 202 in RRS and 80 women in GBAO region. The median score of MDD-W was 7.0 in Sughd, 7.4 in Dushanbe, 6.5 in RRS and 5.9 in GBAO. Between 86 to 96% of the women had a MDD-W score of 5 or more, thus these women met the minimum dietary diversity. The least consumed food groups were eggs, nuts and seeds. Women with higher household income and living in the urban areas showed a higher dietary diversity, they were more likely to meet their micronutrient adequacies compared to women from the rural areas with lower household incomes.

**Conclusion:** The nutrition module MDD-W was successfully integrated into Tajikistan's HBS system. The integration process included: capacity development of enumerators and trainers on dietary data collection; adaptation of the MDD-W questionnaires and supporting materials to the local context in Sughd and Dushanbe regions; and the conduction of two pilot studies with subsequent data analysis, interpretation and reporting. Scaling-up the integration of the MDD-W into the regular HBS data collection

would feed valuable information into the country's food security and nutrition information system in a practical and relative inexpensive way. MDD-W can be used to collect data at national and decentralized level, as well as to identify regions and population groups at high risks of malnutrition due to inadequate dietary diversity and micronutrient inadequacies. It is recommended to undergo a nationwide implementation of this nutrition module that covers different seasons, different geographic regions and socio-economic groups throughout the country. This would generate rapid national representative nutrition information for decision making by the government.

## 2 Background

Inadequate and/or delayed management of malnutrition and nutrition interventions projects and programmes has serious public health implications. These factors can contribute to an increased mortality and morbidity among women and young children perpetuating the cycle of poverty, hunger, impaired growth and poor health in low resource countries. Tajikistan is the lowest-income country in Central Asia, in 2014 the average income per capita was 323 Somoni/month (~65 USD/month)<sup>(1)</sup>.

Tajikistan consists of four administrative regions: Khatlon, Sughd, Gorno-Badakhshan Autonomous Oblast (GBAO) and the Regions under Republican Subordination (RRS) with the capital Dushanbe city. Data from 2014 showed that the total population of Tajikistan was approximately of 7.99 million people: 4.13 million were female (49.4%) and 6.1 million people (73.5%) lived in rural areas<sup>(1)</sup>.

The latest report on poverty measurement in Tajikistan showed that 16.8% of Tajik people live below the extreme poverty line with limited access to nutritious food<sup>(2)</sup>. An



overall poverty rate of 32% was reported, where the highest rate was found in RRS (37.8%), followed by Khatlon (37.7%) and GBAO (37.3%) and lowest poverty rates were in Sughd (23.1%) and Dushanbe (19.9%)<sup>(2)</sup>. Poverty rate was also reported to be higher in rural areas (36.1%) than in urban households (23.5%)<sup>(2)</sup>.

**Figure 1. Tajikistan.** Source AoS, 2012<sup>(3)</sup>

Tajikistan is the only country in Central Asia that has not yet achieved the Millennium Development Goal (MDG) of cutting by half the proportion of people who suffer from hunger by 2015<sup>(4)</sup>. National data from the latest 2012 Demographic and Health Survey (DHS)<sup>(3)</sup> showed a high prevalence of malnutrition and micronutrient deficiencies amongst children and women of reproductive age (15-49 years old). A quarter of all children under five were stunted (nearly half of them were severely stunted) and wasting affected around 10% of children under five<sup>(3)</sup>. The prevalence of micronutrient deficiencies in children and women called for attention: roughly 53% of children under five and 59% of women of reproductive age were iodine deficient; anaemia affected 50% of children under two years old, and 29% of children under the age of five;

prevalence of anaemia among women was 24%, the highest levels were found in GBAO and in RRS<sup>(5)</sup>.

It is a fact that malnutrition can be passed on from one generation to the next, malnourished women give birth to malnourished children who often grow up to become malnourished adults<sup>(6)</sup>. Evidence has shown that the impact of malnutrition during the critical 1000 days, which starts from a woman's pregnancy through to a child's second birthday, can last a lifetime. Hence, childhood malnutrition is inevitably linked to the nutritional status of women at reproductive age<sup>(6; 7)</sup>. Despite the high prevalence of undernutrition and micronutrient deficiencies, the rate of overweight and obesity has gradually increased in Tajikistan, as it has in many other developing economies. It was reported that 30% of women suffers from overweight and obesity, with higher rates in women living in urban areas (37%) compared with women living in rural areas (24%), these changes may be largely due to changes in food habits<sup>(3)</sup>.

The consequences of malnutrition are huge and the country's development targets might not be met if nutrition issues were not addressed timely. Timely and accurate evaluation of population's dietary intake is very important to effective design and implementation of nutrition strategies, interventions and to tailor-make policies to decrease malnutrition. In response to the lack of nutrition information of women in Tajikistan and the alarming nutrition situation in the country, the Tajik government joined the Scaling Up Nutrition (SUN) movement in 2013, committing to improve nutrition for the people in Tajikistan. Furthermore, the government has prioritized the setting up of national information systems to understand and monitor the quality and diversity of people's diets through the use of a simple and valid food-based indicator. The MoH has requested the AoS to collect national representative nutrition information in the country. In order to accomplish this task, AoS called upon the FAO to provide technical support in the implementation of regular nutrition data collection at national level.

HBS is a country representative survey conducted at regular basis in many countries, even though HBS is not designed as a nutrition survey, it can be an important source of information on food availability and socio-economic factors that affect dietary choices. HBS presents several useful characteristics such as: standardized methodology, representativeness of the samples, large sample size and regular data updating<sup>(8; 9)</sup>. In Tajikistan, the AoS has a long history in conducting HBS at national level. However, HBS in Tajikistan has not yet included any nutrition module such as food consumption, or dietary information either at individual or household level. Therefore, to integrate a nutrition module into the HBS would be of great importance for building a national food security and nutrition information systems in Tajikistan. In the nutrition modules, proxy indicators to measure dietary diversity have been recognized as potential and simple

tools to be used in different settings, in particular in resource-poor settings, to evaluate dietary diversity. These tools count the number of food groups consumed over a given reference period, the score yielded provides an indication of the dietary diversity<sup>(10)</sup>. Dietary diversity is an important component of dietary quality, it has been reported that the consumption of a higher number of food items and food groups is associated with a higher probability of improved diet adequacy<sup>(11; 12)</sup>.

Until recently, a proxy tool to measure dietary diversity in women, named Women's Dietary Diversity Score (WDDS)<sup>(10; 13)</sup>, has been widely used. This indicator was developed in 2010, by secondary data analysis from five datasets of multiple 24-hour recalls in different low-resource countries<sup>(10; 13)</sup>. The WDDS score was constructed with the simple count of 9-food group indicator, yet this proxy tool did not have an established cut-off value<sup>(10)</sup>. Several users have expressed the need for a dichotomous indicator that might be useful for advocacy and target setting purposes<sup>(14)</sup>. In 2012-14, FAO commissioned a project "Women's Dietary Diversity Follow-up Project (WDDP-II)" with the aim to refine the WDDS<sup>(15)</sup>. The project expanded the number of databases to cover more settings in Africa and Asia, as well as to revise the food group classification and to propose a dichotomous indicator for global use. As a result, a new indicator was developed through secondary analysis of dietary intake (from multiple 24-hour recalls) of nine datasets from rural and urban areas of six countries (Bangladesh, Burkina Faso, Mali, Philippines, Mozambique and Uganda)<sup>(14)</sup>.

The new indicator, named "Minimum Dietary Diversity-Women (MDD-W)", is defined as *"the percentage of women, 15-49 years of age, who consume at least 5 out of 10 defined food groups"*<sup>(14)</sup>. MDD-W is constructed by counting 10-standard food groups (1. all starchy staples; 2. beans and peas; 3. nuts and seeds; 4. all dairy; 5. flesh foods; 6. Eggs; 7. vitamin A-rich Dark Green Leafy Vegetables (DGLV); 8. other vitamin A-rich vegetables and fruits; 9. other vegetables and 10. other fruits), and it has a cut-off point of five groups. This means that women consuming food items from five or more food groups are more likely to have an adequate dietary diversity and to meet their micronutrient requirements than women consuming foods from less than five food groups<sup>(14)</sup>. MDD-W has the potential to indicate micronutrient adequacies for eleven micronutrients (i.e. vitamin A, iron, thiamine, riboflavin, niacin, vitamin B-6, folate, vitamin B-12, vitamin C, calcium and zinc)<sup>(14)</sup>. It also evaluates the consumption of nutrient-dense foods. Hence, MDD-W can provide valuable information on dietary diversity and probability of micronutrient adequacies, while it demands relatively less resources and technical capacity compared to most traditional food consumption surveys that are usually labour intensive and demand significant technical capacity and financial resources<sup>(14)</sup>. The MDD-W tool is particularly useful for assessing whether agricultural development, food security and nutrition education programmes and policies are effectively leading to more diverse and nutritious diets in the population.

The MDD-W tool is very useful for countries, both at national and decentralized levels and it is easy to use, easy to analyse and relatively inexpensive. Due to the above characteristics, the MDD-W has been selected as the tool in the nutrition module to be integrated into the Tajik HBS.

The purpose of the present project was to integrate the MDD-W nutrition module into the national HBS in Tajikistan, conducted in the framework of the EU-FAO project “*Improved Global Governance for Hunger Reduction*”. The project was designed in three phases: 1. preparatory phase for project implementation, 2. capacity development and adaptation of the dietary diversity tool and 3. design and implementation of the pilot studies. In 2014, the three phases were satisfactorily conducted in the integration of the former WDDS into HBS in Khatlon region<sup>(16)</sup>. In 2015, following the success of the training course and pilot study in Khatlon, FAO was requested by AoS to provide further training for local AoS staff in the remaining parts of the country. Thus, capacity development and pilot studies on the integration of MDD-W nutrition module were expanded to Sughd and Dushanbe regions, the pilot study in the Dushanbe region included GBAO and RRS regions. The present project report presents an overview of the overall project and a detailed report of the results from the pilot studies conducted in Sughd, Dushanbe, GBAO and RRS.

### **3 Project objectives**

#### ***Overall objective***

To integrate the individual-based MDD-W module into the national HBS in Sughd, Dushanbe, GBAO and RSS regions in Tajikistan.

#### ***Specific objectives***

- Ø To develop capacity for Tajikistan to validly and accurately assess nutritional impact of actions resulting from food and nutrition policies or interventions by using the MDD-W indicator.
- Ø As part of the integration process, to conduct two pilot studies; one in Sughd region and the second in Dushanbe, GBAO and RRS regions. The objectives of the pilot studies are described below:
  - To evaluate the Minimum Dietary Diversity (MDD-W) of women of reproductive age in Sughd, Dushanbe, RRS and GBAO regions in Tajikistan.
  - To determine the percentage of women that had a dietary diversity above the MDD-W cut-off (5 or more), as well as the percentage of women that had consumed food items in every standard food group.

- To evaluate the women's consumption of nutrient-dense foods in areas of the pilot studies, which may have implications in micronutrient adequacies and health outcomes.
- To investigate the associations between socio-economic and demographic characteristics of women in the pilot studies and their dietary diversity scores.
- For enumerators, to practice the technical skills in dietary data collection, which they had acquired during the training courses.

## 4 Project design and implementation

The AoS (<http://www.stat.tj/en/>) has been conducting HBS since 1995 at a quarterly basis. Currently, with the support of the World Bank, the modules and data collection methods of the HBS are under review with an introduction of new methods for sampling, data collection and analysis. Since 2009, HBS in Tajikistan is collected four times per year with a coverage of 3000 households from urban and rural districts around the country. This sample size was designed to be representative at a national level. The households (survey units) for the survey were selected by cluster randomization<sup>(2)</sup>. The information obtained from the HBS provides some of the socio-economic characteristics that are used to study living standards of the Tajik population. Results of the survey provide information on income, expenditure, consumption, and savings of different groups of the population<sup>(2)</sup>. The HBS covers all the 5 regions of Tajikistan. The sample distribution across the regions is: 900 households in Khatlon, 860 households in Sughd, 400 households in Dushanbe, 240 households in GBAO and 600 households in RRS<sup>(2)</sup>.

Based on the solid experience of AoS in conducting HBS, and with the technical support from the Nutritional Assessment and Scientific Advice Team (ESNA)- FAO, the current project on the integration of the MDD-W into the HBS was designed and implemented in three phases: 1) a preparatory phase for project implementation; 2) capacity development and adaptation of the dietary diversity tool and 3) design and implementation of pilot studies.

### 4.1 Phase 1. Preparatory phase for project implementation

As part of this phase, in 2014, a capacity mapping was conducted, as well as the scene for the project implementation in Khatlon region was established. Details can be found in the previously published project report<sup>(17)</sup>.

In 2015, following the previous experience, the workplans to conduct two more training courses and pilot studies in Sughd, Dushanbe, GBAO and RRS regions were set up.

## 4.2 Phase 2. Capacity development and adaptation of the dietary diversity tool

In 2015, ESNA-FAO conducted two 5-day intensive hands-on-practice training courses for capacity development of enumerators, trainers and government officials on applying MDD-W. Two training courses were delivered, one in Khujand, the capital of Sughd region and the other one in Dushanbe. The training courses were designed to train enumerators and trainers from different parts of the country who had prior experience in conducting interviews and data collection. Each course included:

- *Classroom lectures and practice*, where the participants would familiarize themselves with the MDD-W questionnaire and the qualitative 24-hour recall which is the mode of data collection;
- *Adaptation of the MDD-W questionnaire* to the local context for use in Sughd and Dushanbe regions respectively. The questionnaires were adapted through meetings with key informants and focus group discussions;
- *Fieldwork*, necessary for testing the questionnaire and practicing data collection through interviews with women of reproductive age at various semi-urban and rural settings;
- *Classroom lectures and practice of calculation of the MDD-W score*, data analysis and interpretation.

The training courses in 2015, included an additional lecture and practice about anthropometric measurements. The principles and uses of anthropometrics were provided and the participants were instructed on how to take proper measurement of weight and height. Participants practiced the measurements in pairs and taking measurements of the volunteers during fieldwork. The data were entered into Excel spreadsheets to calculate BMI and to interpret results.

Details about the lectures, exercises and practice carried out during the capacity development and adaptation process can be found in the previously published reports for the training course in Khujand, Sughd<sup>(18)</sup> and in Dushanbe<sup>(19)</sup>.

