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NATIONAL IODINE STATUS SURVEY IN TAJIKISTAN 2021

FINAL REPORT
October 2023

Acknowledgments

The National Iodine Status Survey in Tajikistan 2021 was led and implemented by the Ministry of Health and Social Protection of Population of the Republic of Tajikistan with support from the United Nations Children's Fund (UNICEF). Technical support for the preparation, implementation, and analysis of the survey was provided by NielsenIQ. The survey was made possible by the financial contribution of the United States Agency for International Development. Critical contributions were made by State Institution Tajik Scientific and Research Institute of Preventive Medicine" under the Ministry of Health and Social Protection of Population of the Republic of Tajikistan. The survey would not have been possible without the tireless efforts of the enumerators and laboratory technicians and the willingness of household members to participate.

Content

1. Introduction

Amirjon Khaydarov | 2023

1.1 Background

Iodine is a micronutrient required for biological activities in human body, including the production of thyroid hormones. Iodine deficiency disorders (IDD) remain a major health concern globally because of their devastating effects on the mental and psychomotor development of infants and young children. Children born in iodine-deficient regions on average have 13.5 intelligence quotient (IQ) points less than children born in iodine-sufficient regions. It has been estimated that a 1-point increase in a nation's average IQ is associated with 0.11 per cent annual increase in GDP, thus IDD elimination can potentially contribute to 1.5 per cent GDP growth annually. The consequences of IDDs are often invisible and irreversible, but at the same time, are totally preventable.

Globally, 1.8 billion people are living in areas at risk of iodine deficiency due to insufficient iodine intake. Iodine deficiency affects all stages of human life, from the intra-uterine stage to old age. Effects of iodine deficiency include poor birth outcomes, cretinism, goiter, hypothyroidism and retarded physical and mental development. However, women of reproductive age, including pregnant and lactating women, and children younger than 5 years, are particularly at high risk. During foetal and neonatal growth and development, iodine deficiency leads to irreversible damage to the brain and central nervous system.

In Tajikistan, the entire population is prone to IDDs due to a deficiency of iodine in the soil of the country and subsequently the food derived from it. The country has invested in the universal salt iodization programme for decades as a highly effective strategy for preventing and controlling iodine deficiency. Tajikistan adopted the Law "On the provision of population with fortified food products" in 2019 that requires all edible salt to be adequately iodized. Significant efforts were made to increase demand for adequately iodized salt through mass communication campaigns and to improve the capacity of salt producers and government inspectorates to produce quality adequately iodized salt by strengthening legislative and regulatory measures. Efforts were also made to improve capacity of stakeholders in internal and external quality control and quality assurance, as well as equip factories and labs with necessary supplies.

1.2 Rationale

Despite some improvements over the years, malnutrition in Tajikistan remains a significant public health problem. The 2017 Demographic and Health Survey (DHS) identified that 18 per cent of children under 5 years are stunted, 6 per cent are wasted, and 3 per cent are overweight. According to the 2016 Tajikistan Micronutrient Status Survey, iodine deficiency also continues to be a public health concern, with children aged 6-59 months and women of reproductive age showing suboptimal iodine status (87.5 µg/L and 75 µg/L, respectively). For both groups, iodine concentration had fallen substantially since 2009.

The health management information system does not capture data on iodine deficiency status. Data on iodine deficiency status in particular was only available from the 2016 Micronutrient Status Survey. To determine the current iodine status and identify any disparities by different sociodemographic characteristics, there was a pressing need to conduct a nationwide IDD survey as early as possible. This was a nationally-driven survey, and the results are intended to contribute to informing decision-makers on progress to combat iodine deficiency in Tajikistan, and shape future interventions in a way that will ensure adequate iodine availability among the Tajik population and serve as an advocacy tool. The survey results also provide baseline values for an IDD indicator to measure the progress of the National Development Strategy 2016-2030 as well as its medium-term plan.

1.3 Objectives

The overall objective of the IDD survey in Tajikistan was to assess iodine status among children and women through a nationally representative survey. Specifically, the IDD survey aimed to:

- Assess the iodine status of children between 6-59 months of age and women of reproductive age between 15-49 years.
- Assess the household coverage of iodized salt by region and other characteristics.
- Assess the knowledge, attitude and practices regarding iodized salt at household level.
- Provide decision makers with progress in IDD elimination and guide them to strategize future actions as part of the universal salt iodization programme.

