Project Report on the Integration of the Women's Dietary Diversity Score into the Household Budget Survey in Tajikistan, 2014

Giorgia F. Nicolò, Verena Nowak, Queenie W. Y. Mak and Warren T. K. Lee
Nutrition Assessment and Scientific Advice Team
Nutrition Division (ESN)
Food and Agriculture Organization of the United Nations (FAO)

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This project report on the Integration of the Women's Dietary Diversity Score into the Household Budget Survey in Tajikistan, 2014 has been drafted by the Food and Agriculture Organization of the United Nations in the framework of the two projects of the European Union: ''*Support the strengthening of the National Food Security Information System in Tajikistan''* and ''*Improve Global Governance for Hunger Reduction.''*

Contents

1 List of abbreviations

AoS: The Agency on Statistics under President of the Republic of Tajikistan

DD: Dietary Diversity

DDS: Dietary Diversity Score

DHS: Demographic and Health Survey

FAO: Food and Agriculture Organization of the United Nations

FAO-ESNA: Nutrition Assessment and Scientific Advice team based in FAO Rome

FSMS: Food Security Monitoring System

GDP: Gross Domestic Product

HBS: Household Budget Survey

M: arithmetic mean

MNSS: Micronutrient Status Survey

MoH: Ministry of Health

SD: Standard Deviation

SE: Standard error of the mean

TWG: Technical Working Group

WDDS: Women's Dietary Diversity Score

WRA: Women of Reproductive Age

2 Acknowledgements

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3 Executive summary

Project aim: The Agency on Statistics under the President of the Republic of Tajikistan (AoS) and the Ministry of Health (MoH) called upon FAO to technically assist the implementation of regular collection of nutrition related data at the national level in the framework of the EU-FAO project *Support to the strengthening of the National Food Security Information System in Tajikistan*. Tajikistan already conducts a Household Budget Survey (HBS) at the national level which has not, until now, included any module to collect nutritional data either at individual or household level. Integrating the Women's Dietary Diversity Score (WDDS) into the regular collection of HBS data is very useful to assess and monitor the country's food security and nutrition situation in a quick and inexpensive way both at a national as well as at a decentralized level, and represents a validated proxy indicator for micronutrient adequacy of the target population.

Project design: The pilot project was executed in three phases: i) setting the scene for implementation, including the mapping of the existing technical capacity for carrying out pilot data collection, ii) capacity development and adaptation of the WDDS tool to the Tajik context, and iii) design and implementation of the pilot study in the Khatlon region for testing the tool.

Results and discussion: Twenty-one enumerators and staff of the Agency on Statistics (AoS) under the Presidency of Tajikistan were trained in the administration of WDDS, from tool adaptation to data collection and analysis, during a six-day training that took place at AoS in Kurgan Tube, Khatlon region. After the training, the fully adapted WDDS tool was used for pilot data collection in four urban and 11 rural settlements in Khatlon region, in June 2014. A total of 331 women of reproductive age (WRA), aged 15-49 (34.5 ± 9.9), were interviewed.

Results of the pilot study show that WDDS values in Khatlon region are relatively high as compared with previous studies conducted in different countries: the results indicate a higher probability of micronutrient adequacy in the surveyed women. However, high values might be partly due to the timing of data collection (June is the harvest season) and the confined geographical location of the survey. The median WDDS was 6, ranging from 1 to 9. High values of WDDS indicate a more diversified diet compared with low values of WDDS. The food groups that accounted for the differences between low and high WDDS (low and high dietary diversity) were: dark green leafy vegetables; other vitamin A rich fruits and vegetables; meat and fish; eggs; legumes, nuts and seeds; milk and milk products. They were consumed by ≥ 50% of women in the group with a highly diversified diet (WDDS ≥ 7) but by less than 50% of women in the lowest WDDS category (WDDS ≤ 4). The consumption of vitamin A rich foods was relatively high in all WDDS groups while the consumption of haem-iron rich foods was only found in women with high WDDS. Almost all women consumed starchy staples and other fruits and vegetables (non vitamin rich). Legumes, nuts and seeds were consumed mostly by women with high WDDS, which revealed a potential

for promotion to other women in order to improve the overall dietary quality of Tajik women.

Two socioeconomic determinants of WDDS were identified: living area (urban or rural) and education level. Women living in the urban areas and women with a higher education level showed a significantly higher dietary diversity. No significant associations were found for age, physiological state (pregnancy or lactation), marital status, number of children, responsibility for food preparation, total household income as well as income determined by applying the household equivalent scale. The mean household income was significantly higher in those women consuming flesh meat and sweets compared with those not consuming those food groups, and it was significantly lower in women consuming dark green leafy vegetables. However, the association of food group consumption with household income reveals that higher income is not necessarily associated with a better quality of the diet and it also suggests that a *nutrition transition* (persistence of undernutrition with concurrent increase in overweight and obesity, even within the same family) might be taking place in Tajikistan, as observed in other low-income countries.

Conclusion: The Nutrition module with WDDS was successfully integrated in Tajikistan's current HBS system, including the training of enumerators, adaptation of materials as well as conduction of a pilot study and data analysis. A nationwide implementation of the nutrition module covering different seasons, different geographic regions and socio-economic groups would provide invaluable national representative nutritional data for decision making by the government. It would also help to identify regions and population groups at high risks of malnutrition and micronutrient inadequacy.

4 Background

The Agency on Statistics under the President of the Republic of Tajikistan (AoS) and the Ministry of Health (MoH) called upon FAO to technically support the implementation of regular collection of nutrition related data at the national level in the framework of the EU-FAO project *Support the strengthening of the National Food Security Information System in Tajikistan*. Tajikistan already conducts a Household Budget Survey (HBS) at the national level which has not, until now, included any module of food consumption data either at the individual or at the household level.

Improper or delayed management of malnutrition has serious public health implications, contributing to increased mortality and morbidity among women and young children, and perpetuating the cycle of poverty, hunger, poor growth and ill health in Tajikistan. The consequences of malnutrition are huge and development targets might not be met if nutrition issues are not adequately and timely addressed. Consistent efforts have already been made: namely, Tajikistan has recently joined the SUN movement and has made additional commitments to fight malnutrition. Reliable baseline indicators need to be established to measure these efforts, while progress and achievements need to be monitored and evaluated.

Since 2000, sustained economic growth coupled with large increase in remittance have led to a fivefold increase in per capita Gross Domestic Product (GDP) in Tajikistan, which resulted in a large decline in extreme poverty, from over half of the population in 1999 to about 6.5 percent in 2009 (Food and Agriculture Organization of the United Nations, 2013b). However, estimates in 2009 revealed that in several regions more than 15 percent of the Tajik still lived below the extreme poverty threshold, with limited access to nutritious food. Based on the 2009 Micronutrient Status Survey (MNSS), extremely high prevalence of malnutrition and micronutrient deficiency among women and children still poses serious concerns: iodine deficiency occurred in more than half of the surveyed women (59 percent) together with anaemia affecting almost one out of four women (Ministry of Health Republic of Tajikistan & UNICEF, 2010).

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. Evidence has shown that the impact of malnutrition during the critical 1 000 days starting from a woman's pregnancy through to a child's second birthday can last a lifetime (The 1 000 Days Partnership, 2014). Therefore, childhood malnutrition is inevitably linked with the nutritional status of women at reproductive age. As a matter of fact, the number of stunted children, which reflects a longstanding inadequate food intake, is still very high in Tajikistan: 26 percent of children under age five are stunted and 10 percent are severely stunted. Overall, one out of five children are wasted, which is usually the result of acute food shortage coupled with diseases (Ministry of Health Republic of Tajikistan & UNICEF, 2010).

Khatlon region, being one of the poorest regions in the country, presents very high figures of micronutrient deficiencies, with the rate of iodine deficiency among women of reproductive age (WRA) peaking at more than 84 percent and severe cases of iodine deficiency at 5 percent, representing the highest rates in the country (Ministry of Health Republic of Tajikistan & UNICEF, 2010).