### 4.3 Phase 3. Design and implementation of the pilot studies

Soon after each training course, a pilot study was conducted as part of the integration process, the design and implementation of the pilot studies were in accordance with the methods used by the AoS and following the steps shown below:

#### *Study design and methods*

The design of each pilot study consisted of a cross-sectional survey with approximately 300 participants, collecting data on HBS and MDD-W. The enumerators were trained to perform adequate dietary data collection in Sughd, Dushanbe, GBAO and RRS regions.

#### *Questionnaires and supporting materials*

The necessary tools, to conduct the pilot studies on integrating the MDD-W into the HBS, were adapted by the ESNA-FAO following the guidelines previously published by FAO and information on the meeting of MDD-W consensus on food groups and cut-off<sup>(10; 14)</sup>. The developed materials were adapted to the local context during the training courses conducted in Sughd and Dushanbe. Detailed information on the material development and adaptation can be found in the previous published training course reports in Khujand, Sughd<sup>(18)</sup> and Dushanbe<sup>(19)</sup>. The following materials were produced and are presented in Annexes.

- Questionnaire on socio-demographic characteristics (i.e. living area (rural/urban), education level, marital status, number of children, etc.) (Annex 1 and 2).
- MDD-W questionnaire, for Sughd and Dushanbe (Annex 1 and 2), the questionnaires include:
  - A qualitative open 24-hour recall questionnaire;
  - A 16-food group classification (1. cereals; 2. white roots and tubers; 3. vitamin A-rich rich vegetables and fruits; 4. dark green leafy vegetables (DGLV); 5. other vegetables; 6. vitamin A-rich fruits; 7. other fruits; 8. flesh foods and organ meat; 9. Eggs, 10. Fish and sea foods; 11. beans and peas; 12. nuts and seeds; 13. milk and milk products; 14. Oils and fats, 15. sweets and 16. spices, condiments, beverages);
  - A 10-standard food group (SFG) classification (SFG-1. all starchy staples; SFG-2. beans and peas; SFG-3. nuts and seeds; SFG-4. all dairy; SFG-5. flesh foods; SFG-6. Eggs; SFG-7. vitamin A-rich dark green leafy vegetables (DGLV); SFG-8. other vitamin A-rich vegetables and fruits; SFG-9. other vegetables and SFG-10. other fruits).
- A guide-form on how the 16-food group classification is aggregated into the 10-SFG (Annex 3).

- A list of most consumed dishes classified by meals in Sughd and Dushanbe region (Annex 4 and 5)
- Instructions for administering MDD-W questionnaire (Annex 6).
- Frequently asked questions and answers for MDD-W assessment (Annex 7).
- Excel spreadsheet for data entry and calculation of MDD-W score.

The questionnaires and supporting materials contain relevant information (i.e. dietary habits, common foods and meal) for every region. All the material was translated from English to Tajik prior their use. It was ensured that the questionnaires were understandable by the interviewees and easy to administer by the enumerators.

Socio-economic data such as the household income and number of household members were collected on the standard HBS questionnaire developed by AoS (<http://www.stat.tj/en/>).

### *Sample selection*

AoS, as part of the routinely HBS data collection, has a database on the households for HBS data collection. These households were selected by cluster randomization (Primary Sampling Unit (PSU) method) in all regions in both rural and urban areas. The total sample consisted of:

- 860 households in Sughd
- 400 households in Dushanbe
- 600 households in RRS
- 240 households in GBAO

From those selected households approximately one third of women of reproductive age (15-49 years old) were interviewed for MDD-W data collection.

### *Data collection and monitoring*

The enumerators from AoS were trained on dietary data collection on the 5-day training courses, details are presented in previous reports<sup>(18; 19)</sup>. Less than two weeks after the training courses, the enumerators collected information on HBS from the selected households and information on MDD-W from eligible women. A FAO national consultant, with technical backstopping from ESNA-FAO headquarters, monitored the progress of the two pilot studies. The consultant was in regular telephone contact to answer any questions, doubts or difficulties that the enumerators encountered and he provided technical assistance. The data were collected as follows:

- In May 2015, at the beginning of the harvest season, in Sughd and
- In August 2015, at the end of the harvest season in Dushanbe, GBAO and RSS.

The HBS data (<http://www.stat.tj/en/>) included household income and number of household members along with other socio-economic characteristics. Data on socio-demographic characteristics were collected on the structured questionnaire prepared by ESNA-FAO (Annex 1 and 2). Data on women's socio-economic and demographic characteristics were useful to identify association with the dietary diversity scores.

To collect data on MDD-W, the previously adapted questionnaires for both pilot studies were used (Annex 1 and 2). Data collection on MDD-W is based on a qualitative 24-hour recall. To complete the questionnaire, the participants were asked to report everything they had consumed the previous day (i.e. from the time getting up from bed in the morning until the time getting up again the next day) including both foods and drinks consumed at home and away from home. When mixed dishes were consumed, all ingredients used needed to be disaggregated. A list of common mixed dishes with their ingredients was provided to the enumerators that helped to probe for possible missing ingredients (Annex 4 and 5). From the ingredients listed in the 24-hour questionnaire, only the food items that were consumed in quantities more than 15-gram (roughly a table spoon) were underlined/counted towards the 16-food group classification. This minimum quantity-rule was previously tested, against 1-gram rule, in a study carried out in Tajikistan<sup>(20)</sup>. The quantity rule was shown to be relevant mainly because the majority of the Tajik local dishes contain at least four different food groups yet the quantity might not be sufficient to significantly contribute to micronutrient intakes<sup>(20)</sup>.

Once the food items are underlined into the 16-group classification they are then aggregated into the 10-SFG to construct the total score. A form-guide on how to aggregate the food groups was also provided and it is presented in Annex 3. Every food group in which at least one food item was underlined received the score of "1" otherwise a "0" was given. At the end of the interview the scores of the food groups were summed up to get the total score, which can vary from 0 to 10. More details regarding how to collect and analyse data for dietary diversity and MDD-W can be found in the FAO guidelines for measuring dietary diversity <sup>(10; 14)</sup>.

#### ***Data management (data entry, analysis, interpretation and report)***

Upon completion of HBS/MDD-W data collection, the completed questionnaires were reviewed by AoS staff and the data were entered into Excel spreadsheets for calculation and data analysis. Data revision and data entry were undertaken by capable AoS staff in the central statistical office in Dushanbe. The Excel spreadsheets for MDD-W calculation were previously prepared by ESNA-FAO to allow for an automatic food group aggregation and count of the final MDD-W score. The Excel databases contained the following information:

- MDD-W scores of the interviewed women collected on the MDD-W questionnaire.
- Socio-demographic characteristics of the interviewed women, collected on the

structured form for socio-demographic characteristics.

- Household income and number of household members collected on the HBS questionnaire.

The Excel databases were sent to ESNA-FAO headquarters, where the data were double checked to ensure data quality and the statistical analysis was performed. The data were checked for missing values and extreme outliers (box plots) and analysed using SPSS (SPSS Inc. version 18.0, Chicago, Illinois). To make household income comparable across households of different sizes (different number of household members) the household income equivalent (HHIEq) was calculated (total household income divided by the square root of the number of household members)<sup>(21)</sup>. The distribution of continuous variables (age, HHIEq) and MDD-W was inspected by kurtosis and skewness, the data were not normally distributed thus the results of these variables are presented as median and percentiles (25<sup>th</sup>, 75<sup>th</sup>).

The overall data were useful for calculation of the percentage of women that met the minimum dietary diversity, represented by women who had consumed foods listed in 5 or more SFG classification. As well as to obtain information on the frequency and percentage of women who consumed each food group from the 16-food group classification and from the 10-SFG. The MDD-W scores can also denote women who consumed nutrient-dense food groups (i.e. rich sources of specific micronutrients such as vitamin A and iron). Furthermore, bivariate analysis (Chi-square test) was used to investigate the associations between women's socio-economic and demographic characteristics and their corresponding MDD-W scores (the results are presented as  $\chi^2$  *Chi square*, *P value*). To be able to use MDD-W scores in the associations with categorical socio-economic and demographic characteristics, the MDD-W data were first classified in tertiles, thus the associations were made for low, medium and high MDD-W values. Continuous data (i.e. age and HHIEq) were also divided by tertiles before the bivariate analysis. All the statistical tests were two-sided with a level of significance at  $P < 0.05$ .

## 5 Outputs

### 5.1 Outputs phase 1. Preparatory phase for project implementation

The timeline for the project implementation in Sughd, Dushanbe, GBAO and RRS was agreed upon between AoS and FAO. It was decided that a 5-day training course would take place in Khujand (capital of Sughd) from 27<sup>th</sup> April to 1<sup>st</sup> May 2015 followed by data collection in June in the Sughd region. A second 5-day training course was conducted in Dushanbe from 27<sup>th</sup> to 31<sup>st</sup> July 2015 followed by a pilot study with data collection in Dushanbe, GBAO and RRS regions

It was agreed that a jointly data analysis would be performed on the data collected from both pilot studies and the results would be reported in November 2015.

## **5.2 Outputs phase 2. Capacity development and adaptation of the MDD-W tool**

In Sughd region, 17 enumerators and 2 trainers were trained and 22 enumerators and 4 trainers were trained in Dushanbe region. The enumerators were fully equipped to apply the MDD-W in field surveys and the trainers would become facilitators in future training courses, to run pilot studies and data collection across the country.

Questionnaires, instructions and supplementary materials in both English and Tajik were developed and used in the pilot studies. The adaptation procedure was performed, in each region, to ensure that the MDD-W questionnaire was relevant to the local food habits and included the local names of commonly consumed foods in the area. During the adaptation process, the 10-SFG were revised and locally consumed foods were added into the 10-SFG classification. The adapted tools and supporting materials can be found in previously published reports on the training courses in Sughd<sup>(18)</sup> and Dushanbe<sup>(19)</sup>.

## **5.3 Outputs phase 3. Implementation of the pilot studies, results and discussion**

The two pilot studies, one in Sughd and the second in Dushanbe, GBAO and RRS, were successfully conducted. HBS data were collected using standard methods by AoS, women of reproductive age (about 30% of the total HBS sample) were interviewed and provided data on socio-demographic characteristics and food consumption as part of the MDD-W questionnaire. The number of women were distributed as follows:

- In the first pilot study a total of 286 women from Sughd were interviewed, this sample represented the 33% of the households selected for HBS questionnaire.
- In the second pilot study a total of 415 women from Dushanbe, GBAO and RRS were interviewed, in this pilot study the women were from different regions:
  - 133 women were from Dushanbe, they represented 31% of the HBS sample.
  - 202 women were from RRS (34% of the HBS sample)
  - 80 women were from GBAO (33% of the HBS sample)

### Minimum Dietary Diversity-Women scores

Results of the median and percentiles (25<sup>th</sup>, 75<sup>th</sup>) of the dietary diversity score (MDD-W) of the interviewed women in the different regions are shown in Table 1. The lowest MDD-W was found in GBAO region 5.9 (5.0, 7.0). The Table 1 also presents the percentage of women that have met the minimum dietary diversity as determined by the percentage of women who had a MDD-W of 5 or more (MDD-W cut-off).

Table 1. MDD-W scores from first and second pilot studies

Region	MDD-W		Percentage of women (%)	
	Median	P ( 25 <sup>th</sup> , 75 <sup>th</sup> )*	Below cut-off	Equal or above cut-off
<b>Sughd, 1<sup>st</sup> pilot (n=286)</b>	7.0	6.0, 8.0	4.5	95.5
<b>Overall 2<sup>nd</sup> pilot (n=415)</b>	7.0	6.0, 8.0	8.9	91.1
Dushanbe (n=133)	7.4	7.0, 8.0	2.0	98.0
RRS (n=202)	6.5	5.0, 8.0	12.0	88.0
GBAO (n=80)	5.9	5.0, 7.0	14.0	86.0

MDD-W, Minimum Dietary Diversity-Women.

\*P(25<sup>th</sup>, 75<sup>th</sup>), percentiles.

### Percentage of women that had a dietary diversity score equal or above the cut-off

Figure 1 and 2 show the frequency and percentages of women's MDD-W in the first and second pilot study respectively. In the first pilot study (Figure 1), among all women from Sughd region, 4.5% had a MDD-W below the cut-off of 5 and 95.5% had a MDD-W equal or above the cut-off.

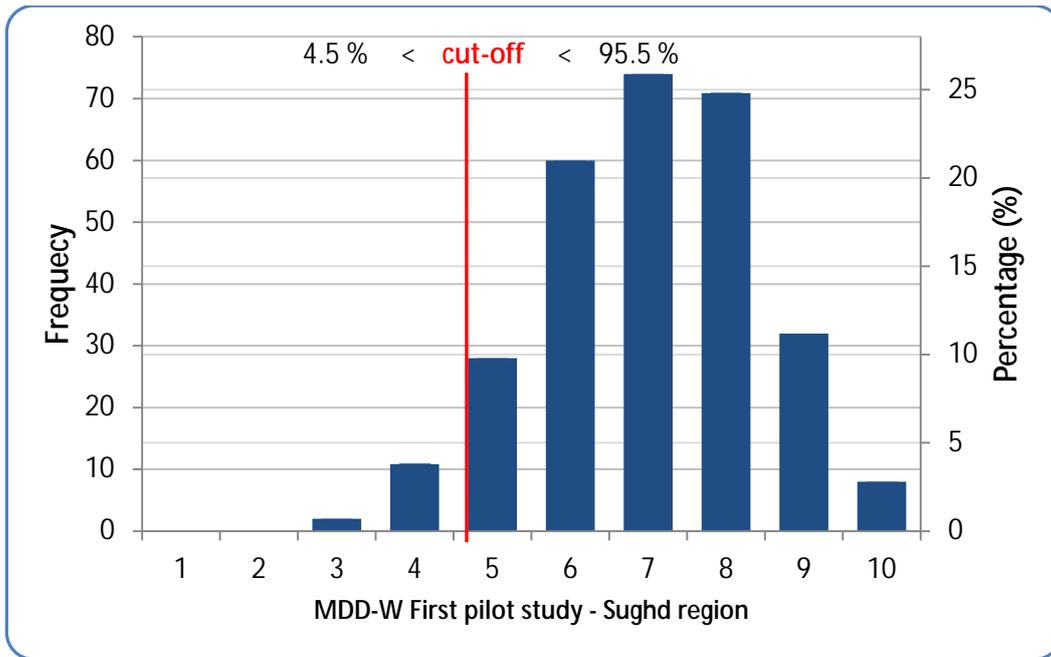


Figure 1. MDD-W scores in the first pilot study (Sughd region)