2. Methodology

2.1 Demographic and geographical context

Based on population estimates in 2016 and 2019, Tajikistan's population was slightly over 9.3 million people in 2019. This estimate was used to design the sample plan and distribution for the 2021 survey (Table 1).

The country is divided into four oblasts (regions): Sughd in the northwest, Khatlon in the southwest, Districts of Republican Subordination (DRS) in the center and west, and Gorno-Badakhshan Autonomous Oblast (GBAO) in the east (Figure 1). The capital, Dushanbe, in the DRS, is a separately administrated area and was considered as a separate region for the purpose of this study. Oblasts are divided into rayons (districts). Rayons are further subdivided into mahallas (communities) in urban areas, and jamoats (villages) in rural areas. Tajikistan's population is concentrated in the lowlands, and 90 per cent of its inhabitants live in valleys, often in densely concentrated urban centres.

Table 1: Estimated population size in 2020 by administrative divisions of Tajikistan (extrapolation from 2010 census)

	2016			*2019*		
	Estimated population on 1 January 2016 (% of national population)			*Estimated population on 1 January 2019 (% of national population)*		
Administrative divisions	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Dushanbe	802700 (9.4)	0 (0)	802700 (9.4)	863400 (9.3)	0 (0)	863400 (9.3)
DRS	262316 (3.1)	1709984 (20)	1972300 (23.1)	421900 (4.5)	1744100 (18.7)	2166000 (23.2)
Sughd	620217 (7.3)	1890783 (22.1)	2511000 (29.4)	500500 (5.4)	2206800 (23.7)	2707300 (29.1)
Khatlon	548604 (6.4)	2499196 (29.2)	3047800 (35.6)	267200 (2.9)	3081100 (33.1)	3348300 (36)
GBAO	29349 (0.3)	188051 (2.2)	217400 (2.5)	30500 (0.3)	198400 (2.1)	228900 (2.4)
Tajikistan	**2263186**	**6288014**	**8551200 (100)**	**2083500**	**7230400**	**9313900 (100)**

Source: State Statistical Agency of the Republic of Tajikistan

Figure 1. Map of Tajikistan

2.2 Study design

A cross-sectional study design was used to conduct a nationally representative survey. The strata and sample size were guided by two considerations: (1) consistency with the methodology used in 2003, 2009 and 2016 to allow for comparison over time; and (2) ensuring a statistically representative sample of women of child-bearing age and children under five years in each of the four oblasts (Khatlon, DRS, Sughd, GBAO) and Dushanbe, as well as at national level and for urban and rural areas. The quantitative survey consisted of household interviews and the collection of salt from sampled households, and urine samples from eligible women and children in the same households.

2.3 Sample size

The sample size was determined to allow reliable estimation of iodine status based on a representative probability sample at the level of:

- Tajikistan as a whole, stratified along urban and rural areas; and
- The five main administrative regions (oblasts) of the country (Dushanbe, DRS, Sughd, Khatlon and GBAO).

The sampling estimates and the sampling procedures remained consistent with the 2009 and 2016 nutrition surveys in Tajikistan, using the following formula:

c =(((t² x p (1-p)) / m²) x D) / nh + 10%

Where:

c =required number of clusters
t =confidence level at 95% (standard value of 1.96)
p =estimated prevalence of iodine deficiencies (50% (maximum) was used for both 2009 and 2016 surveys)
m =margin of error at 6.5%
D =design effect (1.75 was used for both 2009 and 2016 surveys)
nh = number of households by cluster

Table 2: Sample size for the 2021 survey

	Population on January 1 2019	*Prevalence (%)*	*Expected prevalence error (%)*	*Sample households*	*Adjusted sample achieved (+10%)*	*Number of clusters*
Dushanbe	863400	50	6.5	432	493	33
DRS	2166000	50	6.5	432	465	31
Sughd	2707300	50	6.5	432	467	31
Khatlon	3348300	50	6.5	432	468	31
GBAO	228900	50	6.5	432	465	31
Tajikistan	**9313900**			**2160**	**2358**	**157**

The estimated population in Tajikistan for 2021 extrapolated based on the 2010 census data was used as the basis for the sample size calculation (Annex 2).