Despite the high prevalence of undernutrition and micronutrient deficiencies, the rate of overweight and obesity has gradually increased since the previous MNSS survey. In 2003 the rate of overweight and obesity in women was slightly above 25 percent compared with 28 percent in 2009. In the Khatlon region alone, overweight and obesity increased even more from 16 percent in 2003 to a staggering 25 percent in 2009. The rate of overweight was significantly higher among women living in the urban areas (37 percent) compared with women living in the rural areas (24 percent).

Lowering the prevalence of malnutrition calls for effective design and implementation of tailor-made policies and programmes , which require the availability of timely information. Nationwide food consumption surveys provide important information on dietary patterns and nutrient intake of the population. Yet, no such survey has been implemented in Tajikistan. This might be related to the fact that food consumption surveys are usually labour intensive and demand significant technical capacity and financial resources. Although anthropometric studies could be used, anthropometric measures provide little information on the immediate diet quality and micro-nutrient intakes.

Conversely, assessing the dietary diversity demands relatively less resources and technical capacity, and still provides valuable information on diet adequacy and dietary patterns. The Women's Dietary Diversity Score (WDDS) is defined as the number of food groups (see Annex 1 and Annex 2) consumed over a given reference period and is an indicator for micronutrient adequacy among women. This tool is particularly useful for assessing whether agricultural development, food security and nutrition education programmes and policies effectively lead to more nutritious diets in the population. It is a simple tool for assessment, target-setting, monitoring and evaluation, and advocacy. The WDDS tool is very useful for countries, both at national as well as decentralized level and has the advantage of being easy to use and ease of data analysis while representing a validated proxy indicator to asses and monitor the food security and nutrition situation in a quick and inexpensive way.

WDDS data could potentially complement the information collected by the DHS in Tajikistan. DHS collects information on dietary diversity for children under two years old but the survey only conducted every five years, while data collected by the Food Security Monitoring System (FSMS) on dietary diversity are at the household level.

5 Project aim

The objectives of this project were to:

1. Develop capacity for Tajikistan to validly and accurately assess nutritional impact of actions resulting from food and nutrition policies or interventions by using a simple and valid food-based nutrition indicator.
2. Integrate a nutrition module, i.e. - *Women's Dietary Diversity Score* (WDDS) - an *individual-based* dietary diversity indicator into HBS to evaluate the dietary quality of Tajik women at reproductive age (15-49) through a pilot study in the Khatlon region, Tajikistan.

6 Project design

The Agency of Statistics of the republic of Tajikistan has a long history of conducting Household Budget Surveys (HBS) as well as Demographic and Health Surveys (DHS): the latter also includes a component of dietary diversity for infants (IYC). Currently and with the support of the World Bank, the methodology of the HBS is under revision with the introduction of new methods for sampling, data collection and analysis, and the introduction of the software CSPro for data analysis.

With the support from FAO, AoS planned to launch the first project by integrating DDS into the HBS. The project was carried out in three phases:

Phase 1: Setting the scene for project implementation:

a. Mapping the available capacity at country level;
b. Assess the feasibility of the pilot study on data collection (capacity needs, logistic arrangements and financial requirements).

Phase 2: Capacity development and adaptation of the dietary diversity tool:

a. An intensive hands-on-practice training course focused on providing training and practical experience to the Tajik government officials and enumerators in applying the WDDS tool;
b. Adaptation of the WDDS tool to the Tajik context.

Phase 3: Design and implementation of the pilot study:

a. Sampling: selection of households based on which women would be interviewed;
b. Data collection and logistic arrangements;
c. Data analysis.

6.1 Phase 1

The first phase (approximately one month of work) was intended to set the scene for the implementation of the initiative and comprised the following activities:

- To map the available institutional capacity to perform collection and analysis of the DDS data, collect all the relevant background documents, including methodology of the HBS, and to set up a Technical Working Group (TWG).
- To agree on the expected outcomes of the project with all partners.
- To decide on the pilot study design, including selection of the pilot areas, sample size planning, and data collection etc., and to refine the expected outcomes.
- To help integrate the DDS module into the HBS questionnaire.
- To develop a program of training (ToRs, training modules, number of rounds of trainings, number of enumerators to be trained at each round, duration of the training, background and expertise of the trainees, estimated training costs and logistics arrangement, etc.)

During Phase 1, a nutrition officer from the Nutrition Assessment and Scientific Advice team (FAO-ESNA) based in FAO Rome carried out a back-stopping mission to Tajikistan in order to meet with the TWG and relevant institutional partners to fine-tune the entire process.

6.2 Phase 2

The training course comprised an intensive six-day training under the supervision of the FAO-ESNA team:

- Three days of classroom lectures and the adaptation of the DDS tool and questionnaire to the local context; and
- Three days for testing the tool and practicing interviews with data collection at various local settings, as well as data analysis and interpretation. The training course was designed to train enumerators from different parts of the country who have had experience in conducting interviews and data collection.

6.3 Phase 3

A total of 15 clusters for data collection were selected: four clusters in urban and 11 clusters in rural areas. The selection of settlements and households was performed randomly and was based on the existing lists of jamoats, villages and households used by AoS in regular household budget surveys. A woman at reproductive age from each selected household was invited to undergo WDDS interview.

WDDS data collection was performed in conjunction with HBS. Upon completion of DDS data collection, the completed DDS questionnaires were firstly checked by the Rayon statistical department. Subsequently, the questionnaires were sent to the Oblast statistical department for a validity check and then to the central statistical office for data entry. Monitoring DDS data collection was performed both at the Oblast level as well as at the central level. The quality control of data entry was performed by AoS.

DDS analysis and reporting were undertaken with the support from FAO-ESNA in Rome, including recommendations for necessary amendments to the WDDS module and for integration of the nutrition module in future HBS data collection. A detailed report on the materials and methods and data analysis can be found in Annex 1.

7 Outputs

7.1 Phase 1

During the mapping exercise, most relevant institutions (Nutrition Research Institute in Tajikistan, UNICEF, WHO, WFP, World Bank and USAID, etc.) were consulted and informed about the scope and objectives of the project. The Nutrition Research Institute also offered technical input in the adaptation process. However, national technical capacity in nutrition at the country level appeared to be limited.

The timeline for the project was agreed upon. It was decided that the training would take place in May 2014 followed by data collection in June and data analysis and reporting in July-September 2014.

Incorporation of local foods into the WDDS questionnaire that resulted from a previous adaptation exercise conducted in October 2013 was further refined by taking into account all the inputs from members of TWG in phase 1.

7.2 Phase 2

Questionnaires and supplementary materials in both English and Tajik were developed for use in the pilot study. A final report on the training course is given in Annex 3.

Twenty-one enumerators and staff of AoS were trained and are now fully equipped to apply the WDDS in field surveys.

7.3 Phase 3

A detailed report describing data collection and analysis is included in Annex 1.

8 Key results

1. A total of 331 women aged 34.5 ± 9.9 years were interviewed to obtain WDDS: the data collection took place in the Khatlon region during the month of June 2014.
2. The median WDD Score was 6, ranging from 1 to 9. This result is relatively high as compared with previous studies.
3. The following six food groups were consumed by the majority of women: starchy staples, dark green leafy vegetables, other vitamin A rich fruits and vegetables, other fruits and vegetables, meat and fish, and milk and milk products. The results showed that the study women consumed a relatively diverse diet.

4. In the lowest WDDS group (WDDS ≤ 4, meaning women consuming equal to or less than four food groups), only two food groups were consumed by ≥ 50percent of women, i.e. starchy staples and other fruits and vegetables. Whereas in the highest WDDS group (WDDS ≥ 7), all food groups except organ meat were consumed by ≥ 50 percent of women.
5. Two socioeconomic determinants, living area (urban or rural) and education level, were found associated with WDDS. Women dwelling in the urban area showed a significantly higher WDDS than those living in the rural area, while women with higher education level had a significantly higher WDDS than those with lower education level. No significant associations were found between WDDS and age, physiological state (pregnancy and lactation), marital status, number of children or responsibility for food preparation.
6. The consumption of vitamin A rich foods was relatively high in all WDDS groups while the consumption of haem-iron rich foods was only found in women with high WDDS. Organ meats were almost not consumed.
7. Starchy staples and fruits and vegetables (other than vitamin A rich) were consumed by almost all women.
8. The food groups legumes, nuts and seeds and eggs were consumed by a small percentage of women and mostly by women with high WDDS.
9. WDDS was not significantly associated with total household income nor with the income expressed as the household equivalent scale. However, differences could be observed upon disaggregating food groups into single ones. On average, women consuming flesh meat or sweets had a higher household income than those not consuming those food groups; on average, women consuming dark green leafy vegetables had a lower mean household income than those women not consuming those foods.