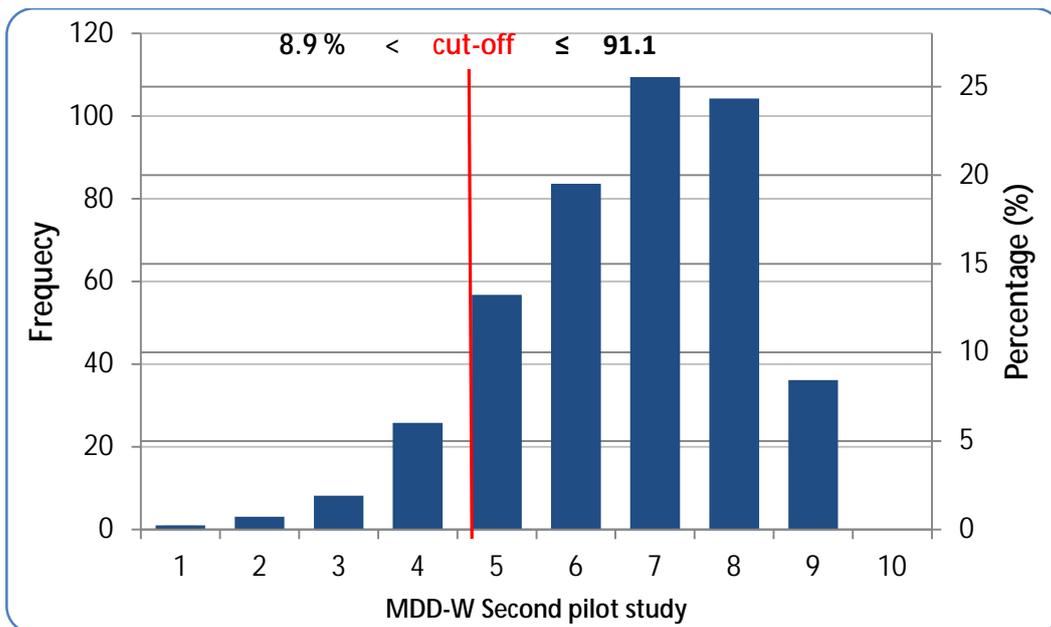


Figure 2. MDD-W scores in the second pilot study (all regions: Dushanbe, GBAO and RRS)

In the second pilot study (Figure 2), 8.9 % of the women had MDD-W below the cut-off, in this pilot study women were distributed across 3 different regions Dushanbe, RRS and GBAO. Thus, Figure 3 shows the frequency and percentage of women’s MDD-W in each one of these regions. The higher percentage of women who have not reached a minimum

dietary diversity was in GBAO (14%), followed by RRS (12%) and Dushanbe (2%). Women that have reached a minimum dietary diversity, meaning having consumed foods from 5 or more standard food groups, have a greater likelihood of meeting their micronutrient requirements when compared to women who consumed foods from fewer food groups.

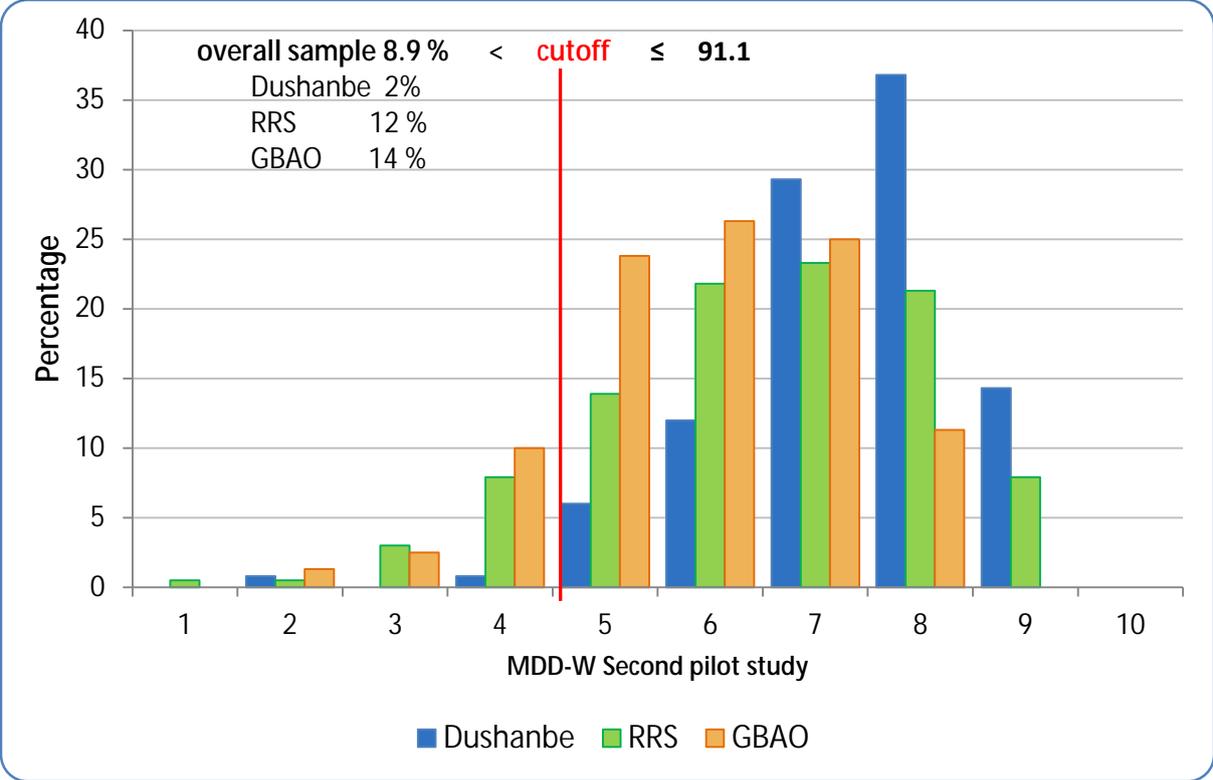
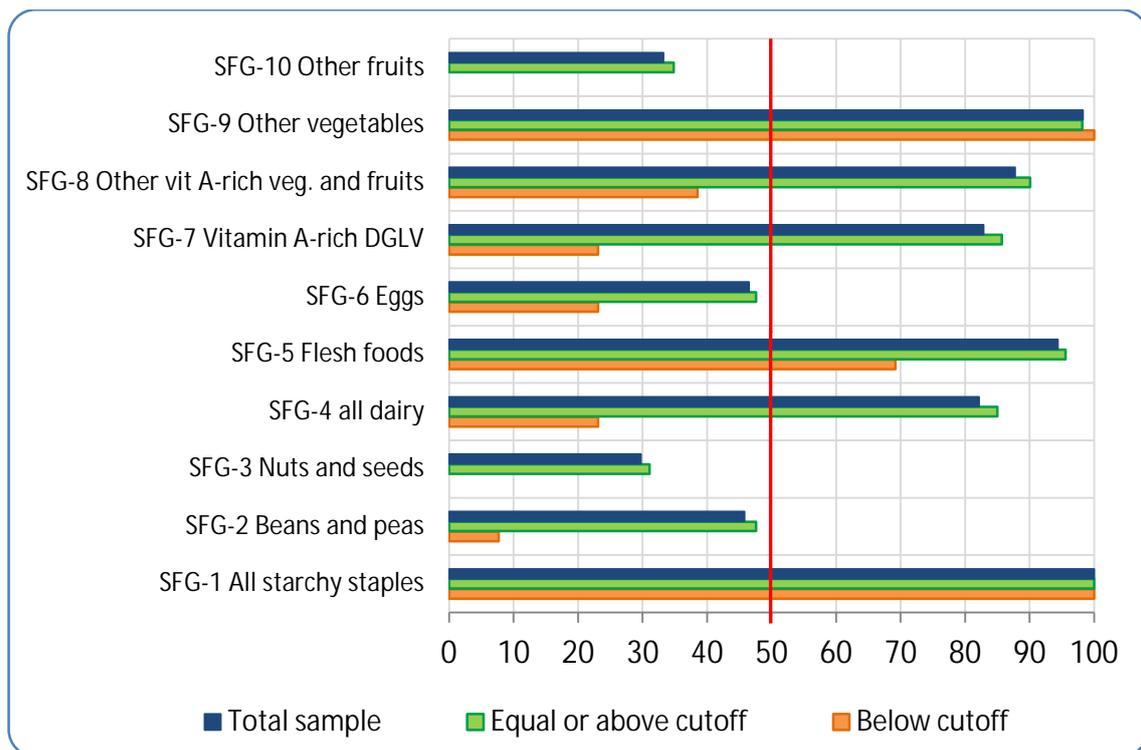


Figure 3. MDD-W scores in the second pilot study disaggregated by regions: Dushanbe, GBAO and RRS

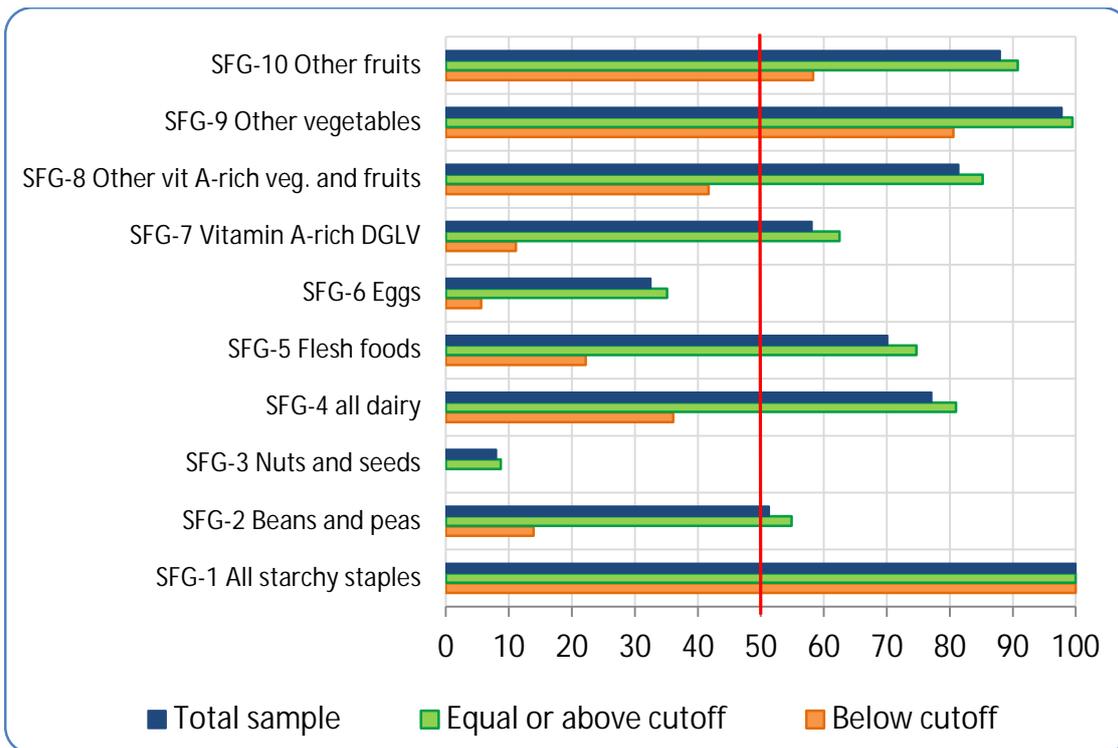
*Percentage of women that had consumed every Standard Food Group (SFG) the day before the MDD-W interview*

The contribution of each SFG to the construction of the MDD-W and for reaching the cut-off can be observed in Figure 4 for the first pilot study and in figure 5 for the second pilot study. The diet of the target population was based on starchy staples, which were consumed by 100 % of the women, and other vegetables consumed by more than 90% of the women. Other vitamin A-rich fruits and vegetables, DGLV, flesh foods and dairy products were consumed by more than 50% of the women who reached the MDD-W cut-off and the rest of the food groups were consumed by 8 to 45% of women.



**Figure 4. Percentage of women that consumed the SFG in the first pilot study (Sughd region)**

Regarding women below the MDD-W cut-off (Figure 4 and 5), these women did not reach the minimum dietary diversity. Less than 50% of them had consumed vitamin A-rich fruits and vegetables, DGLV, and dairy products. Eggs were consumed by only 23% (in the first pilot study) and 6% (in the second pilot study) of the women in this group. In addition, these women had reported no consumption of other fruits in the first pilot study, and no consumption of nuts and seeds in both pilot studies. Therefore, by promoting the consumption of other fruits, nuts and seeds, beans and peas and eggs, women who did not meet the MDD-W cut-off could potentially achieve an adequate MDD-W, as well as increase their likelihood of achieving micronutrient adequacies. Eggs, beans and nuts are nutrient-dense foods, which are rich sources of protein and micronutrients at a more affordable price than meat, fish or flesh foods. The promotion of these foods among Tajik women is highly recommended.



**Figure 5. Percentage of women that consumed the SFG in the second pilot study (Dushanbe, GBAO and RRS regions)**

Figure 6 presents the percentage of women that consumed the SFG in every region, Sughd, Dushanbe, RRS and GBAO. It was found that none of the women in GBAO region had consumed nuts and seeds the day before the interview. In Dushanbe and RRS, however, nuts and seeds were consumed by about the 10% of the women and by 30% of the women in Sughd. Eggs were consumed by 49% of women in Dushanbe, 47% in Sughd, 31% in RRS and only 9% in GBAO. Regarding beans and peas, these were consumed by 57% of women in Dushanbe, 55% in RRS, 46% in Sughd and only 34% in GBAO.

In general Sughd region had shown to have a good MDD-W with consumption of most of the food groups by more than 50% of the women (Figure 6), except for the consumption of other fruits, which was somehow lower in Sughd, where 33% of the women consumed other fruits, compared to 95% in Dushanbe, 91% in RRS and 69% in GBAO. One of the reasons for this result might be the seasonal variations, as the pilot study in Sughd was conducted at the beginning of the harvest season and the pilot study in the other regions was conducted at the end of the harvest season. Seasonal variations have been shown to have an effect on dietary diversity<sup>(22)</sup>, for this reason it is suggested to conduct data collection in different seasons, in particular during lean season, when the availability of certain food groups may be reduced. The difference on food consumption between one region and the others may be also due to the geographical location of the

areas, and socio-economic and demographic characteristics of the populations. In addition, food availability and food access together with food choices may also influence the consumption of food from different groups.