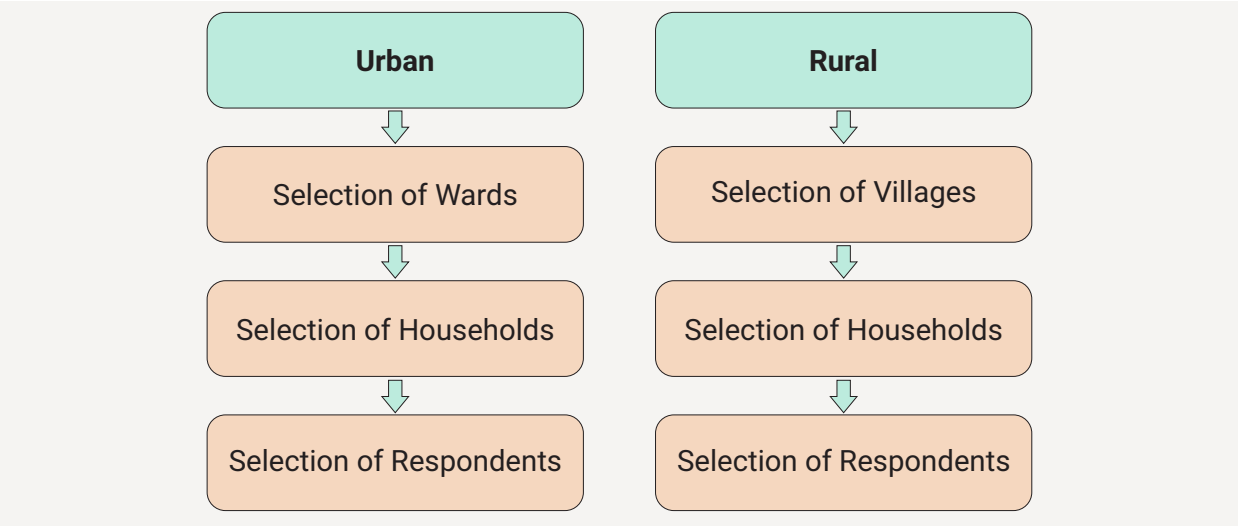
2.4 Sampling methodology

The methodology used was consistent with the national nutrition surveys in 2003, 2009 and 2016. First, 31 clusters were selected with the probability of selection within each region proportional to size (Table 1). A multi-stage, stratified cluster sampling methodology was used in rural and urban areas. The two-stage random cluster-sampling approach was used in the study to calculate the national percentages.

The survey sampling was based on a national cross-sectional cluster sample design, using population estimates from the 2010 census extrapolated to 2019. This cluster design was used because taking a simple random sample for individuals across Tajikistan is inappropriate.

1. In the first stage, the primary sampling units, i.e. the clusters (usually villages or mahallas in urban areas), were selected, with a probability proportional to the population size of the primary sampling unit (region);

2. In the second stage, a random sample was selected in each village (as determined in the first stage) of a fixed number of individuals (children aged 6-59 months and non-pregnant women aged 15-49 years).



Regions and urban versus rural residences were defined as strata. A total of nine strata was covered, because one region (Dushanbe) had no rural population.

Household inclusion and identification

A household was considered eligible for survey inclusion if:

- It included at least one non-pregnant woman aged 15-49 years and/or at least one child aged six to 59 months;
- The non-pregnant woman and/or the respective caregiver of the child aged six to 59 months and the child was available for the interview; and
- At least one non-pregnant woman (aged 15-49 years) or caregiver of a child (aged 6-59 months) signed an informed consent form.

To identify the households, the teams had support from staff members of the local health centres of the clusters. Once a household was identified, the field data collection team checked for the eligibility criteria. If the eligibility criteria were not fulfilled or consent was not obtained, the team identified the next eligible household. This procedure was repeated until each field study team had identified 15 children and 15 non-pregnant women per village/community.

In cases where very small villages were selected with insufficient numbers of households, other geographically proximate villages were added to reach the fixed number of subjects per cluster.