9 Conclusions

1. A nutrition component has been developed for the Tajikistan's food security and nutrition information system by incorporating WDDS into the current HBS. This was in response to a specific recommendation made by the Project Evaluation Team of the country's EU funded project *Support the strengthening of the National Food Security Information System in Tajikistan.*
2. A pilot study for collecting food consumption data in women at reproductive age was performed successfully in the Khatlon region of Tajikistan by using a locally adapted WDDS questionnaire.
3. It took relatively short time to obtain WDDS data, the project took approximately four months for adapting the WDDS tool locally, piloting a study to collect data, data analysis and report writing , which was much shorter as compared with *classical* food consumption surveys where data are usually available in 1-2 years upon survey completion.

4. Low technical capacity in nutrition and limited budget at the country level did not discourage the use of the dietary assessment tool. In fact, the project capitalized the existing national capacity and equipped the local AoS staff with a valuable dietary assessment tool within a relatively short period of time and lower in cost for dietary data collection.
5. The initial cost for the three-phase DDS *adaptation to implementation* process tool was USD 90 000. It is expected that further data collection and analysis in the same scale would be even cheaper, as the tools and methodology have already been developed and enumerators have been trained. Conversely, the cost to set up a *classical* food consumption survey is estimated to be about 100 times higher than running a WDDS survey: it also requires solid nutrition capacity and availability of updated local food composition tables (FCTs).
6. Beside the total score information, the tool also provides information on the disaggregated food groups consumed by the respondents. This allows, for example, to evaluate and monitor consumption of specific food groups over time, at different seasons and in different urban/rural settings. This information can be used for early detection of emerging nutrition issues such as nutrition transition associated with increased income as well as urbanization, etc.
7. A nationwide implementation of the nutrition module, being representative of seasonality, geographic locality and socio-economic groups, would help to identify regions and population groups at high risk of micronutrient inadequacy, and to provide invaluable national representative data for policy and decision making by the government.
8. Furthermore, collecting data within the framework of the national HBS provides the following advantages:
    - Ensures sustainability of data collection while strengthening national capacities;
    - Data collection is cost-effective, as regular data collection for HBS is already in place.

10 Recommendations

1. The tool has shown to suit the Tajik context for all the above mentioned reasons and data collected during this pilot exercise are providing the first baseline information of dietary quality of women at reproductive age for the Khatlon region.
2. A further data collection in Khatlon region, during a lean season or a season of limited food availability, is recommended to evaluate the dietary diversity during typical seasons of the year in order to identify seasonal variation in dietary diversity.
3. Consider different options for upscaling the DDS data collection according to the nutrition information needed:
    - Target specific regions/districts which present high levels of malnutrition/micronutrient deficiencies, or

- Remote/isolated areas that might present specific nutrition problems, or
- Comparing rural/urban areas, or
- Nationwide implementation (once every second year for monitoring of dietary diversity and evaluation purposes).

4. In future studies, DDS-HBS data collection tools should aim at having comparable food related information. If feasible, food groups in the HBS should be aligned with the DDS food groups in order to expand the array of analysis and make the data more comparable between the two datasets.
5. Consider the emerging issue of increased consumption of sugar and sugar-containing foods associated with overweight and obesity.
6. Legumes, nuts and seeds have a potential for being promoted to women in order to improve the overall dietary quality.
7. Consider measuring body height, body weight and the waist circumference, which would provide valuable additional information to dietary diversity. This would be useful to understand an emerging issue of obesity in the country.
8. Findings from WDDS surveys could inform the setting up of dietary guidelines for behavioral change and public education policies and programs, as the surveys provide information on what the women actually eat and do not eat.

Annex 1
Detailed description of the data analysis, results and discussion

10.1 Materials and Methods

10.1.1 Questionnaire and supporting material

The questionnaire to assess the Women's Dietary Diversity Score (WDDS) and related documents were developed by the Nutrition Assessment and Scientific Advice team of FAO following the guidelines developed by Kennedy et al. (2011) (Table 1). All parts of the questionnaire were interview-based. The questionnaire also includes questions on socioeconomic factors in addition to an open qualitative 24-hour recall and a table of 16 standard food groups listing local foods items commonly consumed in the Khatlon region of the country.

To complete the 24-hour recall, the participants were asked to report everything they consumed on 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 reported, the enumerators asked for each single ingredient. A list of common mixed dishes with their ingredients was provided to the enumerators that helped to probe for possible missing ingredients.

The material was translated from English to Tajik. Due to time constraints, it was not back translated, however, through on-site supervised training it was ensured that the intended meaning was clearly conveyed. In addition, an Excel spread sheet was developed for data entry and analysis.

Table 1 Women's Dietary Diversity (WDDS) toolkit for Tajikistan (number 1-4 see Annex 3)

1. Questionnaire • Qualitative 24-hour recall • Questions on socioeconomic factors • Table of food groups 2. List of most common mixed dishes classified by meals 3. Instructions for administering the questionnaires in the field 4. Frequently asked questions for DDS interviewers 5. Excel spread sheet for WDDS data entry and analysis

10.1.2 Data collection

Study participants were selected from 14 settlements, three from urban areas and 11 from rural areas of the Khatlon region. Table 2 shows the districts, village names and number of interviews of the study. The survey was conducted from 4 to 11 June 2014, during the harvest season.

Table 2 Geographical distribution of the study participants in Khatlon region (N=331)

	District	Jamoat (third-level administrative divisions)	Village name	Number of participants
Rural	Waksh		Rudaki	22
	Rumi	Tugalang	St.Kirov	22
	Pyanj	Kabud Saifiddin	Selga and Kyrgiz	22
	Shaartuz	Kholmatov	Chinor	22
	Vose	Tugarak	R.Fayzov	22
	Timurmalik	S.Rakhimov	Davat	22
	Dangara	Dehoti Sangtuda	Guliston	22
	Bokhtar		Navbahor	23
	Bokhtar		Oqteppa	22
	Jomi	Ittifoq	Bustonsulaimon	22
	Khuroson	Aini	Yangier	22
Total Rural				**243**
Urban	Kulob		Kulob (2 clusters)	44
	Kurgan tube		Kurgan tube	22
	Sarband		Sarband	22
Total Urban				**88**

Means for ensuring data quality

All enumerators were trained in a six-day intensive workshop which was held in Kurgan Tube, Khatlon region, Tajikistan from 19 to 24 May 2014. The data collection took place less than two weeks after the workshop in order to ensure that the recently trained skills could directly be applied.

After completing WDDS data collection in conjunction with the household budget survey, enumerators delivered completed questionnaires to the Rayon statistical department where a first data check was undertaken. The forms were sent to the Oblast statistical department for a validity check and then to the central statistical office for data entry. Monitoring of data collection was performed both at the Oblast level as well as the central level. The quality control of data entry was done by AoS.

A total of 15 enumerators participated in the pilot study for data collection; each enumerator visited pre-selected households to interview about 22 individuals.

During the study period, an FAO project staff was in regular telephone contact to answer any enquiry and to provide technical support during the field work. In addition, on-the-spot-checks were performed during data collection to assure data quality.

10.1.3 Statistical analysis

All statistical analyses were done using the software R 3.0.3 (2014-03-06) (R Core Team, 2014) and RStudio Version 0.98.982 (Rstudio, 2014).

For associations of continuous variables, such as age and income, with WDDS, Spearman correlation was used. Results are presented in correlation coefficient (r_s) and significance level (p).