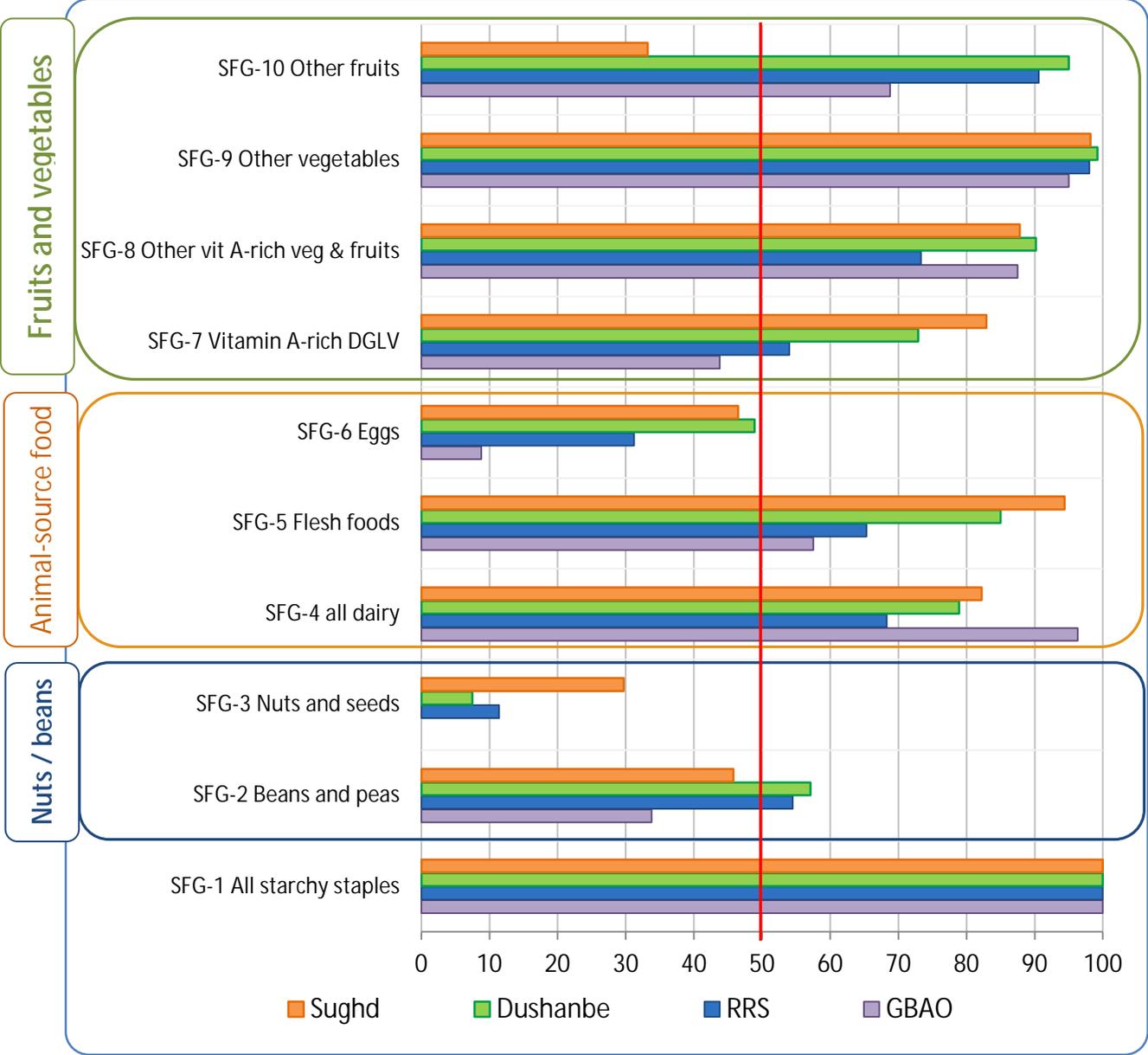


Figure 6. Food groups consumed by 50 percent or more women in Sughd, Dushanbe, RRS and GBAO regions

**Table 2. Frequency and percentage of women that have consumed the 10-SFG and the 16-dissagregated food groups\***

	<b>Sughd</b> (n=286)	<b>Dushanbe</b> (n=133)	<b>RRS</b> (n=202)	<b>GBAO</b> (n=80)
<b>10- SFG classification</b>	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
SFG-1 Starchy staples	286 (100)	133 (100)	220 (100)	80 (100)
<b>SFG-2 Beans and peas</b>	<b>131 (46)</b>	<b>76 (57)</b>	<b>110 (55)</b>	<b>27 (34)</b>
<b>SFG-3 Nuts and seeds</b>	<b>85 (30)</b>	<b>10 (7.5)</b>	<b>23 (11)</b>	<b>0 (0)</b>
SFG-4 All dairy	235 (82)	105 (79)	138 (68)	77 (96)
SFG-5 Flesh foods, includes organ meat, fish, etc.	270 (94)	113 (85)	132 (65)	46 (58)
<b>SFG-6 Eggs</b>	<b>133 (47)</b>	<b>65 (49)</b>	<b>63 (31)</b>	<b>7 (9)</b>
SFG-7 Vitamin A-rich green leafy vegetables	237 (83)	96 (73)	109 (54)	35 (44)
SFG-8 Other vitamin A rich fruits and vegetables	251 (88)	120 (90)	148 (73)	70 (88)
SFG-9 Other vegetables	281 (98)	132 (99)	198 (98)	76 (95)
SFG-10 Other fruits	95 (33)	126 (95)	183 (91)	55 (69)
<b>16-Food Group classification (disaggregated food groups)</b>				
1. Cereals	286 (100)	130 (100)	220 (100)	80 (100)
2. White roots and tubers	270 (94)	116 (87)	173 (86)	52 (65)
3. Vitamin A rich vegetables and tubers	250 (87)	106 (80)	129 (64)	59 (74)
4. Dark green leafy vegetables	237 (83)	97 (73)	109 (54)	35 (44)
5. Other vegetables	281 (98)	132 (99)	198 (98)	76 (95)
<b>6. Vitamin A rich fruits</b>	<b>17 (6)</b>	<b>59 (44)</b>	<b>63 (31)</b>	<b>37 (46)</b>
7. Other fruits	95 (33)	127 (96)	183 (81)	55 (69)
8. Flesh foods and organ meat	270 (94)	112 (84)	132 (65)	46 (58)
<b>9. Eggs</b>	<b>133 (47)</b>	<b>65 (49)</b>	<b>63 (31)</b>	<b>7 (9)</b>
<b>10. Fish and sea food</b>	<b>5 (2)</b>	<b>4 (3)</b>	<b>3 (2)</b>	<b>0 (0)</b>
<b>11. Beans and peas</b>	<b>131 (46)</b>	<b>76 (57)</b>	<b>110 (55)</b>	<b>27 (34)</b>
<b>12. Nuts and seeds</b>	<b>85 (30)</b>	<b>10 (8)</b>	<b>23 (11)</b>	<b>0 (0)</b>
13. Milk and milk products	235 (82)	105 (79)	138 (68)	77 (96)
14. Oils and fats	283 (99)	130 (98)	198 (98)	79 (99)
15. Sweets	278 (97)	121 (91)	191 (95)	64 (80)
16. Spices, condiments, beverages	286 (100)	132 (99)	199 (89)	78 (98)

\*Highlighted food groups indicate the food groups that were consumed by approximately 50% of the women in every region

In Table 2 the percentages of women that consumed every SFG are presented, together with the percentages of women that consumed the disaggregated food groups (i.e. the 16-food group classification). Less than 50% of the women, from every region, consumed eggs, beans and peas and nuts and seeds. The food groups fish and seafood were the least consumed, between 0 and 5% of the women had consumed any foods

from this classification the previous day of the interview. Conversely, food groups such as oils, fats and sweets were consumed by 80 to 99% of the women the previous day. Fats and sweets taken in excessive amounts are bad for health, however, caution must be taken with the interpretation of the results. Since MDD-W is not a quantitative tool. MDD-W does not provide any information on the quantity of foods consumed, only that the food items were above 15 grams, which is the minimum quantity rule, and therefore included in the constructions of the MDD-W score.

### *Consumption of nutrient-dense food groups. Implications for micronutrient adequacies.*

According to the report on choosing a standard operational indicator for women's dietary diversity<sup>(14)</sup> the consumption of certain nutrient-dense food groups are important to reach a micronutrient adequacy:

- Consumption of fruits and vegetables contribute to the adequacy of minerals and vitamins (i.e. vitamin C, E, pro-vitamin A, carotenes, etc.), these micronutrients are known as promoters of health and protective antioxidants against human cancers<sup>(23; 24)</sup>. Figure 6 (green box) shows the percentage of women consuming foods from these food groups. In the two pilot studies it was reported that more than 50% of all women in all regions consumed fruits and vegetables, except for other fruits-group, which in Sughd was consumed by only 33 % of the women. The relatively adequate consumption of these food groups was expected as the MDD-W interviews were carried out at the beginning of the harvest season in Sughd and at the end of the harvest season in the other regions. However, if the MDD-W evaluation is repeated during lean season, the results may be different.
- Consumption of animal-source foods (Figure 6, orange box) provides an important source of protein, iron and vitamin A. These foods provide highly bioavailable iron (hem-iron) needed to overcome problems of iron deficiencies and anaemia<sup>(25; 26)</sup>. The percentage of women consuming flesh foods (which include meat, organ meat, fish and seafood) and dairy foods was more than 50% in all the regions. However, the consumption of eggs was less than 50%: Egg consumption the day before the interview was shown to be 47% in Sughd, 49%, in Dushanbe, 31% in RRS 31% and only 9% in GBAO. These results can be due to the geographical characteristics of every region, which might determine the availability of these food items. The results of animal-source food consumption are in accordance with the results of a food security report, published in 2015 by the AoS<sup>(27)</sup>, where it was indicated that the production of key animal-source foods (meat, eggs and milk) was much higher in Sughd (10 Tn of meat, 32 Tn of

eggs and 59 Tn of milk) when compared to GBAO (1.4 Tn of meat, 0.5 Tn of eggs and 1.9 Tn of milk)<sup>(27)</sup>.

- Consumption of legumes, nuts and seeds (Figure 6, blue box) is important for the intake of essential minerals (i.e. zinc, iron, selenium) and B-vitamins as well as plant-based proteins<sup>(28; 29)</sup>. Beans and peas were consumed by more than 50% of women in Dushanbe and RRS but the consumption was lower in Sughd (46%) and GBAO (34%). Regarding nuts and seeds, this was the food group that was least consumed the day before the interview in all the regions; 30% in Sughd, 11% in RRS, 7.5% in Dushanbe and 0% in GBAO.

In addition, previous studies have suggested that the consumption of dark green leafy vegetables and vitamin A-rich fruits and vegetables were positive predictors of vitamin A adequacy, and the food group-meat/fish was a good predictor of the probability of iron adequacy<sup>(13; 30)</sup>.

### *Socio-economic and demographic characteristics of the women*

In Table 3 the socio-economic and demographic characteristics of the women are presented. The median (25<sup>th</sup>, 75<sup>th</sup>) age of women in the first pilot study was 33 (24, 40) years and in the second pilot study was 32 (24, 41) years. The data on household income and number of household members collected on the HBS questionnaire, were used to calculate the household income equivalent (HHIEq) to allow for comparisons between the household incomes. Results showed that the median (25<sup>th</sup>, 75<sup>th</sup>) HHIEq in the first pilot study was 898 (636, 1412) Somoni/month and 735 (512, 1006) Somoni/month, equivalent to a median of 135 and 111 USD/month respectively. The majority of the women (between 50 and 67%) were housewives, while others were office workers, farmers and small percentage were students (7 to 9%). Most of the women (80 to 90%) reported to be responsible of food preparation in the family and the rest reported to be partially responsible of food preparation. About 80% of the interviewed women were married and had between 1 to 4 children, at the time of the interview 6% of the women were pregnant and about 15% were lactating.

Regarding education level, about 50% of the women had reached a secondary education (up to 11 years of study), approximately 20% of the women reported to have a higher education level and only 1% of the women in Sughd region reported not to have any education level. Concerning the living area (urban/rural), in the first pilot study 38.8% of the women were from rural areas and in the second pilot study 47.0% of the women were from rural areas.

Table 3. Socio-economic and demographic characteristics of women

Characteristics	Sughd Region (n=286)		Dushanbe Region (n=415)	
	Median	P ( 25 <sup>th</sup> , 75 <sup>th</sup> )*	Median	P ( 25 <sup>th</sup> , 75 <sup>th</sup> )*
<b>Age, y</b>	33.0	24.0, 40.00	32.0	24.0, 41.0
Low tertile	22.0	19.0, 24.5	22.0	20.0, 25.0
Medium tertile	33.0	30.0, 35.0	32.0	29.0, 36.0
High tertile	44.0	40.0, 47.0	44.0	41.0, 47.0
<b>HHIEq, Somoni/month</b>	898	636, 1412	735	512, 1006
Low tertile	549	403, 638	447	364, 516
Medium tertile	903	789, 1052	735	658, 807
High tertile	1693	1408, 2614	1222	1004, 1619
	<b>n</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b>Occupation</b>				
Housewife	149	52.1	227	66.7
Farmer	20	7.0	12	2.9
Office worker	76	26.6	78	18.8
Student	20	7.0	12	2.9
Other	21	7.3	36	8.7
<b>Number of children</b>				
Without children	45	15.7	111	26.7
1 child	29	10.1	54	13.0
2 children	90	31.5	81	19.5
3 children	90	31.5	77	18.6
More than 4 children	32	11.2	92	22.2
<b>Marital status</b>				
Single	30	10.5	70	16.9
Married	239	83.6	296	88.2
Divorced or widow	17	5.9	49	100
<b>Education level</b>				
No education	3	1.0	0	0
School (5 to 9 y)	19	6.6	124	29.9
Secondary school (10 to 11 y)	159	55.6	184	44.3
Middle-level education (college)	40	14.0	48	11.6
Higher education	65	22.7	59	14.2
<b>Pregnancy</b>				
Non-Pregnant	267	93.4	389	93.7
Pregnant	19	6.6	26	6.3
<b>Lactating</b>				
Non-lactating	239	83.6	350	85.3
Lactating	47	16.4	65	15.7
<b>Responsible of food preparation</b>				
No	1	0.3	0	0
Yes	234	81.8	373	89.9
Partially	51	17.8	42	10.1
<b>Living area</b>				
Rural	111	38.8	195	47.0
Urban	175	61.2	220	35.0

\*P ( 25<sup>th</sup>, 75<sup>th</sup>), percentiles at 25% and 75%.

HHIEq, Household Income equivalent.