Primary and secondary endpoints

Table 3 shows the primary and secondary endpoints measured in the National Iodine Status Survey 2021, with the initial sample estimates. A total of 4,634 subjects (2,345 children aged 6-59 months and 2,289 women of childbearing age) were covered.

Table 3: Sample size for the 2021 survey

Indicator	*Children under 5 years of age*	*Non-pregnant women of reproductive age (15-49 years)*
Urinary iodine concentration	**2,345 children aged 6-59 months**	**2,289 women**
Salt iodization	**One sample per household**	

2.5 Field data collection

Data collection summary

- A total of 157 clusters (villages/mahallas) were included in the study, covering the five administrative division of Tajikistan.
- A total of 12 field teams collected information from households where at least one child (6-59 months) or woman (15-49 years) lived.
- Each team visited one cluster (village/mahalla) every day.
- Teams visited households in each cluster until obtaining information from 15 children (6-59 months) and 15 women (15-49 years).

To complete the survey, a total of 15 working days were required.

Field teams and pre-testing

The field data collection was conducted between 26 October 2021 and 19 November 2021 by 12 teams of three collaborators (an interviewer, laboratory technician and a supervisor). Each team also included a driver.

Prior to the field data collection, the Ministry of Health and Social Protection of Population (MoHSP) and UNICEF organized a one-week training course from 18 to 24 October 2021, for the field teams to standardize the data collection. The NielsenIQ quality control managers guided this. The first days of training focused on sampling methodology (how to complete the questionnaire, interview techniques, and salt and urine sample collection procedures). To practice interviews and identify any clarity issues with the questionnaire, a pre-test was carried out on days four and five. The team members were instructed on principles of informed consent and how to obtain it, interview techniques, basic knowledge on nutrition, coding and labelling of biological samples, safe handling and transport of samples. The pre-testing measured the daily workload and allowed for validation of the survey questionnaire, assessment of the duration of the interviews and salt and urine collection and the modalities of its transportation to the central laboratory in Dushanbe.

Day-to-day work organization, supervision, and quality control

The Tajik Scientific Research Institute of Preventive Medicine under the MoHSPP was responsible for the overall coordination of the survey.

Day-to-day work organization during the data collection was the responsibility of the supervisors, who acted as the contact point for the field teams and had to ensure that the field teams arrived and conducted fieldwork every day at the assigned villages (clusters).

The field data collection and the field teams were closely supervised and assisted by experts from MoHSP, NielsenIQ and UNICEF staff, to ensure high quality data collection that adhered to the study protocol and the field manual. The 12 field teams, each consisting of four people, carried out data and urine collection. The field laboratory specialist in each team was responsible for monitoring urine sampling and sample handling procedure and managing lab field equipment.

Guli Bogodyrova | 2021

Table 4: Roles of each field team member

Group member	Role
Head/Coordinator of Field Research/Work (Tajik Research Institute of Preventive Medicine)	• Oversight, ongoing monitoring and enforcement of the field work plan • Ensuring compliance with field management • Managing interviewers in the field • Communication with visiting teams in case of quality issues • First contact in case of problems during data collection • Replacement of field staff, if necessary, as per feedback from quality control manager/member of a Nielsen commercial group • Ensure proper coordination with laboratories and other health centers as needed • Liaise on a daily basis with a Quality Assurance • Manager/Nielsen Business Group Member • Accounting for materials used in the survey
Supervisor	• Overall coordination of the activities of the group managed by it • Household Eligibility Check • Identification of eligible households • Obtaining oral consent to participate in the surve • Collection of samples of edible salt from households, and their coding, labeling, as well as responsibility for compliance with the transport of salt
Interviewer	• Conducting a brief presentation of the survey • Obtaining written informed consent • Filling in the registration form • Conducting all surveys • Checking the completion of questionnaires
Laboratory assistant	• Ensuring proper storage of urine samples • Current data control and sampling methodology of urine

Questionnaire

The survey instrument was developed based on the questionnaire used in 2016. Some additional questions were added and others were modified. The final version was reviewed and approved by the MoHSP. The instrument used can be found in Annex 3.
The questionnaire consisted of five sections

1. Household characteristics (e.g type of dwelling, income, education level, water and sanitation).
2. Household food security.
3. Child health issues, including presence of goiter and eating patterns.
   - Biologic sampling – urine collection from children.
4. Women's health issues, including presence of goiter, iodine supplements and eating patterns.
   - Biologic sampling – urine collection from non-pregnant women.
5. Information about iodized salt (knowledge and practices, use and consumption of processed food) and salt sample collection.