For categorical data such as lactation (categories: yes, no) and living area (categories: urban, rural), X^2-Test (results presented: X^2, degrees of freedom, p) was used, or, for small samples, Log likelihood ratio statistic (results presented: Log likelihood test statistics G, X^2, degrees of freedom, p) was applied. For those tests, the study population was grouped according to the score value of WDDS from low to high: group 1: WDDS ≤ 4; group 2: WDDS = 5; group 3: WDDS = 6; group 4: WDDS ≥ 7. The decision of the grouping was based on the distribution of WDDS in each group in order to ensure relatively even group size.

For all statistical tests, values of p = 0.05 were considered significant.

Following additional R-Packages were used: Deducer 0.1-7 (Fellows, 2012), doBy 4.5-10, ggplot2_1.0.0 (Wickham, 2009), pastecs 1.3-18 (Grosjean & Ibanez, 2014).

10.2 Results

The dataset included 331 women aged 15.7 to 55.3 years (Mean ± SD = 34.5 ± 9.9 years). Twenty-eight were pregnant and 58 lactating. Regarding the living area, 26.9 percent of women were living in urban areas, while 73.1 percent in rural areas. The majority were married (78.9 percent), 10.3 percent were single, 5.7 percent divorced and 5.1 percent widows. Regarding education level, a majority of women went to secondary school (10-11 years). Two women reported to have no school education at all and 27 had higher education (Table 3).

Table 3 Characteristics of the study women (N=331)

		Number of women	%
Pregnant		28	8.5
Non pregnant		303	91.5
	Σ	331	100
Lactating		58	17.5
Non lactating		273	83.5
	Σ	331	100
Living Area			
Urban		89	26.9
Rural		242	73.1
	Σ	331	100
Marital status			
Single		34	10.3
Married		261	78.9
Divorced		19	5.7
Widow		17	5.1
	Σ	331	100
Education level			
No education		2	0.6
Primary school (1-4 years)		16	4.8
Secondary school (5-9 years)		73	22.1
Secondary school (10-11 years)		186	56.2
Middle-level education (college)		27	8.2
Higher education		27	8.2
	Σ	331	100

10.2.1 The Women's Dietary Diversity Score

The WDDS ranged from 1 to 9 with a median of 6 (Interquartile range: 5-7). Only one of the participants reported consumption of only one food group. Having a closer look at the consumed foods, this participant reported the consumption of cereals and white tubers and roots which have been aggregated to form one standard food group by default the WDDS (starchy staples). Furthermore, she reported the consumption of oils and fats, sweets and spices, condiments and beverages which are the food groups that do not count for WDDS. That is why the woman consumed only one WDDS food group. Two participants consumed foods from all nine food groups. The majority consumed five to six food groups (Figure 1).

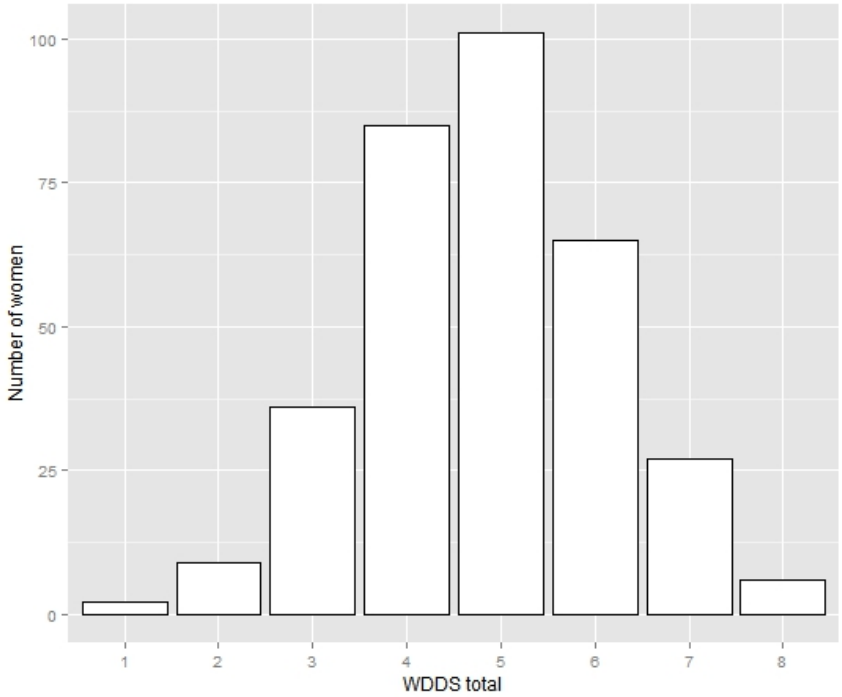

Figure 1 Distribution of Women's Dietary Diversity Score (WWDS) (N = 331)

10.2.2 Consumption of vitamin A and haem-iron rich food groups

According to the guidelines on WDDS (Kennedy et al., 2011), three indicators can be used for indicating vitamin A rich food groups in any WDDS studies:

- Percentage of women consuming plant foods rich in vitamin A (vitamin A rich vegetables and tubers, dark green leafy vegetables, or vitamin A rich fruits).
- Percentage of women consuming vitamin A rich animal source foods (organ meat, eggs or milk and milk products).
- Percentage of women consuming plant or animal source of vitamin A (vitamin A rich vegetables and tubers or dark green leafy vegetables or vitamin A rich fruits or organ meat, or eggs, or milk and milk products).

As indicator for haem-iron foods, it is considered the percentage of women consuming the food groups of organ meat, flesh meat, and fish.

Table 4 shows the percentages of women consuming food groups rich in vitamin A and iron.

Table 4 Indicators for the consumption of vitamin A rich food groups and haem-iron rich food groups by women (in percentage) (N = 331)

Percentage of women consuming…	Total	WDDS groups			
		1-4	5	6	7-9
Indicators for consumption of vitamin A rich food groups			%		
…plant foods rich in vitamin A (vitamin A rich vegetables and tubers, dark green leafy vegetables, or vitamin A rich fruits)	89	65	89	99	100
…vitamin A rich animal source foods (organ meat, eggs or milk and milk products)	84	52	82	94	100
…plant or animal source of vitamin A (vitamin A rich vegetables and Tubers or dark green leafy vegetables or vitamin A rich fruits or organ meat, or eggs, or milk and milk products)	98	89	100	100	100
Indicator for haem-iron rich food groups					
…organ meat, flesh meat, or fish	66	24	55	79	98

10.2.3 Food groups (based on the nine food groups of the WDDS) consumed by equal to or more than 50 percent of women

In Tajikistan, six food groups were consumed by equal to or more than 50 percent of women (Table 5)

Table 5 Food groups consumed by equal to or more than 50 percent of women compared with previous studies (Kennedy et al., 2011)

Tajikistan	Bangladesh	Mozambique	Philippines
Starchy staples	Starchy staples	Starchy staples	Starchy staples
Dark green leafy vegetables	Dark green leafy vegetables		
Other vitamin A rich fruits and vegetables	Other vitamin A rich fruits and vegetables	Other vitamin A rich fruits and vegetables	
Other fruits and vegetables		Other fruits and vegetables	Other fruits and vegetables
Meat and fish	Meat and fish		Meat and fish
Milk and milk products			
		Legumes, nuts and seeds	

10.2.4 Food groups consumed by equal to or more than 50 percent of women by WDDS groups

In the group with the lowest values of WDDS only two food groups were consumed by 50 percent or more of women. Those food groups were starchy staples and other fruits and vegetables. In the group with the highest WDDS (7 and more), only organ meats were not consumed by 50 percent of women or more ; values equal to or higher than 50 percent are in bold figures.

Table 6 shows the percentages of women consuming foods from the different food groups; values equal to or higher than 50 percent are in bold figures.

Table 6 Percentage of women consuming various food groups.