### Associations between MDD-W and socio-economic and demographic characteristics

Results of binary associations between different levels of MDD-W (low, medium and high tertile) and the socio-economic and demographic characteristics of the women are shown in Table 4. Results indicated that the associations between MDD-W and the characteristics rural/urban area and HHIEq were highly significant at level  $P < 0.000$  when the overall sample ( $n=701$ ) from both pilot studies was analyzed, as well as in the analysis of the second study ( $n=415$ ) and RRS region ( $n=202$ ). Women from higher household income and living in urban areas showed to have a higher MDD-W score. These differences might be explained due to the nutrition transition effect, which implies that households with higher incomes tend to diversify their diet by increasing the consumption of food from different groups<sup>(31)</sup>. Hence, the results suggest that Tajikistan is already in the process of nutrition transition.

**Table 4. Associations between MDD-W and socio-economic and demographic characteristics**

Characteristics	Chi- square ( <i>P</i> values) <sup>a*</sup>					
	MDD-W Both pilots n= 701	MDD-W 1 <sup>st</sup> pilot (Sughd) n= 286	MDD-W 2 <sup>nd</sup> pilot n= 415	MDD-W Dushanbe n= 133	MDD-W RRS n= 202	MDD-W GBAO n= 80
Occupation	--	--	--	--	19.27 (0.013)	--
Number of children	--	--	--	--	--	--
Marital status	--	--	--	--	--	--
Education level	18.03 (0.021)	20.03 (0.010)	--	--	--	--
Pregnancy	--	--	--	--	--	--
Lactating	--	--	--	--	--	--
Responsible food preparation	9.10 (0.011)	9.51 (0.007)	--	--	--	--
Rural/urban area	23.13 (<0.000)	--	44.87 (<0.000)	--	--	8.11 (0.017)
Age (tertiles)	9.50 (0.050)	--	--	9.79 (0.044)	--	--
HHIEq <sup>b</sup> (tertiles)	33.30 (<0.000)	--	42.19 (<0.000)	--	22.28 (<0.000)	--

MDD-W, Minimum Dietary Diversity-Women

HHIEq, Household Income Equivalent

<sup>a</sup>A Chi-square test was used to evaluate the bivariate association. MDD-W, age and HHIEq were evaluated as categorical variables after being classified in tertiles

Significant association were defined at  $P < 0.05$

Education level showed to be significantly associated with MDD-W for the analysis of the overall sample and for the first pilot study at levels  $P = 0.021$  and  $P = 0.010$  respectively. The characteristics, responsible of food preparation and age were also associated with the MDD-W category (from  $P=0.007$  to  $P=0.050$ ). The other socio-demographic characteristics such as women's occupation, number of children, marital status of physiological status (pregnancy, lactating) did not show any significant association with the MDD-W outcome.

These findings are in line with previous studies that found associations between socio-economic and demographic characteristics and dietary diversity scores, especially between dietary diversity and living area, household income and education level in low-resource settings such as Bangladesh and Ethiopia<sup>(31; 32; 33; 34)</sup>.

### *Associations between food group consumption and socio-economic and demographic characteristics*

**Table 5. MDD-W scores from first and second pilot studies**

<b>SFG consumed in all the regions (n=701)</b>	<b>Chi-square (<i>P</i> values)<sup>a*</sup></b>		
	<b>HHIEq</b>	<b>Rural area</b>	<b>Education level</b>
SFG-2 Beans and peas	--	--	--
SFG-3 Nuts and seeds	25.59 (<0.000) ↓	6.61 (0.010) ↓	--
SFG-4 All dairy	--	--	--
SFG-5 Flesh foods, includes organ meat, fish, etc.	45.69 (<0.000) ↓	34.18 (<0.000) ↓	--
SFG-6 Eggs	9.99 (0.007) ↓	10.23 (0.001) ↓	--
SFG-7 Vitamin A-rich green leafy vegetables	30.39 (<0.000) ↓	45.89 (<0.000) ↓	--
SFG-8 Other vitamin A rich fruits and vegetables	--	--	--
SFG-10 Other fruits	--	8.04 (0.005) ↑	--

SFG, Standard Food Groups. HHIEq, Household Income Equivalent

\*For the overall sample (includes data from both pilot studies) Chi-square test was used to evaluate the bivariate association. MDD-W, age and HHIEq were evaluated as a categorical variable, divided in tertiles. Significant associations were defined at  $P < 0.05$ . The analysis was not performed for SFG-1 (starchy staples) and SFG-9 (other vegetables) because these groups were consumed by 100% and 95% respectively.

The main determinants for having a higher MDD-W (i.e. rural/urban, HHIEq and educational level) were tested for significant differences in the consumption of the food groups (Table 5). The associations were investigated in the overall sample, which included women interviewed in the first and second pilot studies (n=701). To allow for associations of food groups with HHIEq, the HHIEq was divided into tertiles: low, medium and high with 234 women in each tertile. Consumption of the food groups was also investigated according to the rural/urban area, the overall sample was divided and resulted in two evenly distributed groups with 331 women in rural areas and 370 women in urban areas.

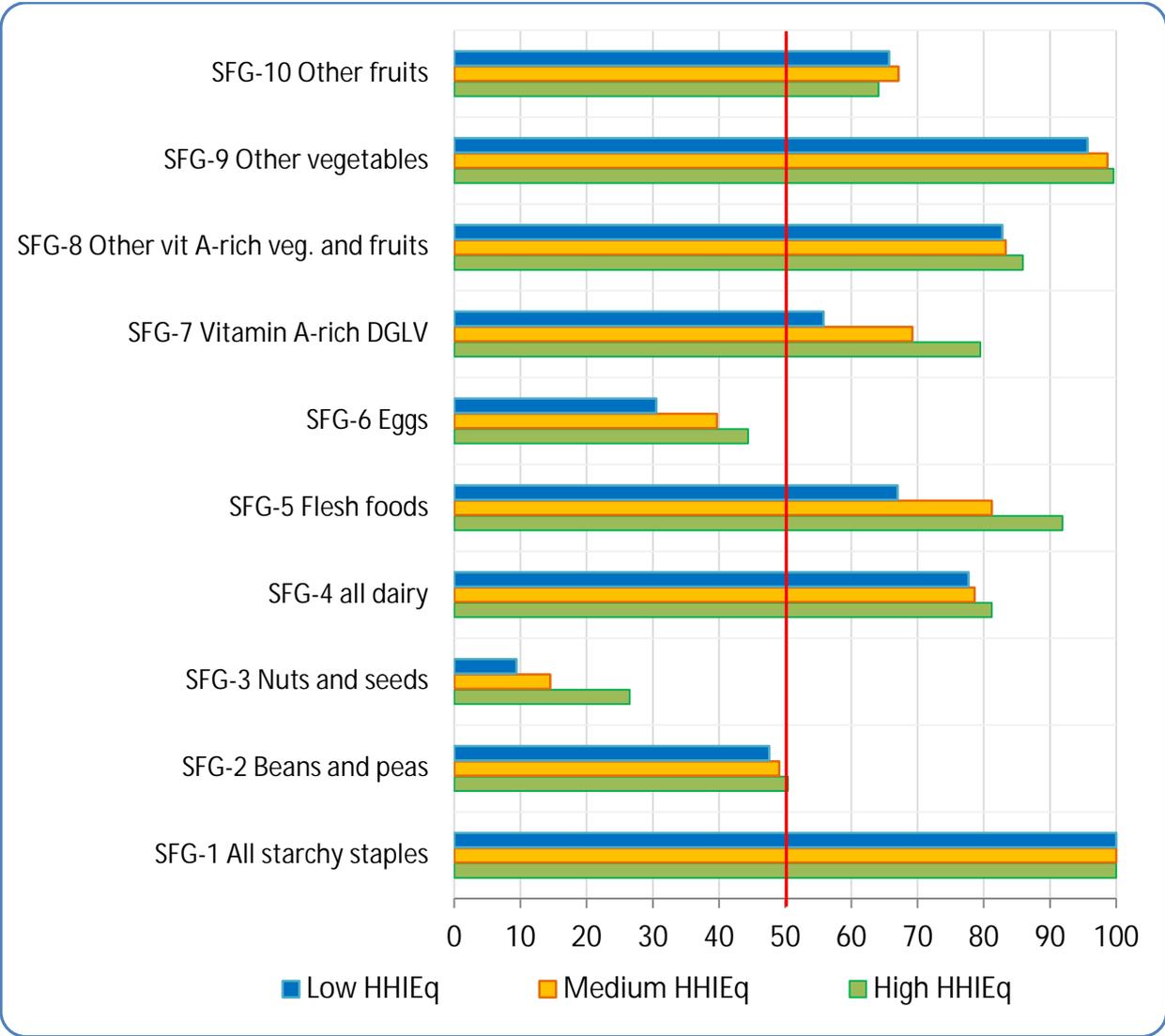


Figure 7. Percentage of women that consumed every food group divided by the household income equivalent (HHIEq)

The consumption of certain food groups was associated with rural/urban area and HHIEq but not with educational level nor with other characteristics (Table 5). Women with higher HHIEq consumed significantly more food groups like nuts and seeds, which was consumed by only 9.4% of women of the low HHIEq, compared with 26.5% of women of a high HHIEq (Figure 7). Consumption of animal-source foods were also affected by the HHIEq, women of low HHIEq consumed less flesh foods and eggs compared with women with a higher income. Moreover, the consumption of vitamin A-rich DGLV was negatively affected by the low HHIEq, where 55.8% of women reported the consumption of foods from this groups compared with 79.5% of women with high income. It is clear that HHIEq is a determinant for the likelihood of consumption of nutrient-dense foods such as nuts, animal-source foods and DGLV. As a consequence, the low consumption of nutrient-dense foods may have a detrimental effect on the micronutrient adequacy of Tajik women with low income.

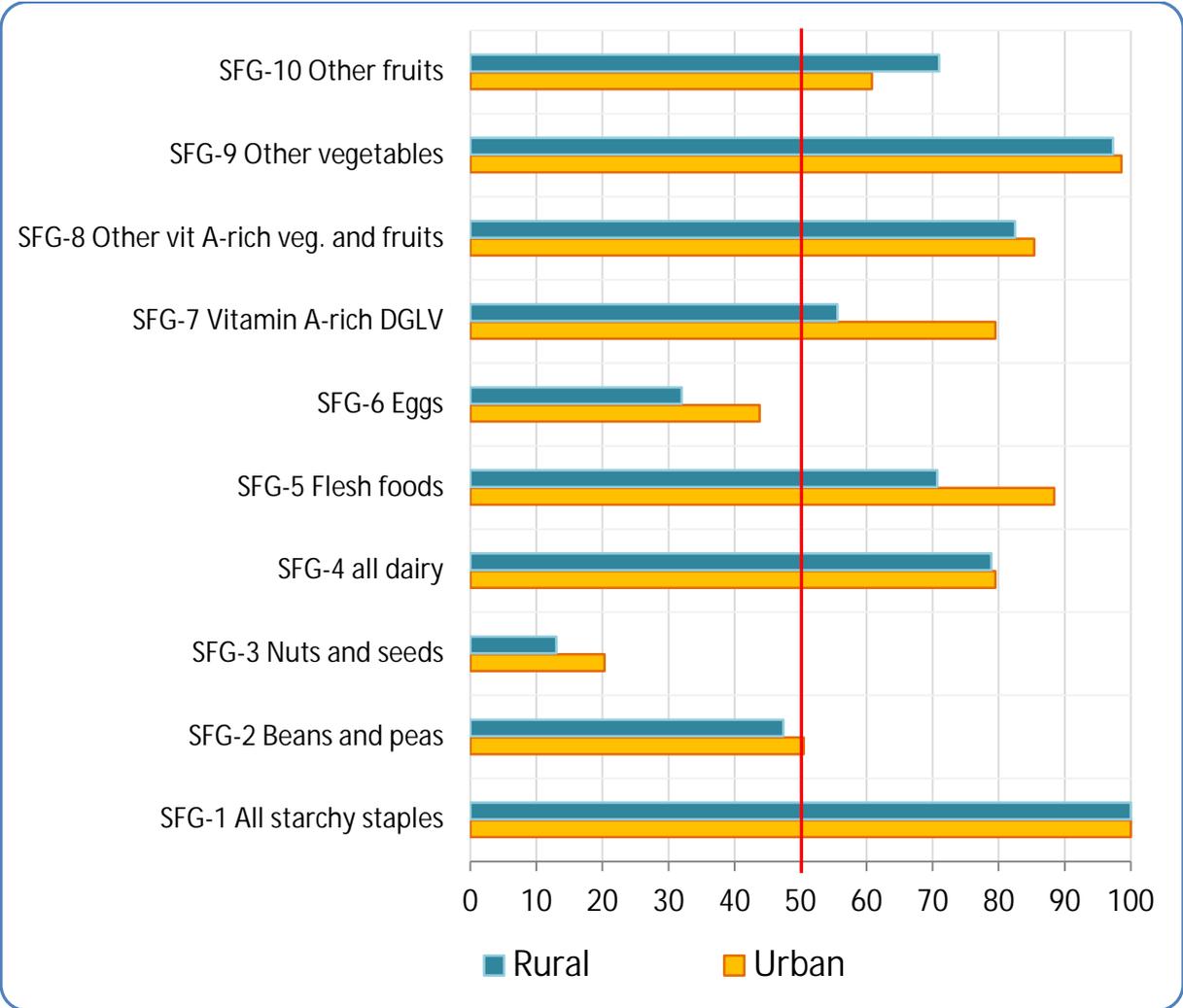


Figure 8. Percentage of women that consumed every food group divided by rural/urban area of residence

Moreover, most of the food groups were consumed by a significantly lower number of women living in rural areas compared with women in urban areas, except for the group of other fruits, which was shown to be consumed by more women in rural areas (Figure 8). One reason for the higher consumption of other fruits in rural areas may be due to the existence of more fruit trees and thus higher fruit availability. The consumption of nuts, flesh foods, eggs and DGLV was higher in women in urban areas; this is in agreement with the data of HHIEq. The results indicated that women living in urban areas, with high household income are more likely to consume these nutrient-rich foods, thus they are more likely to achieve micronutrients adequacy.

Associations between the significant determinants (HHIEa and rural/urban) in the different regions in Tajikistan are shown in Table 6. Lower MDD-W scores were found in RRS (6.47) and GBAO (5.91) compared with Sughd (7.00) and Dushanbe (7.35). In addition, in the regions of RRS and GBAO it was found that the majority of the women (about 75%) were from rural areas, conversely in Sughd only 38.8% of the women were from rural areas and in Dushanbe none of the women was from rural areas.