The questionnaire was translated into Tajik and then translated back into English to check language interpretations. Questionnaire data was collected with electronic tablets using Survey To Go (STG) software. The questionnaire was organized along four STG forms.

Table 5: Structure of questionnaire sections in Survey to Go

Form #	Respondent	Content	How to
Form 1	*Answered by the guardian of a child aged 6-59 months or non-pregnant women aged 15-49 years*	*Includes information on household characteristics, household food security*	***Complete Form 1 once per household***
Form 2	*Answered by the guardian of a child aged 6-59 months*	*Includes information on child health issues: diarrhea, nutrition, complementary foods, and collection of urine samples*	***Complete Form 2 for an eligible child (even if the child's mother or guardian is the same person)***
Form 3	*Answered by women aged 15-49 years*	*Includes information about nutrition, collection of urine samples*	***Complete Form 3 for each eligible woman***
Form 4	*Answered by the guardian of a child aged 6-59 months or non-pregnant women aged 15-49 years*	*Includes information about iodized salt (knowledge and practices, use and consumption of processed food)*	***Complete Form 4 for each household***

Urine sampling

The laboratory technician collected urine samples from each child aged 6-59 months and each non-pregnant woman aged 15-49 years. To measure iodine concentration, 5 ml urine samples were collected using plastic containers, which were distributed to the women or the caregivers. Urine sampling from children was done whenever possible from the traditional cradle (gavora: the urine is traditionally collected in a pot under the cradle). The urine samples were transferred to a labelled storage tube, placed in a -20°C freezer and transported in frozen condition within 24-72 hours to a central storage facility at the immuno-prophylaxis centres and stored in their freezers. When a considerable number of samples had been collected, they were transported to a lab in Dushanbe where they were stored in a freezer at -80°C.

Salt sample

The supervisor or interviewer collected and labelled samples of household salt, which were transported in labelled, fully sealed zip bags. All samples were transported to Dushanbe within the specified timeframe. The team leader informed the head of field research upon completion of this step. Salt samples were kept in darkness, out of direct sunlight, until the laboratory analysis.

2.6 Data management and analysis

Data reporting

Real-time progress of fieldwork, along with the sample achievement status, was monitored through the designated dashboard. The field manager ensured main survey raw data was available for download on real-time basis. After the completion of the fieldwork, raw data was checked for outliers, which was validated with the field teams, and necessary cleaning was done through a systematic process. Unique ID (UID) codes were used to identify and map the households in the survey with the labelled salt and urine sample results. The status of samples collected, dispatched and received by the laboratory was also monitored.

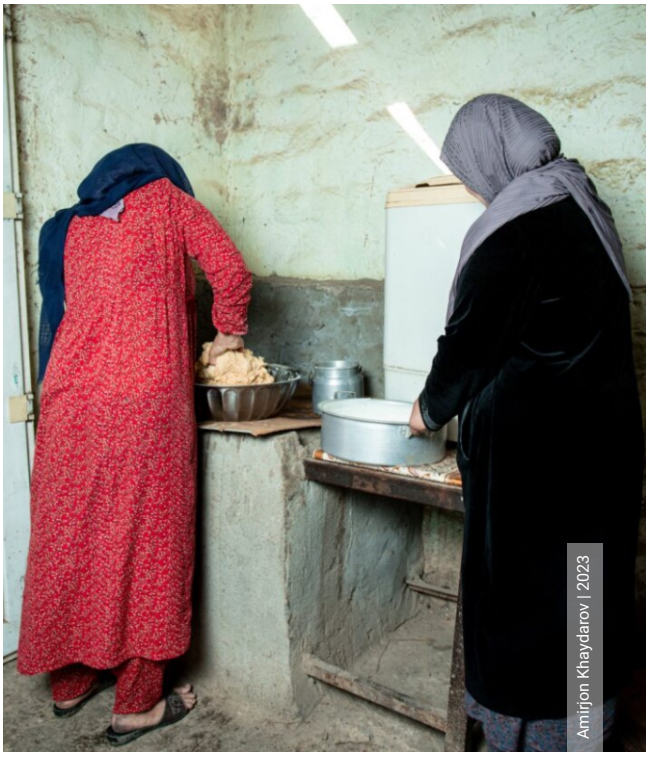
Data entry and analysis

The questionnaire data were collected using electronic tablets and STG software. When teams had issues with the tablets, data from the interviews were collected on paper-based questionnaires and entered by supervisors into the software when access became available. All statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS). Data were checked for outliers and normal distribution (using visual examination of histograms and normality tests).