	Total	Group 1 WDDS ≤ 4	Group 2 WDDS = 5	Group 3 WDDS = 6	Group 4 WDDS ≥ 7
N	331	71	84	87	89
Starchy staples	**100**	**100**	**100**	**100**	**100**
Cereals	**100**	**100**	**100**	**100**	**100**
White roots and tubers	**92**	**92**	**96**	**92**	**88**
Dark green leafy vegetables	**60**	28	45	**69**	**89**
Other vitamin A rich fruits and vegetables	**80**	45	**79**	**93**	**96**
Vitamin A rich vegetables and tubers	**57**	30	**50**	**69**	**75**
Vitamin A rich fruits	**51**	27	**50**	**61**	**62**
Other fruits and vegetables	**98**	**93**	**100**	**100**	**100**
Other vegetables	**98**	**93**	**100**	**97**	**100**
Other fruits	**56**	42	**50**	**54**	**73**
Organ meat	3	1	0	1	9
Meat and fish	**66**	24	**55**	**79**	**97**
Flesh meats	**66**	24	**55**	**79**	**96**
Fish	2	0	2	1	6
Eggs	36	17	20	31	71
Legumes, nuts and seeds	38	7	26	36	**78**
Milk and milk products	**78**	39	**75**	**91**	**100**
Oils and fats	**99**	**99**	**99**	**99**	**100**
Sweets	**95**	**94**	**94**	**95**	**98**
Spices, condiments, beverages	**100**	**100**	**100**	**100**	**100**

Note: bold figures indicate consumption by equal to or more than 50 percent of women (bold food groups refer to the nine aggregated food groups used to calculate WDDS)

Figure 2 shows which food groups contributed to WDDS within the WDDS groups. The graph shows that there is no difference between high and low WDDS in the food groups 'starchy staples' and 'other fruits and vegetables', as all four lines meet at the same spot (at about 100 percent) of the graph. Those two food groups were consumed by almost the entire study population (all four lines meet at about 100 percent in Figure 2). There is also no difference in the group 'organ meats' which was hardly consumed by any woman (all four lines meet at about 0 percent in Figure 2). 'Dark green leafy vegetables', for example, show a gradual increase in the percentage of consumers from the lowest to the highest group of WDDS.

This graph shows that there is little potential of increasing the WDDS for the food groups of 'starchy staples' and 'other fruits and vegetables', as they were consumed by almost all women. It also shows that theoretically there is a high potential of increasing WDDS by promoting the consumption of organ meats. However, as they are only consumed by very few women, those foods might, for example, not be generally accepted by the population or not available and, therefore, a promotion of organ meats might not be an effective strategy to increase WDDS. The food groups 'legumes, nuts and seeds' and 'eggs' are consumed by a

considerable percentage of women belonging to the highest WDDS, whereas only few women belonging to lower WDDS groups consumed them. Promoting the consumption of those food groups could be a good strategy to increase dietary quality in women with lower WDDS. However, before formulating specific dietary recommendations, the cultural acceptability, availability and affordability of foods for the majority of the targeted population need to be further studied.

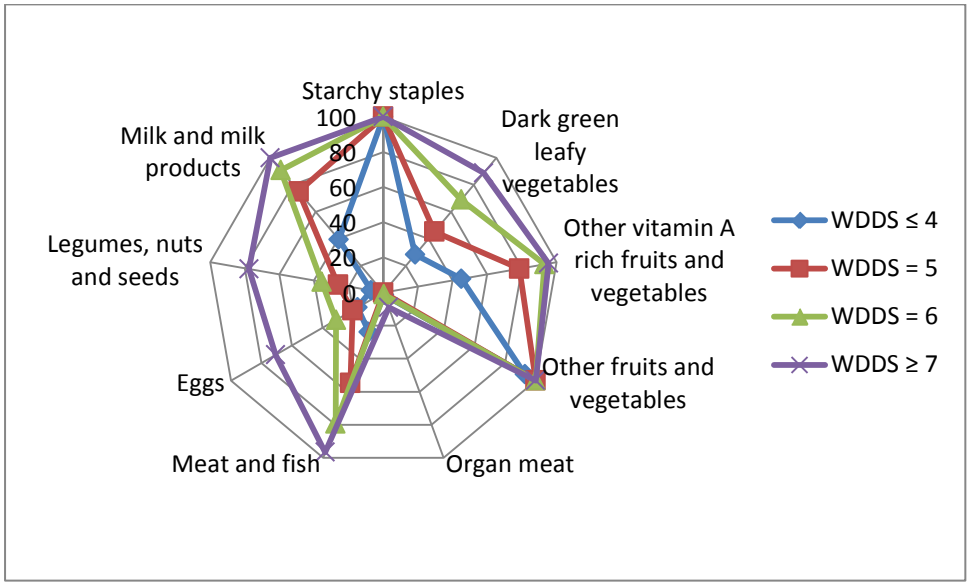

Figure 2 A Spiderweb showing the percentage of women consuming food groups by four grouping the Women's Dietary Diversity Score (WDDS), (N = 331)

10.2.5 Age and physiological state

No significant difference between the mean ages in the three groups of WDDS could be observed (Table 7). There was also no significant relationship between age and WDDS, $r_s = 0.05$, $p = 0.36$.

Table 7 Mean age, by groups of WDDS

WDDS	1-4	5	6	7-9
Mean age (years)	34.7	33.6	33.6	36.2
Confidence interval (95%)	32.5-37.0	31.3-35.9	31.5-35.7	34.2-38.2

Table 8 shows the number and percentages of women that are pregnant and lactating by group of WDDS. There was no significant association between lactating ($X^2(3) = 3.08$, $p = 0.380$) or pregnancy ($X^2(3) = 0.28$, $p = 0.963$) and WDDS. This means that in terms of dietary diversity neither pregnancy nor lactation seemed to have any influence on the diet. However, the sample sizes of lactating (n = 52) and pregnant (n = 28) women were relatively small and it could not be ruled out that with bigger sample size significant association would be detected.

Table 8 Number of lactating/not lactating and pregnant/not pregnant women, by group of WDDS (N=331)

	Group 1 WDDS ≤ 4	Group 2 WDDS = 5	Group 3 WDDS = 6	Group 4 WDDS ≥ 7	Row total
Not lactating, N (%)	54 (19.8)	70 (25.6)	72 (26.4)	77 (28.2)	273 (82.5)
Lactating, N (%)	17 (29.3)	14 (24.1)	15 (25.9)	12 (20.7)	52 (17.5)
Column total, N (%)	71 (21.5)	84 (25.4)	87 (26.2)	89 (26.9)	331 (100)
Not pregnant, N (%)	66 (21.8)	77 (25.4)	79 (26.1)	81 (26.7)	303 (91.5)
Pregnant, N (%)	5 (17.9)	7 (25.0)	8 (28.6)	8 (28.6)	28 (8.5)
Column total, N (%)	71 (21.5)	84 (25.4)	87 (26.3)	89 (26.9)	331 (100)

10.2.6 Socioeconomic factors

There was a significant association between education level (in four groups, see Table 9) and WDDS ($X^2(9) = 28.3$, $p < .001$). More women from the highest education level belonged to the highest diversity group than to the lowest diversity group. Also more women from the lowest education level belonged to the lowest diversity group and fewer to the highest diversity group. In short, it could be shown that a higher education level is associated with a higher WDDS.

Table 9 Contingency table of WDDS and the education level (N=331)

	Group 1 WDDS ≤ 4	Group 2 WDDS = 5	Group 3 WDDS = 6	Group 4 WDDS ≥ 7	Row total
No education and primary school, N (%)	3 (16.7)	4 (22.2)	5 (27.8)	6 (33.3)	18 (5.4)
Secondary school (5-9) , N (%)	28 (38.4)	16 (21.9)	17 (23.3)	12 (16.4)	79 (22.1)
Secondary school (10-11) , N (%)	37 (19.9)	53 (28.5)	49 (26.3)	47 (25.3)	186 (56.2)
Middle-level (college) and higher education, N (%)	3 (5.6)	11 (20.4)	16 (29.6)	24 (44.4)	54 (16.3)
Column total, N (%)	71 (21.5)	84 (25.4)	87 (26.3)	89 (26.9)	331 (100)

The living area (urban or rural) showed a significant association with WDDS group (($X^2(3) = 9.80$, $p = .020$). More women living in urban areas than those living in rural areas are in the highest group of WDDS ≥ 7. In other words, women living in the urban areas had higher WDDS than those in the rural areas.