**Table 6. Socio-economic and demographic factors associated with MDD-W score in the different regions**

Region	MDD-W		HHIEq ↑		Rural area ↓	Poverty rate <sup>†</sup> ↓
	Median	P ( 25 <sup>th</sup> , 75 <sup>th</sup> )*	Median	P ( 25 <sup>th</sup> , 75 <sup>th</sup> )*	n (%)	%
<b>Sughd, 1<sup>st</sup> pilot (n=286)</b>	7.00	6.00, 8.00	898	636, 1412	111 (38.8)	23.1
<b>Overall 2<sup>nd</sup> pilot (n=415)</b>	7.00	6.00, 8.00	735	512, 1006	195 (47)	
Dushanbe (n=133)	7.35	7.00, 8.00	850	646, 1098	0 (0)	19.9
RRS (n=202)	6.47	5.00, 8.00	756	499, 1149	161 (79.7)	37.8
GBAO (n=80)	5.91	5.00, 7.00	526	402, 672	59 (73.8)	37.3
Chi Square (P value)	53.56 (<0.000)		83.5 (<0.000)		235 (<0.000)	

MDD-W, Minimum Dietary Diversity-Women. HHIEq, Household Income Equivalent

\*P(25<sup>th</sup>, 75<sup>th</sup>), 25<sup>th</sup> and 75<sup>th</sup> percentiles.

<sup>†</sup> Poverty rate, data published in 2015 by AoS<sup>(2)</sup>

The results could also be associated with the poverty rate in each region. Table 6, shows the poverty rate in the different regions, which was reported by AoS in 2015<sup>(2)</sup>, higher poverty rates were found in GBAO (37.3%) and RRS (37.8%) compared with the rates found in Sughd (23.1) and Dushanbe (19.9). The results of MDD-W, HHIEq and rural/urban are in agreement with the previously published results of poverty rate. The trend shows that regions with a higher poverty rate (GBAO and RRS) had lower HHIEq

and a higher percentage of the population living in rural areas. These factors were found to be significant determinants for the lower MDD-W reported in these areas. It is recommended that in future, evaluations of poverty rate, food availability and food security (which could be calculated from the HBS interviews), should be investigated together with MDD-W. Therefore, a joint statistical analysis could provide valuable information regarding how the MDD-W in women of reproductive age is affected by household food security, food access and poverty rate.

## **6 Summary of key results obtained in the pilot studies in Sughd and Dushanbe regions**

- Ø HBS and MDD-W data were collected from a total of 286 women ( $32.5 \pm 9.4$  years) in Sughd region and a total of 415 women ( $32.7 \pm 9.6$  years) in Dushanbe, RRS and GBAO. In the second pilot study, 32% (n=133) of the women were from Dushanbe, 49% (n=202) were from RRS and 19% (n=80) from GBAO.
- Ø The MDD-W median and percentiles (25<sup>th</sup>, 75<sup>th</sup>) in Sughd was 7.0 (6.0 – 8.0). In the second pilot study (Dushanbe, RRS and GBAO) the median MDD-W was 7.0 (6.0 - 8.0). MDD-W data disaggregated by regions showed a median MDD-W in Dushanbe of 8.0 (7.0 – 8.0) in RRS was 7.0 (5.0 – 8.0) and in GBAO was 6.0 (5.0 – 7.0).
- Ø The women showed a relatively high MDD-W, about 95% of them have reached the minimum dietary diversity with MDD-W equal or above the cut-off of 5. The percentage of women that met a minimum dietary diversity with the probability of having an adequate nutrient intake was 95.5% in Sughd, 98.4% in Dushanbe, 88.1 in RRS and 86.2% in GBAO. However, it is necessary to bear in mind that data collection took place during the harvest season.
- Ø The following food groups were consumed by more than 50% of the women in each region: starchy staples were consumed by 100% of women in all regions, other vegetables, by more than 95% of the women, other fruits (except in Sughd region) were consumed by 69 to 95% of women, and meat and flesh foods were consumed from 58 to 94% of the women.
- Ø Conversely the following food groups were consumed by less than 50% of the women: eggs, nuts and seeds and beans and peas. Therefore, there is a potential of improving the MDD-W score in this population by encouraging the consumption of food items in these food groups.
- Ø Household income and rural/urban area were significantly associated with having a higher MDD-W score and with the consumption of nutrient-dense foods. Women with higher incomes and living in urban areas had higher MDD-W scores, as well as a higher percentage of women with these characteristics reported the consumption

of flesh foods, eggs and nuts compared with women with lower household income and living in rural areas.

- Ø The poverty rate data reported by AoS in 2015<sup>(2)</sup> showed that the poverty rate in Sughd was 23.1%, 19.9% in Dushanbe, 37.3% in GBAO and 37.8% in RRS region. According to the MDD-W results, women in regions with a lower poverty rate have shown to have a higher MDD-W.

## 7 Conclusions

In conclusion, a nutrition module by means of MDD-W was successfully adapted and integrated into the national HBS in Tajikistan. The nutrition module has been developed for the Tajikistan's food security and nutrition information system in the framework of the EU-FAO project "*Improved Global Governance for Hunger Reduction*". The pilot study, conducted as part of the integration process, provided baseline information about the dietary diversity of women of reproductive age. The following are highlights of the project:

- Ø Capacity of AoS enumerators and trainers was developed on collection of dietary data and MDD-W application. Feedback from the enumerators was requested in the end-course evaluation: all the participants stated that:
  - The dietary data collection was easy to carry out;
  - The MDD-W was a simple and easy tool to use in the field;
  - They (enumerators and trainers) felt confident to undertake broader data collection.
  - Regarding anthropometric measurements, the enumerators stated that the measurements were easy to take, especially if they had the adequate instruments. Some cultural constraints, such as men taking women's measurements could be overcome. Anthropometric measurements were practiced during the training course and fieldwork but they were not yet included in the pilot studies.
- Ø The MDD-W questionnaires were adapted to the local context for its application in Sughd, Dushanbe, RRS and GBAO regions. The proxy tool MDD-W was shown to be suitable for the Tajik context and was satisfactorily adapted to include the local food habits and common food names.
- Ø As part of the integration process two pilot studies were conducted in 2015, one in Sughd and the second in Dushanbe RRS and GBAO regions.

- ∅ The pilot studies were successfully conducted in all the regions. The trained enumerators collected food consumption data on women of reproductive age by applying the MDD-W adapted questionnaires. The data was useful to:
  - Evaluate the dietary diversity of women, identify the percentage of women that did not meet the minimum dietary diversity;
  - Evaluate the consumption of specific food groups. For example, identify the most and least consumed food groups, and the percentage of women that consumed nutrient-dense foods;
  - Provide an indication of micronutrient adequacies (i.e. vitamin A and iron);
  - Allow for monitoring dietary diversity and consumption of specific food groups over time and in different urban/rural settings;
  - Provide a joint statistical analysis on household income and other characteristics collected on the HBS and MDD-W results, in order to investigate the associations of socio-economic and demographic variables and the dietary diversity of women.
  - In addition, during the pilot studies, the enumerators could practice technical skills in dietary data collection.
- ∅ The MDD-W to collect dietary data within the framework of the national HBS has the following advantages:
  - It comprises a large sample size, which represents the national population;
  - Regular data updating ensures sustainability of data collection while strengthening national capacities;
  - Data collection is cost-effective, as regular data collection for HBS is already in place.
- ∅ Quicker project implementation, including data collection and analysis: Each training course, including capacity development and adaptation of the MDD-W questionnaire, had a duration of 5 days, followed by one week pilot study and 3 months for data entry, analysis, interpretation and report. The time invested was much shorter as compared with the time needed to implement and analyze more lengthy quantitative dietary assessment methods such as 24-hours recall or food records.
- ∅ MDD-W presents some advantages compared with traditional dietary assessment methods such as the short time for data analysis, simple application and less expensive. Thus, low technical capacity in nutrition and limited budget at the country level did not discourage the use of this proxy assessment indicator. In fact, the project capitalized the existing national capacity and equipped the local AoS staff

with the MDD-W within a relatively short period of time and low in cost for dietary data collection.

- Ø The initial cost for the three phases, MDD-W planning, capacity development and adaptation and pilot MDD-W data collection, was USD 20 000 (2 training courses and pilot studies). It is expected that further data collection and analysis in the same scale would be less costly, as the tools and methodology have already been developed and enumerators have been trained. Conversely, the cost to set up a traditional food consumption survey is estimated to be about 100 times higher than running a MDD-W survey. Traditional food consumption surveys may also require solid nutrition capacity and availability of an updated national food composition table.
- Ø It must be clarified that MDD-W does not report quantitative information of the dietary intake. It represents the median dietary diversity of the studied group, however not the individual food consumption, and its value may significantly vary by season.

## **8 Recommendations**

- Ø Additional data collection in Sughd and Dushanbe regions, during lean season or a season of limited food availability is recommended to evaluate the dietary diversity during other seasons of the year in order to identify seasonal variation in dietary diversity. It should be borne in mind that in the present project data were collected during the harvest season.
- Ø The government of Tajikistan is encouraged to scale-up MDD-W data collection. A nationwide implementation of the dietary diversity module, being representative of seasonality, geographic locality and socio-economic groups, would help to:
  - Identify regions and population groups at high risk of inadequate dietary diversity and micronutrient inadequacy;
  - Provide invaluable national representative data for policy and decision making by the government.
- Ø According to the nutrition information needed, different options for up-scaling the MDD-W data collection can be considered:
  - Target specific regions or districts at risk of high levels of malnutrition/micronutrient deficiencies;
  - Remote/isolated areas that might present specific nutrition problems;
  - Compare rural/urban areas across different regions in the country;

- Nationwide implementation, once per year, for monitoring of dietary diversity and evaluation purposes.
- ∅ The HBS also collects information on food access and food availability. If feasible, food groups in the HBS should be aligned with the MDD-W food groups in order to expand the array of analysis and make the data more comparable between the two methods.
- ∅ It is recommended to include, in the HBS, a module of anthropometric measurements such as body height, body weight and the waist circumference. These measurements are useful for body mass index (BMI) calculation, which can provide valuable information on the nutritional status of women (i.e. undernutrition, normal weight, overweight, obesity and double burden of malnutrition). In addition these data would be useful to understand emerging issues of obesity in the country.

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## Annex 1

### MDD-W questionnaire used for data collection in Sughd region

**Statistics Agency under the President of Tajikistan**

Household No (from HBS):

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*Household Budget Survey - Add to Form 2*

MDD-W Code:

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**Minimum Dietary Diversity-Women**

Name of the enumerator:	
Date of interview: (dd/mm/yyyy)	

**Part 1 – Demographic information of interviewee,**  
*Please fill in the blank and tick the appropriate boxes.*

Question	Answer	Code for entry (if applicable)
Name of interviewee		
Date of Birth (dd/mm/yyyy)	D   D   M   M   Y   Y   Y   Y	
Age		
Occupation		
Number of Children		
Sex	Male <input type="checkbox"/>	0
	Female <input type="checkbox"/>	1
Marital Status	Single <input type="checkbox"/>	0
	Married <input type="checkbox"/>	1
	Divorced <input type="checkbox"/>	2
	Widow <input type="checkbox"/>	3
Education level	No Education <input type="checkbox"/>	0
	Primary School (1-4) <input type="checkbox"/>	1
	Secondary School (5-9) <input type="checkbox"/>	2
	Secondary School (10-11) <input type="checkbox"/>	3
	Middle- level Education (college) <input type="checkbox"/>	4
Pregnant	No <input type="checkbox"/>	0
	Yes <input type="checkbox"/>	1
Lactation	No <input type="checkbox"/>	0
	Yes <input type="checkbox"/>	1
Responsible for food preparation	No <input type="checkbox"/>	0
	Yes <input type="checkbox"/>	1
	Partial <input type="checkbox"/>	2
Living area	Rural <input type="checkbox"/>	0
	Urban <input type="checkbox"/>	1

**Part 2 – 24-hour dietary recall**

**Please describe the foods (meal/ tea break/ shirini) that you ate or drank yesterday, whether at home or outside the home. Start with the first food or drink of the morning. Write down all foods and drinks mentioned. When composite dishes are mentioned, ask for the FULL list of ingredients.**

*When the respondent has finished, probe for meal/ tea break/ shirini not mentioned*

<b>Time:</b>	<b>Meal/ Tea break/ Shirini:</b>
<b>Time:</b>	<b>Meal/ Tea break/ Shirini:</b>
<b>Time:</b>	<b>Meal/ Tea break/ Shirini:</b>
<b>Time:</b>	<b>Meal/ Tea break/ Shirini:</b>
<b>Time:</b>	<b>Meal/ Tea break/ Shirini:</b>
<b>Time:</b>	<b>Meal/ Tea break/ Shirini:</b>

### Part 3 – Table of Food Groups

After the respondent recalls all the food and beverages consumed, underline the corresponding foods in the list under the appropriate food group. For any food groups not mentioned, ask the respondent if a food item from this group was consumed. Write '1' in the column next to the food group if at least one food in this group has been underlined. If the food is not listed in any group, write it in the remark page (p.4) and discuss it with the supervisor.