Table 10 Contingency table of WDDS and living area (N=331)

	Group 1 WDDS ≤ 4	Group 2 WDDS = 5	Group 3 WDDS = 6	Group 4 WDDS ≥ 7	Row total
Urban, N (%)	17 (19.1)	19 (21.3)	18 (20.2)	35 (39.3)	89 (26.9)
Rural, N (%)	54 (22.3)	65 (26.9)	69 (28.5)	54 (22.3)	242 (73.1)
Column total, N (%)	71 (21.5)	84 (25.4)	87 (26.3)	89 (26.9)	331 (100)

No significant association was found for WDDS and the marital status (Log likelihood ratio statistic (G) = 18.72, $X^2(24)$, p-value = .767) as well as the number of children ($r_s = 0.01$, $p = .841$). Also no association was found for the responsibility of food preparation (“Yes” versus “No and partial”) (($X^2(4) = 2.47$, $p = .481$).

It is noteworthy that socioeconomic factors influenced the total WDDS. Furthermore, certain food groups were found responsible for a significant association between WDDS and the socioeconomic factor. Therefore, for the two identified determinants of WDDS, it was tested for significant differences of consumption of the food groups (Table 11). Women living in urban areas consumed significantly more often the food groups of organ meats, meat and fish, flesh meat and sweets. Regarding the education level, it could be shown that women with higher education levels consumed significantly more often the food groups of other vitamin A rich fruits and vegetables, vitamin A rich vegetables and tubers, vitamin A rich fruits, other fruits, as well as meat and fish, flesh meats and milk and milk products.

Table 11 The food groups with significant associations with living area and education level (by X^2 tests, if not indicated otherwise) (N = 331)

	Living area	Education level
Starchy staples	-	-
Cereals	-	-
White roots and tubers	ns	ns
Dark green leafy vegetables	ns	ns
Other vitamin A rich fruits and vegetables	ns	sig ↑ education
Vitamin A rich vegetables and tubers	sig ↑ urban	sig ↑ education
Vitamin A rich fruits	ns	sig ↑ education
Other fruits and vegetables	ns	ns
Other vegetables	ns	ns
Other fruits	ns	sig ↑ education
Organ meant	sig ↑ urban*	ns*
Meat and fish	sig ↑ urban	sig ↑ education
Flesh meats	sig ↑ urban	sig ↑ education
Fish	ns*	ns*
Eggs	ns	ns
Legumes, nuts and seeds	ns	ns
Milk and milk products	ns	sig, ↑ education*
Oils and fats	ns*	ns*
Sweets	sig ↑ urban*	ns*
Spices, condiments, beverages	-	-

ns: no significant association; -: all women consumed this food group, therefore no analysis was done; sig: significant association; ↑ urban: significantly more women living in urban areas a food group compared with rural; ↑ education: significantly more women with higher education consumed this food group compared with lower education; *: analysis done applying log likelihood ratio.

10.2.7 Cross-analysis with the household budget survey (HBS) data

Two hundred and ninety women were included in the cross-analysis of the HBS and the WDDS datasets. The HBS dataset comprised only 300 cases compared with the 331 of the WDDS dataset and in some cases no matching between the datasets was possible.

To make the household income of households of different sizes comparable, the household income equivalent was calculated: total household income divided by the square root of the number of household members (OECD & Project on Income Distribution and Poverty, n.d.).

The mean household income equivalent was 534.38 (SE=2 476) Somoni with a minimum of 216 and a maximum of 4 050 Somoni. As the maximum value for household income in equivalents (representing income per person) is considered as an outlier, this value was excluded from further analyses, leaving 299 cases.

No significant association between the total household income and the WDDS could be found (r_s = -0.002, p = 0.967). Also, it was found no association between WDDS and household income equivalents (r_s = 0.029, p = 0.626). Again no significant association was found between the number of household members and WDDS (r_s = -0.10, p = .077).

Association of food group consumption and household income equivalents

The mean household income equivalents were higher in the households of women that reported meat (mean = 669 Somoni, SE =30) than those not having consumed meat (mean = 568 Somoni, SE = 29). This difference was significant t(265) = -2.446, p = 0.015. The mean household income equivalents were also significantly higher in the households of women that consumed sweets (mean = 643 Somoni, SE = 23) compared with those not having consumed sweets (mean = 468 Somoni, SE = 52), t(19.722) = -3.07, p = 0.006.

The income (equivalents) in households of women consuming dark green leafy vegetables (Mean = 588 Somoni, SE = 26) was significantly lower than that of women not consuming those foods (Mean = 702 Somoni, SE = 37), t(222.75) = 2.499, p = 0.013. This suggests that higher income is not necessarily associated with healthier food choices.

For all other food groups, no significant difference between the mean household income equivalents was found. The results were similar for the total household income. Also, the household income was significantly higher for the group of women consuming flesh meats and sweets and significantly lower for the women consuming dark green leafy vegetables.

10.3 Discussion

10.3.1 Women's Dietary Diversity Score

The values of WDDS are high compared with previous studies (Table 13) revealing a higher probability of nutrient adequacy among the surveyed sample. The values seem to be particularly high when looking at indicators of prevalence of undernourishment in Tajikistan (expressed as available energy from food)and the level of food deficit: both indicators are high in Tajikistan compared with those countries where the WDDS has already been assessed (Food and Agriculture Organization of the United Nations, 2013a). The same is true for the prevalence of stunting in children. WDDS being a proxy for nutrient adequacy and not for energy intake (or availability), the relatively high values of WDDS might therefore indicate relatively high nutrient intake, that can be achieved despite lower energy intake. However, as high nutrient adequacy is more difficult to achieve when energy intake is low. Further investigations, in particular with a nationwide representative sample and a bigger sample size, are strongly recommended.

Table 12 Undernourishment and depth of food deficit of selected countries (Food and Agriculture Organization of the United Nations, 2013a)

	Tajikistan	Burkina Faso	Mali	Mozambique	Bangladesh	Philippines
Undernourishment (%)	31.7	25.9	7.9	39.2	18.8	17
Depth of food deficit (kcal/cap/day)	306	172	52	298	115	97

Several reasons for the high values of the WDDS are possible: seasonality, locality of data collection and methodological issues (a qualitative method was used compared with a quantitative method in the cited studies).

Season: Previous studies on dietary diversity (using different dietary diversity indicators) in Tajikistan showed that results varied depending on the season (World Food Programme, World Health Organization, & Department for International Development, 2009). The current study was carried out amidst harvest season in June; a repetition of the study in winter or spring is likely to show lower values and would give very important information on the fluctuation of food consumption during different seasons of the year.

Region: The study sample derives from the Khatlon region alone and is not representative for Tajikistan. It needs to be considered that the diet quality in other regions can differ due to the geographic location and the latitude, which might contribute to a different agricultural and climate condition, which might in turn influence food availability and thereby WDDS (thus, a countrywide assessment of WDDS in different geographic locations and latitudes is warrant).

Table 13 Percentage of women who consumed 9 food groups from Tajikistan compared with previously published results from 5 countries (Arimond et al., 2010)

	Tajikistan[1]	Burkina Faso[2]	Mali[2]	Mozambique[2]	Bangladesh[2]	Philippines[2]
Starchy staples	100	100	100	100	100	100
Dark green leafy vegetables	60	55	28	34	49	23
Other vitamin A rich fruits and vegetables	80	32	25	77	16	9
Other fruits and vegetables	98	93	100	53	82	46
Organ meant	3	0	0	0	0	6
Meat and fish	66	71	95	41	57	93
Eggs	36	1	8	6	7	26
Legumes, nuts and seeds	38	61	39	56	33	26
Milk and milk products	78	18	47	0	18	13

[1]Measured with qualitative 24 hour recall, [2]Measured with quantitative 24 hour recall

Methodological issues: The higher score for women's dietary diversity obtained in the present pilot study, compared with previous publications, might be due to the method of data collection. The present study used a qualitative 24-hour recall, which is the recommended procedure (Kennedy et al., 2011), whereas the already available studies used a quantitative 24-hour recall. It has been shown that using qualitative methods might

overestimate WDDS when applying a 15 g cut-off compared with data derived from quantitative 24-hour recalls (Martin-Prevel, Becquey, & Arimond, 2010).