Question Number	Food group	Locally available foods	Yes=1 No=0
1	<b>Cereals</b>	Wheat, barley [perlofca], buckwheat, oats, maize, rice, sorghum, pasta, wheat bread, rye and other bread, wheat flour, other flour, pasta products, kirieshki (snack made from flour), pop corn	
2	<b>White roots and tubers</b>	Potato, turnip (yellow, white), radish (red, green)	
3	<b>Vitamin A rich vegetables and tubers</b>	Pumpkin, carrot, red sweet pepper (bulgori), squash	
4	<b>Dark green leafy vegetables (DGLV)</b>	- Spinach, rhubarb, siyoalaf, bargi salat; - dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel, celery, grape leaves, jagh-jagh [Consider as DGLV when consumed at least one table spoon of these vegetable(s) per day. Otherwise, go to Group 16]	
5	<b>Other vegetables</b>	Cabbage, cauliflower, garlic, cucumber, leek, tomato, onion, eggplant, beetroot, mushrooms fresh and dried, anzur, green beans, green pepper	
6	<b>Vitamin A rich fruits</b>	Apricot [quoq] and dried apricot, peach and dried peach, Persimmon	
7	<b>Other fruits</b>	Apple, banana, lemon, watermelon, mandarin, grapes, pears, melon, muskmelon, fruits and berries, dried fruits and berries, raisins, oranges, cherries, figs, plum, pomegranate, prune, quince, raspberries, strawberries, blackberries, mulberries, king mulberries, yellow cherry, plum (orange-color), sinjid, chelon, dulona, kiwi, pineapple, grapefruit, simorodina, green apricot, hips	
8	<b>Flesh foods and organ meat</b>	Beef, mutton, goat, chukar, rabbit, chicken, goose, turkey, quail, sausages, veal, lamb and chevron, meat of wild animals and games, sausage products and smoked meat, horse, duck, ox tail, liver, kidney, heart, lung, stomach, intestine, tongue, brain (goat and Sheep), spleen [saburs] (cow, goat and sheep), pustdumba (skin of button sheep)	
9	<b>Eggs</b>	Quail eggs, chicken eggs, goose eggs, turkey eggs, duck eggs	
10	<b>Fish and sea foods</b>	Fresh and frozen fish, canned fish, smoked fish, dried fish, caviar, crab sticks	
11	<b>Beans and peas</b>	Mung bean, peas, red beans, white beans, lentils, chickpeas	
12	<b>Nuts and seeds</b>	Sesame seed, pistachios, almonds, pumpkin seeds, sunflower seeds, walnuts, peanuts, apricot seeds, hazelnut, pecan	

Question Number	Food group	Locally available foods	Yes=1 No=0
13	<b>Milk and milk products</b>	Milk, skim milk, sour milk, yogurt, qurut (dried yogurt), ice-cream, kefir, chaka, kaymak (sour cream), cheese, sour cream/smetana, powdered milk, condensed milk, tvorog, falla (colostrum from cow), goat milk	
14	<b>Oils and fats</b>	Vegetable oil (sunflower, flax, sesame, cotton, olive), butter, sheep fat, margarine, mayonnaise, ravgani zard (oil prepared from kaimak and butter), mahsar/saflo oil (plant oil), mixed oil (animal fat and vegetable oil), turta (sediment of boiled kaymak), potato chips	
15	<b>Sweets</b>	Sugar, honey, candies, chocolate, cakes, biscuits, jam, halva, baklava, obinabot (crystalised sugar), nishollo, shirini tut (Tajik snicker, mulberry paste with sugar), pechak	
16	<b>Spices, condiments, beverages</b>	<ul style="list-style-type: none"> <li>- black pepper, cumin, ketchup, salt, pripava (adviya), chicken/ beef cubes; balsamic vinager, vinager;</li> <li>- dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel, rosemary (small green leaves), black sesame seeds, bay leaf. [Consider as condiments when these vegetable(s) are consumed less than one table spoon a day. Otherwise, go to Group 4];</li> <li>- coffee, black and green tea, khuch, fruit drinks (compote), sweet soda, water</li> </ul>	

**Remarks:**



Food and Agriculture  
Organization of the  
United Nations

## Annex 2

### MDD-W questionnaire used for data collection in Dushanbe region

**Statistics Agency under the President of Tajikistan**

Household No (from HBS):

*Household Budget Survey - Add to Form 2*

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**Minimum Dietary Diversity-Women**

MDD-W Code:

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Name of the enumerator:	
Date of interview: (dd/mm/yyyy)	

**Part 1 – Demographic information of interviewee,**  
*Please fill in the blank and tick the appropriate boxes.*

Question	Answer	Code for entry (if applicable)
Name of interviewee		
Date of Birth (dd/mm/yyyy)	D    D    M    M    Y    Y    Y    Y	
Age		
Occupation		
Number of Children		
Sex	Male <input type="checkbox"/>	0
	Female <input type="checkbox"/>	1
Marital Status	Single <input type="checkbox"/>	0
	Married <input type="checkbox"/>	1
	Divorced <input type="checkbox"/>	2
	Widow <input type="checkbox"/>	3
Education level	No Education <input type="checkbox"/>	0
	Primary School (1-4) <input type="checkbox"/>	1
	Secondary School (5-9) <input type="checkbox"/>	2
	Secondary School (10-11) <input type="checkbox"/>	3
	Middle- level Education (college) <input type="checkbox"/>	4
Pregnant	No <input type="checkbox"/>	0
	Yes <input type="checkbox"/>	1
Lactation	No <input type="checkbox"/>	0
	Yes <input type="checkbox"/>	1
Responsible for food preparation	No <input type="checkbox"/>	0
	Yes <input type="checkbox"/>	1
	Partial <input type="checkbox"/>	2
Living area	Rural <input type="checkbox"/>	0
	Urban <input type="checkbox"/>	1

## Part 2 – 24-hour dietary recall

**Please describe the foods (meal/ tea break/ shirini) that you ate or drank yesterday, whether at home or outside the home. Start with the first food or drink of the morning.**

*Write down all foods and drinks mentioned. When composite dishes are mentioned, ask for the **FULL list of ingredients**.*

*When the respondent has finished, probe for meal/ tea break/ shirini not mentioned*

Time:	Meal/ Tea break/ Shirini:
Time:	Meal/ Tea break/ Shirini:
Time:	Meal/ Tea break/ Shirini:
Time:	Meal/ Tea break/ Shirini:
Time:	Meal/ Tea break/ Shirini:
Time:	Meal/ Tea break/ Shirini:

### Part 3 – Table of Food Groups

After the respondent recalls all the food and beverages consumed, underline the corresponding foods in the list under the appropriate food group. For any food groups not mentioned, ask the respondent if a food item from this group was consumed. Write '1' in the column next to the food group if at least one food in this group has been underlined. If the food is not listed in any group, write it in the remark page (p.4) and discuss it with the supervisor.

Question Number	Food group	Locally available foods	Yes=1 No=0
1	<b>Cereals</b>	Wheat, barley [perlofca], buckwheat, maize, rice, pasta, wheat bread, other bread, wheat flour, other flour, pasta products, kirieshki (snack made from flour), pop corn	
2	<b>White roots and tubers</b>	Potato, turnip (yellow, red), radish	
3	<b>Vitamin A rich vegetables and tubers</b>	Pumpkin, carrot, red sweet pepper (bulgori), squash	
4	<b>Dark green leafy vegetables (DGLV)</b>	- Spinach, rhubarb, siyoalaf, bargi salat; - dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel, wine leaves, jagh-jagh [Consider as DGLV when consumed at least one table spoon of these vegetable(s) per day. Otherwise, go to Group 16]	
5	<b>Other vegetables</b>	Cabbage, cauliflower, garlic, cucumber, leek, tomato, onion, eggplant, beetroot, mushrooms fresh and dried, anzur, green beans, green pepper	
6	<b>Vitamin A rich fruits</b>	Apricot and dried apricot, peach and dried peach, persimmon, cantaloupe melon	
7	<b>Other fruits</b>	Apple, banana, lemon, watermelon, mandarin, grapes, pears, melon, muskmelon, fruits and berries, dried fruits and berries, raisins, oranges, cherries, figs, plum, pomegranate, prune, quince, raspberries, strawberries, blackberries, mulberries, king mulberries, yellow cherry, plum (orange-color), sinjid, chelon, dulona (haw), kiwi, pineapple, grapefruit, simorodina, hips	
8	<b>Flesh foods and organ meat</b>	Beef, mutton, goat, chukar, rabbit, chicken, goose, turkey, quail, sausages, veal, lamb and chevron, meat of wild animals and games, sausage products and smoked meat, horse, duck, ox tail, liver, kidney, heart, lung,, stomach, intestine,tongue, brain (goat and sheep), spleen [ssiyohlavak] (cow, goat and sheep),	
9	<b>Eggs</b>	Quail eggs, chicken eggs, goose eggs, turkey eggs, duck eggs	

10	<b>Fish and sea foods</b>	Fresh and frozen fish, canned fish, smoked fish, dried fish, caviar, crab sticks	
11	<b>Beans and peas</b>	Mung bean, peas, red beans, white beans, lentils, chickpeas, split peas	
12	<b>Nuts and seeds</b>	Sesame seed, pistachios, almonds, pumpkin seeds, sunflower seeds, walnuts, peanuts, apricot seeds, hazelnut, pecan	
13	<b>Milk and milk products</b>	Milk, skim milk, sour milk, yogurt, qurut (dried yogurt), ice-cream, kefir, chaka, kaymak (sour cream), cheese, sour cream/smetana, powdered milk, condensed milk, tvorog, falla (colostrum from cow), goat milk	
14	<b>Oils and fats</b>	Vegetable oil (sunflower, flax, sesame, cotton,olive), butter, sheep fat, margarine, mayonnaise, ravvani zard (oil prepared from kaimak and butter), mahsar/saflo oil (plant oil), mixed oil (animal fat and vegetable oil), turta (sediment of boiled kaymak), potato chips, cow fat, sheep fat	
15	<b>Sweets</b>	Sugar, honey, candies, chocolate, cakes, biscuits, jam, halva, baklava, obinabot (crystalised sugar), nishollo, shirinii tut (Tajik snicker, mulberry paste with sugar), pechak	
16	<b>Spices, condiments, beverages</b>	<ul style="list-style-type: none"> <li>- black pepper, cumin, ketchup, salt, pripava (adviya), chicken/ beef cubes; balsamic vinager, vinager</li> <li>- dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel, rosemary (small green leaves), black sesame seeds, bay leaf. [Consider as condiments when these vegetable(s) are consumed less than one table spoon a day. Otherwise, go to Group 4];</li> <li>- coffee, black and green tea, khuch, fruit drinks (compote), boiled water, sweet soda, water</li> </ul>	

**Remarks:**

### Annex 3

#### Aggregation of food groups to calculate MDD-W score

Question number(s)	The 10 Food groups	Score
1,2	All starchy staples	
11	Beans and peas	
12	Nuts and seeds	
13	All dairy	
8, 10	Flesh foods (including organ meat and miscellaneous small protein)	
9	Eggs	
4	Vitamin A-rich dark green leafy vegetables	
3, 6	Other vitamin A-rich vegetables and fruits	
5	Other vegetables	
7	Other fruits	
<b>MDD-W (sum of the above scores)</b>		

## Annex 4

### List of most consumed dishes classified by meals in Sughd region

A. Breakfast		Ingredients
1	Black and green tea	Tea, sugar, honey
2	Boiled eggs and sausages (boiled/ fried)	Egg, oil, beef, chicken, soy bean, onion, greens, ketchup
3	Bread	Wheat flour, salt, variation: butter
4	Butter or margarine	Cow milk, maska
5	Chalpak	Wheat flour, oil, salt, greens, onion
6	Fried potatoes/ boiled potato	Oil, potatoes, onion, variation: beef
7	Havloi tar	Wheat flour, sugar, oil, water/milk
8	Jam/murabbo	Fruits, sugar, water
9	Kefir/Yogurt/Qatiq	Kefir/Yogurt/Qatiq
10	Mannaya kasha	Semolina, milk, sugar, butter
11	Oshi omuch	Locally made wheat starch, milk, yellow oil or butter
12	Omelets	Egg, wheat flour, greens, oil
13	Orzuq	Wheat flour, oil, salt, milk, egg
14	Otala	Fried wheat flour with oil, milk, salt, water
15	Pancakes	Egg, wheat flour, egg, milk, oil, sugar
16	Kaymak	Kaymak (cream)
17	Shirbirinj	Milk, rice, salt, butter, water
18	Shirchoy	Tea, milk, salt, sometimes walnuts are added,
19	Shirkadu	Pumpkin boiled into milk, salt, sugar
20	Shirravaghum	Milk, oil (maska), sometimes Kaimak is added
21	Smetana	Smetana (sour cream)
22	Quymog	Wheat flour, water, vegetable oil, chicken, egg
B. Lunch/ Dinner		Ingredients
1	Borsh	Beetroots, cabbage, beef meat, onion, carrot, potato, tomato
2	Bread	Wheat flour
3	Damlama	Cabbage, carrot, potato, meat (beef or lamb), onion, oil, greens, chickpeas, garlic
4	Fatir	Wheat flour bread containing oil
5	Fruits	Apple, pear, peach, cherry, plump, pomegranate, grape, mandarin, kiwi, banana
6	Goluptsi	Sweet pepper (or cabbage), minced beef/mutton meet, onion, rice, grape leaves, oil, salt, water, condiments
7	Greens	Parsley, coriander, dill, sorrel, spring onions
8	Gushtbiryon	Fried meat (beef or lamb or goat) , onion, oil, condiments
9	Kadubiryon	Fried pumpkin, onion, oil, salt, sugar
10	Kalla pocha	Intestines, stomachs, leg, head of lamb, chickpeas, onion, greens all boiled, condiments

11	Kefir/Yogurt	Kefir/Yogurt
12	Kotlet	Minced meat (beef), onion, dried bread, oil
13	Lagman	Homemade noodles, oil, meat, vegetables, potatoes, herbs
14	Makaron plov /pasta plov	Oil, macaroni, meat, carrot, onion, tomato
15	Mantu	Wheat flour to make a steamed dough, meat (or pumpkin), onion, oil, local variation: potatoes
16	Mastova	Rice, oil, carrot, potato, meat, tomato, peppers, chickpeas, greens, sometime chakka is added
17	Moshkichiri	Mung beans, beans, oil, rice, carrot, onion, salt
18	Non-plov/ bread plov	Dried bread, onion, carrots, oil, potato, local variation: eggs
19	Okroshka	Cucumber, kefir, dill, mashed meat or sausage, egg, greens, radish
20	Fatir	Wheat flour, butter/ravgani zard
21	Fatir maska	Wheat flour (fatir), butter, milk
22	Plov/ osh	Rice, beef or mutton, chickpeas, carrots, onion, oil, condiment: cumin, hot pepper powder, dill, parsley, coriander, blackberries
23	Qalama	Wheat flour (dough), oil, eggs, sugar, sour cream
24	Qurutob	Small pieces of fatir (crashed wheat bread) hot water, yoghurt and cucumber, tomato, onion, oil, green vegetables and meat
25	Rasolnik	Meat, oat, cucumbers, carrot, oil, potato, greens
26	Sambusa	Wheat flour to dough, meat, onion, oil, cooked in the traditional oven-tandoori or oven, local variation: greens, lagh-lagh
27	Shakarob	Tomatoes, cucumber, onions, oil, herbs, greens
28	Shashlik	Grilled meat (beef, lamb, chicken, turkey, liver) and condiments
29	Shavla	Onion, carrot, small pieces of meat, water, oil, and can be prepared without meat
30	Shurbo	Meat (beef/lamb), carrots, potatoes, oil, onion, herbs, variations: peas, chickpeas, tomato, sweet pepper
31	Tea	Tea, black or green, sugar, honey
32	Tuppa	Wheat flour to make boiled dough cut in small pieces, vegetables served with boiled vegetables (beans, peas, coriander), onion, tomato, carrot, yellow turnip. Yogurt can be added before eating
33	Tushbera/pelmeni:	Noodle dough filled with meat in soup, tomato, onion, oil
34	Ugro:	Wheat flour, oil, onion, chickpeas and greens, wheat noodles, meat, tomato, carrot, potato, yellow turnip, mugbeans
35	pickles	Pickles ( cucumber, tomatoes)
36	Moshgurunj/Moshshula	Mug beans, rice, onion, carrot, potato, meat, tomato, oil

3. Snack/ tea break (Shirini/ Advia)		Ingredients
1	Biscuits	Biscuits
2	Bread	Bread
3	Cakes	Cakes
4	Chakchak	Fried dough with eggs and sugar/honey
5	Chocolate	Chocolate
6	Cookies	Cookies
7	Dried fruits	Dried fruits
8	Jam	Jam
9	Kefir	Kefir
10	Pickles	Pickles
11	Tajik Snicker	Mashed mulberry with sugar
12	Toast/ Dried bread	Toast/ Dried bread
13	Nuts, pistachio, almonds, sunflower/pumpkin seeds ....	Nuts, pistachio, almonds, sunflower/pumpkin seeds ....
14	Halvoitar	Wheat flour, sugar, milk or water, walnuts
15	Chocolate	Chocolate
16	Dried mulberry	Dried mulberry
17	Nishollo	Delicacy from sugar and whipped egg
18	Potato chips	Potato, oil, salt
19	Pop corn	Corn, oil, sugar, variation: sugar

## Annex 5

### List of most consumed dishes classified by meals in Dushanbe region

<b>A Breakfast</b>		<b>Ingredients</b>
1	Black and green tea	Tea, sugar, honey
2	Boiled eggs and sausages (boiled/ fried)	Egg, oil, beef, chicken, soy bean, onion, greens, ketchup
3	Bread	Wheat flour, salt, variation: butter
4	Butter or margarine	Cow milk, maska
5	Chalpak	Wheat flour, oil, salt, greens, onion
6	Fried potatoes/ boiled potato	Oil, potatos, onion, variation: beef
7	Havloi tar	Wheat flour, sugar, oil, water/milk
8	Jam/murabbo	Fruits, sugar, water
9	Kefir/Yogurt/Qatiq	Kefir/Yogurt/Qatiq
10	Mannaya kasha	Semolina, milk, sugar, butter
11	Oshi omuch	Locally made wheat starch, milk, yellow oil or butter
12	Omelets	Egg, wheat flour, greens, oil
13	Orzuq	Wheat flour, oil, salt, milk, egg
14	Otala	Fried wheat flour with oil, milk, salt, water
15	Pancakes	Egg, wheat flour, egg, milk, oil, sugar
16	Kaymak	Kaymak (cream)
17	Shirbirinj	Milk, rice, salt, butter, water
18	Shirchoy	Tea, milk, salt, sometimes walnuts are added,
19	Shirkadu	Pumpkin boiled into milk, salt, sugar
20	Shirravaghum	Milk, oil (maska), sometimes Kaimak is added
21	Smetana	Smetana (sour cream)
22	Quymog	Wheat flour, water, vegetable oil, chicken, egg
<b>B. Lunch/ Dinner</b>		<b>Ingredients</b>
1	Borsh	Beetroots, cabbage, beef meat, onion, carrot, potato, tomato
2	Bread	Wheat flour
3	Damlama	Cabbage, carrot, potato, meat (beef or lamb), onion, oil, greens, chickpeas, garlic
4	Fatir	Wheat flour bread containing oil
5	Fruits	Apple, pear, peach, cherry, plump, pomegranate, grape, mandarin, kiwi, banana
6	Goluptsi	Sweet pepper (or cabbage), minced beef/mutton meet, onion, rice, grape leaves, oil, salt, water, condiments
7	Greens	Parsley, coriander, dill, sorrel, spring onions
8	Gushtbiryon	Fried meat (beef or lamb or goat) , onio, oil, condiments
9	Kadubiryon	Fried pumpkin, onion, oil, salt, sugar
10	Kalla pochа	Intestines, stomachs, leg, head of lamb, chickpeas, onion, greens all boiled, condiments

11	Kefir/Yogurt	Kefir/Yogurt
12	Kotlet	Minced meat (beef), onion, dried bread, oil
13	Lagman	Homemade noodles, oil, meat, vegetables, potatoes, herbs
14	Makaron plov /pasta plov	Oil, macaroni, meat, carrot, onion, tomato
15	Mantu	Wheat flour to make a steamed dough, meat (or pumpkin), onion, oil, local variation: potatoes
16	Mastova	Rice, oil, carrot, potato, meat, tomato, peppers, chickpeas, greens, sometime chakka is added
17	Moshkichiri	Mung beans, beans, oil, rice, carrot, onion, salt
18	Non-plov/ bread plov	Dried bread, onion, carrots, oil, potato, local variation: eggs
19	Okroshka	Cucumber, kefir, dill, mashed meat or sausage, egg, greens, radish
20	Fatir	Wheat flour, butter/ravgani zard
21	Fatir maska	Wheat flour (fatir), butter, milk
22	Plov/ osh	Rice, beef or mutton, chickpeas, carrots, onion, oil, condiment: cumin, hot pepper powder, dill, parsley, coriander, blackberries
23	Qalama	Wheat flour (dough), oil, eggs, sugar, sour cream
24	Qurutob	Small pieces of fatir (crashed wheat bread) hot water, yoghurt and cucumber, tomato, onion, oil, green vegetables and meat
25	Rasolnik	Meat, oat, cucumbers, carrot, oil, potato, greens
26	Sambusa	Wheat flour to dough, meat, onion, oil, cooked in the traditional oven-tandoori or oven, local variation: greens, lagh-lagh
27	Shakarob	Tomatoes, cucumber, onions, oil, herbs, greens
28	Shashlik	Grilled meat (beef, lamb, chicken, turkey, liver) and condiments
29	Shavla	Onion, carrot, small pieces of meat, water, oil, and can be prepared without meat
30	Shurbo	Meat (beef/lamb), carrots, potatoes, oil, onion, herbs, variations: peas, chickpeas, tomato, sweet pepper
31	Tea	Tea, black or green, sugar, honey
32	Tuppa	Wheat flour to make boiled dough cut in small pieces, vegetables served with boiled vegetables (beans, peas, coriander), onion, tomato, carrot, yellow turnip. Yogurt can be added before eating
33	Tushbera/pelmeni:	Noodle dough filled with meat in soup, tomato, onion, oil
34	Ugro:	Wheat flour, oil, onion, chickpeas and greens, wheat noodles, meat, tomato, carrot, potato, yellow turnip, mugbeans
35	pickles	Pickles (cucumber, tomatoes)
36	Moshgurunj/Moshshula	Mug beans, rice, onion, carrot, potato, meat, tomato, oil

<b>3. Snack/ tea break (Shirini/ Advia)</b>		<b>Ingredients</b>
1	Biscuits	Biscuits
2	Bread	Bread
3	Cakes	Cakes
4	Chakchak	Fried dough with eggs and sugar/honey
5	Chocolate	Chocolate
6	Cookies	Cookies
7	Dried fruits	Dried fruits
8	Jam	Jam
9	Kefir	Kefir
10	Pickles	Pickles
11	Tajik Snicker	Mashed mulberry with sugar
12	Toast/ Dried bread	Toast/ Dried bread
13	Nuts, pistachio, almonds, sunflower/pumpkin seeds ....	Nuts, pistachio, almonds, sunflower/pumpkin seeds ....
14	Halvoitar	Wheat flour, sugar, milk or water, walnuts
15	Chocolate	Chocolate
16	Dried mulberry	Dried mulberry
17	Nishollo	Delicacy from sugar and whipped egg
18	Potato chips	Potato, oil, salt
19	Pop corn	Corn, oil, sugar, variation: sugar

## Annex 6

### Instructions for administering MDD-W questionnaire

1. Introduce yourself and explain the purpose of the interview clearly in layman language.
2. Fill in the MDD-W Code and demographic information, make sure all items are filled in correctly (call out the answer to the respondent)
3. Ask the respondent if the previous day was a usual/typical day in terms of their food intake. Ask if they consumed more or less than usual. If the previous day's intake was usual then continue with the questionnaire.
4. Explain to the respondent that you are going to ask her a series of questions about the foods and drinks that she consumed the previous day or the last 24-hour. The 24-hour cycle lasted from the time she got up in the morning yesterday until at the time she got up in the morning today. It doesn't matter that the recall period spans over two calendar days. Both inside and outside home food consumption are counted. Tell the respondent that there are no correct or incorrect answers.
5. If the respondent is the one who is responsible for cooking in the family, remind her that you are going to ask about the diet that she actually consumed but not the diets of her family.
6. Ask the respondent to think back to yesterday, to the time she woke up in the morning. Ask her to tell you the first thing she ate or drank – record this in the free recall space. For the Tajik eating habits, the first foods eaten in the morning are usually at breakfast. You should also ascertain if she ate or drank anything in between the time she got up in the morning and the breakfast.
7. Continue asking “after breakfast, when was the next meal, food, or drink she consumed?” And record everything including water in the open space. Continue through the entire day until the respondent went to bed. Be cautious that some women might eat or drink at night, e.g. Lactating mothers breastfeed infants at night. Use local names for meal occasions such as breakfast, lunch, dinner, meal, tea and shirini. Record these items in the space provided in the questionnaire.
8. Probe for food, drinks, tea and shirini eaten between the three main meals with the respondent. Probe for added foods such as sugar in tea, jam in bread, oil in mixed dishes or greens in soups and salads.
9. For any mixed dishes (e.g. plov, shurbo or mantu) record each ingredient in the free recall space. Please refer to the recipes in the document “List of common mixed dishes classified by meals” have been underlined in the food group.
10. Apply the minimum quantity rule, **excluding** food groups that contain quantity less than 15g per day (but not per meal) (15g is roughly about one tablespoon). Except for salt, spices and condiments in group 16.
11. After the respondent recalls all the foods and drinks consumed, start underlining the corresponding foods items listed in the appropriate food groups. Underline food

items in the food groups meal by meal in chronological order in order to avoid confusion. For foods or dishes not listed in any food group, write it in the "Remark" column on the questionnaire and discuss with the supervisor.

12. Write "1" in the column next to the food group if at least one food in this group has been underlined. Do not write "0" in the column next to the food group at this stage if no food items have been underlined in the food group.
13. Continue to probe for food groups where no food was underlined. It is not necessary to read out to the respondent the exact name of the food group, but simply ask (for example) about fruits, vegetables or tubers if these groups were not previously reported. Write "0" in the column next to the food group when it is certain that no foods in that group were eaten.
14. For foods with unknown ingredients; write down the name of the food in the "Remarks" section at the end of the questionnaire. Ask the respondent to check the ingredients from the person who prepared the foods and get back to you later. Alternatively if the food was bought from the market, go and check the ingredients from the shop in the market.

## Annex 7

### Frequently asked questions and answers for MDD-W assessment

**1. How many enumerators should be present at the household to undertake MDD-W interview with the respondent?**

No more than 2 enumerators should be present in the household; otherwise, the respondent would feel uncomfortable, in particular among women, and she might refuse to be interviewed.

**2. What is the target group in the household for MDD-W data collection?**

The target individuals in the household are women at reproductive age, i.e. 15-49 years old. It is desirable to interview the woman who prepares foods for the family if there is more than one woman meeting the criteria in the same household.

**3. If the target woman in the household is not available or if the previous 24-hour was not a usual/ typical day, what should we do?**

Only one woman meeting the selection criteria should be interviewed. The enumerator should make a future appointment to visit the target woman again in a few days' time. Alternatively, if there is a woman in the household falling within 15-49 years of age and meeting the selection criteria, the enumerator may consider interviewing this woman as an alternative.

**4. What are unusual/ untypical days that the enumerators should not base on which to collect MDD-W information?**

- i. Unusual/ untypical days refer to those days in which food habits of the sample population are different from usual days, such as Ramadan, religious ceremonies with feasts and other ceremonies. At the same time, food habits of most people at country, region, district, jamoat or family level are also different from usual days. However, celebrations of birthdays, weddings, family visits, eating out at restaurants, etc. that are customary in Tajikistan should be regarded as usual days.
- ii. Respondents with acute health conditions, such as surgical operations, fasting for medical treatments or diarrhea, etc. should be regarded as unusual days. While respondents with chronic disease conditions such as diabetes, high blood pressure or coronary heart diseases, etc. that need to follow a special diet for life, food recall on those long-term special diets should be regarded as usual days.
- iii. Respondent fast for a few days with religious reasons prior to Ramadan should be regarded as unusual days.

**5. Should we consider eating at parent's, friend's or neighbor's places as usual/typical days?**

It should be usual days because these events are popular in the Tajik's culture.

6. **Shall the enumerator record all foods that the woman prepared for the family including those she did not actually eat?**

It is the foods and drink actually consumed by the woman herself should be recorded in the questionnaire. Any foods, drinks or dishes, although prepared by the woman, but were not actually consumed by herself should not be recorded.

7. **Shall the enumerator record food or drinks consumed by lactating women after she has gone to bed at night in order to practice breastfeeding?**

Yes, any food consumed from the time getting up in the morning during yesterday until the time she got up in the morning as of today, including foods or drinks taken overnight, should be recorded in the questionnaire.

8. **Is there any difference between grouping sweet pepper (bulgori) red in color and green in color?**

Sweet pepper (bulgori) red in color is high in vitamin A than those with other colors. Red color sweet pepper should be grouped under Group 3 (Vitamin A rich vegetables and tubers), while green and other colors sweet peppers should be grouped under Group 5 (Other vegetables).

9. **What about foods or drinks eaten at any time during the day, e.g. nuts, chocolate, fruits and dried fruits or tea?**

Enter these item(s) in the space provided for tea breaks/ shirini between main meals corresponding to the time she consumed the food or drink during the day.

10. **Shall greens (herbs) be grouped under Group 16 (Spices, condiments, beverages) if any of these greens (herbs) is/are consumed in a large quantity?**

Greens or herbs should be entered into Group 4 (Dark green leafy vegetables, DGLV) when the amount consumed is at least one tablespoon per day. If consumption is less than one tablespoon per day, these greens or herbs should be considered as condiments and grouped under Group 16.