10.3.2 Analysis at the food group level

The percentages of women consuming vitamin A rich foods were relatively high in the current sample. Almost all women (98 percent) consumed either a plant or an animal source of vitamin A. A difference between low and high WDDS could be observed for vitamin A-rich plant fruits and vitamin A-rich animal source foods: only 65 percent from the lowest WDDS group consumed vitamin A-rich plant foods and 52 percent vitamin A-rich vegetables compared with 100 percent of women in the highest WDDS group.

As indicator for haem-iron rich food groups, it can be considered the number of women consuming organ meat, flesh meat, or fish. In the lowest WDDS group only 24 percent of women consumed at least one of these food groups, whereas in the highest WDDS group 98 percent of women reported the consumption of those food groups. As only ten women consumed organ meats and eight women fish, this indicator is made up mainly from flesh meat. Haem-iron rich foods were consumed significantly more often in urban than in rural areas, $X^2(1) = 5.70$, $p = 0.017$.

In comparison with previous studies cited in the guidelines (Kennedy et al., 2011), in Tajikistan more food groups were consumed by over 50 percent of women (Table 5). This as well as the higher total WDDS indicates a more varied diet in the present sample and, consequently, a probable better nutrient adequacy.

10.3.3 Determinants of Women's Dietary Diversity

The data suggest that household income (as equivalents or as is) has a significant association with the consumption of some food groups: on average, women consuming flesh meats and sweets had a significantly higher household income than women not consuming those food groups; on the contrary, women consuming dark green leafy vegetables had a significantly lower household income. This result suggests that a higher income is not necessarily associated with a better quality of the diet and it also suggests the development of nutrition transition in Tajikistan. Those findings go well together with the results from the latest Tajikistan's Demographic and Health Survey that showed an increasing prevalence of overweight and obesity with increasing wealth in 15 to 49 years old women: The prevalence was 21.9 percent in the lowest wealth quintile and 36.4 percent in the highest wealth quintile (Statistical Agency under the President of the Republic of Tajikistan (SA), Ministry of Health [Tajikistan], & ICF International, 2013).

10.4 Technical problems encountered during data processing

The original mathematical formulas used to determine WDDS in the Excel spreadsheet (In Tajik version) for WDDS data collection data were changed with unknown reason. It took some time to correct the formulas and to re-calculate the WDDS in the Excel template. Since

those formulas can be easily changed by mistake, it is necessary to check the correctness of the formulas before data analysis.

No identification numbers (IDs) for individual women in the WDDS data sheet were provided. Instead, IDs were only given at the household level. As in some households two women were interviewed, a unique ID for each interviewed woman is absolutely necessary to avoid data mismatching.

Furthermore, the IDs did not always correspond to the ones from the household budget survey. This resulted in a total of 290 participants for which a cross analysis of the two datasets could be done instead of 300. In future, it should be taken special care in coding the WDDS and HBS record forms in order avoid losing valuable study subjects.

10.5 Conclusions

The assessment of the Women's Dietary Diversity was performed successfully in the pilot study. It took a relatively short time to collect the WDDS data and generate analytical results. The data were collected in good care by the enumerators. On average, the study women consumed varied diets with good dietary quality, which is reflected in the high WDDS. The analysis of food group consumption also allowed for detecting food groups mainly consumed by women from wealthier households, which implied that nutrition transition towards affluent diets in the higher income group occurs , which might be associated with increasing prevalence of obesity and non-communicable diseases. A nationwide implementation of the nutrition module including different seasons, different geographic regions and socio-economic groups would provide invaluable national representative data for decision making by the government. It would also help to identify regions and population groups at high risk of malnutrition and micronutrient inadequacy.

Annex 2

Food groups used for the assessment and the calculation of Women's Dietary Diversity Score (WDDS); number of women (%) having reported consumption of the food groups

Food Groups used during dietary assessment	Number of women	%
Cereals	331	100
White roots and tubers	304	92
Vitamin A rich vegetables and tubers	190	57
Dark green leafy vegetables	197	60
Other vegetables	323	98
Vitamin A rich fruits	169	51
Other fruits	184	56
Organ meats	10	3
Flesh meats	217	66
Eggs	119	36
Fish	8	2
Legumes, nuts and seeds	127	38
Milk and milk products	259	78
Oils and fats	328	99
Sweets	316	95
Spices, condiments, beverages	331	100
Aggregated food groups for calculation of WDDS		
Starchy staples	331	100
Dark green leafy vegetables	197	60
Other vitamin A rich fruits and vegetables	264	80
Other fruits and vegetables	326	98
Organ meat	10	3
Meat and fish	218	66
Eggs	119	36
Legumes, nuts and seeds	127	38
Milk and milk products	259	78

Annex 3
Questionnaires and supporting materials for interviews

- Questionnaire
- List of most common mixed dishes classified by meals
- Frequently asked questions and answers for WDDS assessment
- Instructions for administering the WDDS Questionnaire

Part 1 – Demographic information of the interviewee

Statistics Agency under the President of Tajikistan

WDDS Code: _____

Household No:

(from HBS)

Household Budget Survey - Add to Form 2
Women's Dietary Diversity

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

Please fill in the blank and tick the appropriate box

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	☐	0
	Female	☐	1
Marital Status	Single	☐	0
	Married	☐	1
	Divorced	☐	2
	Widow	☐	3
Education level	No Education	☐	0
	Primary School (1-4)	☐	1
	Secondary School (5-9)	☐	2
	Secondary School (10-11)	☐	3
	Middle- level Education (college)	☐	4
	Higher Education	☐	5
Pregnant	No	☐	0
	Yes	☐	1
Lactation	No	☐	0
	Yes	☐	1
Responsible for food preparation	No	☐	0
	Yes	☐	1
	Partial	☐	2

Living area	Rural	☐	0
	Urban	☐	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, <u>underline</u> 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 #	Food group	Locally available foods	Yes=1 No=0
1	**Cereals**	Wheat, barley, buckwheat, oats, maize, rice, sorghum, pasta, wheat bread, rye and other bread, wheat flour, rye flour, other flour, pasta products,	
2	**White roots and tubers**	Potato, turnip(red, yellow, white), radish(red,green)	
3	**Vitamin A rich vegetables and tubers**	Pumpkin, carrot, red sweet pepper(bulgori), squash	
4	**Dark green leafy vegetables (DGLV)**	- Spinach, checkri, rov, roshak, siyoalaf, bargi salat; - Dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel [Consider as DGLV when consumed at least one table spoon of these vegetable(s) per day. Otherwise, go to Group 16]	
5	**Other vegetables**	Cabbage, cauliflower, garlic, cucumber, leek, tomato, onion, eggplant, beetroot, mushrooms fresh and dried, anzur , green beans, green pepper	
6	**Vitamin A rich fruits**	Apricot and dried apricot, peach and dried peach, Persimmon,	
7	**Other fruits**	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, pinapple, grapefruit, simorodina	
8	**Organ meat**	Liver, kidney, heart, lung,, stomach, intestine,tongue, brain(Goat and Sheep), spleen (Cow, Goat and Sheep)	
9	**Flesh meat**	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	
10	**Eggs**	Quail eggs, chicken eggs, goose eggs, turkey eggs, duck eggs	
11	**Fish and sea foods**	Fresh and frozen fish, canned fish, smoked fish, dried fish, caviar	
12	**Legumes, nuts and seeds**	Mung bean, sesame seed, pistachios, almonds, pumpkin seeds, sunflower seeds, walnuts, peanuts, apricot seeds, hazelnut, pecan,	

		peas, red beans, white beans, lentils, chickpeas	
13	**Milk and milk products**	Milk, skim milk, Sour milk, yogurt, qurut (dried yoghourt), ice-cream, kefir, chaka, kaimak(cream), cheese, sour cream/Smetana, powdered milk, condensed milk, tvorog, fala (colostrum from cow)	
14	**Oils and fats**	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)	

Question #	**Food group**	**Locally available foods**	**Yes=1 No=0**
15	**Sweets**	Sugar, honey, candies, chocolate, cakes, biscuits, jam, halva, baklava,, obinabot (Crystalised sugar), nishollo, shirim initut (Tajik Snicker, mulberry paste with sugar)	
16	**Spices, condiments, beverages**	- black pepper, cumin, ketchup, salt, pripava (adviya), chicken/ beef cubes; - Dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel, Jambil (small green leaves) [Consider as condiments when these vegetable(s) are consumed less than one table spoon a day. Otherwise, go to Group 4]; - Coffee, black and green tea, alcohol, beer, fruit drinks (compote), sweet soda	

Remarks:

List of most common mixed dishes classified by meals

Most common mixed dishes classified by meals		
1. **Breakfast**		**ingredients**
1	Black and green tea	Tea, sugar , honey
2	Boiled eggs and sausages (boiled/ fried)	Egg, oil, beef, chicken, soy bean
3	Bread	Wheat flour, salt
4	Butter or margarine	Cow milk , maska
5	Chagaldak	Wheat flour, oil, salt, greens, onion
6	Dalda	Wheat flour, walnuts, chickpeas, milk, oil
7	Fried potatoes/ boiled potato	Oil,potatos, onion
8	Havloi tar	Wheat flour, sugar, oil, water/milk
9	Jam/murabbo	Fruits, sugar, water
10	Kefir/Yogurt	Kefir/Yogurt
11	Mannaya kasha	Semolina, milk, sugar, butter
12	Nashoista	Locally made wheat starch, milk, yellow oil or butter
13	Omelets	Egg, wheat flour, greens, oil
14	Orzuq	Wheat flour, oil, salt, milk, egg
15	Otala	Fried wheat flour with oil, milk, salt, water
16	Pancakes	Egg, wheat flour, egg, milk, oil, sugar
17	Qaymaq	Qaymaq (cream)
18	Shirbat or Gardsuz	Wheat flour, oil, milk, salt
19	Shirbirinj	Milk, rice, salt, butter, water
20	Shirchoy	Tea,milk, salt, sometimes wallnuts are added, dried mulberries
21	Shirkadu	Pumpkin boiled into milk, salt, sugar
22	Shirrughan	Milk, oil(maska), sometimes Kaimok is added
23	Shirshulla	Milk, rice, water, salt
24	Smetana	Smetana (sour cream)
2. Lunch/ Dinner		
1	Borsh	Beetroots, cabbage, beef meat, onion, carrot, potatoes
2	Bread	Wheath flour
3	Cashk/dalda/danguicha	Wheat flour, onion, chickpeas, legs and head of sheep or cow, stomach, water, beans
4	Chagaldak	Fried dough mixed with greens, oil, salt
5	Damlama	Cabbage, carrots, potatoes, meat (beef or lamb), onion, oil, greens
6	Fatir	Fatir : wheat flour bread containing oil
7	Fruits	Apple, pear, peach, cherry, plump,pomegranate, grape, mandarin, kiwi, banana
8	Goluptsi	Sweet pepper (or cabbage), minced beef/mutton meet, onion, rice, oil, salt, water,

		condiment
9	Greens	Parsley, coriander, dill, sorrel, spring onions
10	Gushtbiryon	Fried meat(beef or lamb or goat) , oil, condiments
11	Kadubiryon	Fried pumpkin, onion, oil, salt, sugar
12	Kalla pocha	Intestines, stomachs, leg, head of lamb,chickpeas, onion, greens all boiled
13	Kefir/Yogurt	Kefir/Yogurt
14	Kotlet	Minced meat(beef), onion, dried bread, oil
15	Lagman	Pasta, oil, meat, vegetables, potatoes, herbs
16	Makaron plov /pasta plov	Oil, macaroni, meat, carrots, onion
17	Mantu	Wheat flour to make a steamed dough, meat (or pumpkin),onion, oil
18	Mastova	Rice, oil, carrot, potato, meat, tomato, peppers, chickpeas, greens, sometime chakka is added
19	Moshkichiri	Mungbeans, beans, oil, rice, carrot, onion, salt
20	Non-plov/ bread plov	Dried bread, onion, carrots, oil, potatos
21	Okroshka	Cucumbers, kefir, dill, mashed meat or sausage, egg, greens
22	Oshi burida	Wheat noodles, beets, chickpeas, onion, yoghurt, beetroot
23	Fatir	Wheat flour , butter/ravgani zard
24	Fatir maska	Wheat flour(fatir), butter, melon
25	Plov/ osh	Rice, beef or mutton, chickpeas, carrots, onion, oil, condiment: zira, hot pepper powder, dill, parsley, coriander
26	Qalama	Wheat flour(dough), oil, eggs, sugar, yogurt,fried
27	Qurutob	Small pieces of fatir (crashed wheat bread)hot water, yoghurt and cucumber, tomato, fried onion and oil, green vegetables. Local variations can include yellow oil or flux oil
28	Rasolnik	Meet, oat, cucumbers, carrot, oil, potato, greens
29	Sambusa	Wheat flour to dough, meat, onion, oil, cooked in the traditional oven-tandoori or oven
30	Shakarob	Tomatoes, cucumber, onions, oil, herbs, greens
31	Shashlik	Grilled beef, lamb or chicken and triprava)
32	Shavla	Onion, carrot, small pieces of meat, water, oil, and can be prepared without meat
33	Shurbo	Meat (beef/lamb), carrots, potatoes, oil, onion, herbs, sometimes with chickpeas and other vegetables
34	Tea	Tea, black or green, sugar, honey

35	Tuppa	Wheat flour to make boiled dough cut in small pieces, vegetables served with boiled vegetables (beans, peas, coriander), chakka can be added before eating
36	Tushbera/pelmeni:	Noodle dough filled with meat in soup
37	Ugro:	Ugro: (flour, oil, onion, chickpeas and greens, wheat noodles
38	pickles	Pickles (cucumber, tomatoes)
3. Snack/ tea break (Shirini/ Advia)		
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

Frequently asked questions and answers for WDDS assessment

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

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

2. **What is the target group for DDS data collection?**

   The target individuals in the household are women at reproductive age, i.e. 15-49 years old

3. **If the target woman in the household is not available or if the previous 24-hours were 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 DDS 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, cerebrations 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. For 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. Respondents fasting 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 drinks actually consumed by the woman herself that should be recorded in the questionnaire. Any foods, drinks or dishes, although prepared by the woman, but not actually consumed by herself should not be recorded

7. **Shall the enumerator record foods 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 she got 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 table spoon per day. If consumption is less than one table spoon per day, these greens or herbs should be considered as condiments and grouped under Group 16

Instructions for administering the WDDS Questionnaire

1. Introduce yourself and explain the purpose of the interview clearly, using a simple language
2. Complete the demographic information section and make sure all items are filled in correctly (call out each 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 food and drink that she consumed the previous day or the last 24-hour. The 24-hour cycle include all foods eaten 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 if 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 food that she actually consumed and not the food she prepared 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 drunk – 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 her 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 breast-feeding infants at night time. Use local names for identifying meals such as breakfast, lunch, dinner, tea and shirini. Record these items in the space provided in the questionnaire
8. Probe for foods, drinks, tea and shirini eaten between the three main meals with the respondent. Probe for easily forgotten added foods such as sugar or milk in tea, jam on the 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 as
10. After the respondent recalls all the foods and drinks consumed, start underlining the corresponding food items listed in the appropriate food groups. Underline food items in the food groups meal by meal in chronological order as to avoid confusion. For foods or dishes not listed in any food group, write it in the "Remark" column in the questionnaire and discuss this issue with your supervisor
11. Write "1" in the column next to the food group if at least one food in this group has been underlined. At this stage, do not yet write ''0'' in the column next to the food group if no food item has been underlined within the food group

12. 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

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