To calculate the national percentages and values, the cluster-sampling approach used in this study was taken into account and defined the 157 primary sampling units. Regions and urban or rural residence were defined as strata. There was a total of nine strata, because one region (Dushanbe) had no rural population. To take care of the disproportionate allocation of rural and urban samples, as well as provide pooled estimates at the national level, necessary weights were applied to the data. Weighting factors were obtained by dividing the total population size of each stratum by the sample size for the same stratum and normalizing the factors.

For example, the results from Dushanbe were weighted to contribute 9.27 per cent of the national population or value. Given the larger population size of Khatlon and Sughd, these regions were weighted higher and their relative contributions to the national percentages and values were 35.95 per cent and 29.07 per cent respectively. In other words, the results from the demographically large strata/regions contributed more to the national percentage or value

Data analysis was conducted following standard epidemiological approaches. Firstly, the data was summarized (e.g. means and percentages) and the associations between outcomes and explanatory variables were explored while considering confounders.



Minimum dietary diversity for women

The minimum dietary diversity for women was calculated using the approach and methodology described in “Minimum Dietary Diversity for Women - A Guide to Measurement” (FAO 2021). The 10 food groups included and analyzed were: (1) Grains, white roots and tubers, and plantains; (2) Pulses – beans, peas and lentils; (3) Nuts and seeds; (4) Dairy; (5) Meat, poultry and fish; (6) Eggs; (7) Dark green leafy vegetables; (8) Other vitamin A-rich fruits and vegetables; (9) Other vegetables; and (10) Other fruits. Women who consumed at least 5 out of the 10 food groups within the last day were considered to have minimum diet diversity. Thus the 10 food groups were first summed into a score ranging from 0 to 10. Each woman was coded “yes” for scoring ≥ 5 and “no” for scoring <5, followed by a calculation of the proportion of women who scored 5 and above.

Laboratory analysis

The Research Laboratory of the Tajik Scientific and Research Institute of Preventive Medicine conducted laboratory analysis between April and May 2022.

Table 6 provides a summary of the laboratory methods used for this assessment of the iodine status of participants.

Table 6: Laboratory method used and cut-off for iodine status

	Indicator	*Cut-off children (6-59 months)*	*Cut-off women of reproductive age*	*Reference for cut-off*
Iodine intake	*Urinary iodine concentration (UIC)*	*Median value UIC <100µg/l considered as population level iodine deficiency (for comparison with past surveys: Iodine deficiency: UIC<100µg/l)*		*WHO 2013*

Urinary iodine concentration

An estimated 35 per cent of the world's population has insufficient iodine intake and continues to live at risk of iodine deficiency and associated iodine deficiency disorders. Urinary iodine is a well-accepted, cost-efficient, and easily obtainable indicator of iodine status. The most common indicator assessing the impact of the universal salt iodization programme is urinary iodine. Because more than 90 per cent of ingested iodine is excreted in the urine, urinary iodine is a sensitive marker of current iodine intake and can reflect recent changes in iodine status (WHO/ICCIDD/UNICEF 2007). Because there is high variation in an individual's daily iodine intake and diurnal (within each day) variation in iodine excretion, single spot urine samples do not reflect individual habitual intake of iodine. As such, it is not appropriate to use UIC values to estimate individual intake, nor to assess the percentage of the population that is deficient. However, where the sample size is large enough, the median UIC represents the overall iodine intake of that population. A median urinary iodine level of 100 µg/l or less is proposed for classifying iodine deficiency in the population (Zimmermann 2008). Thus, the present survey was primarily interested in the median urinary level.

The method applied in the Tajikistan National Iodine Status Survey 2021 was adapted from the ammonium persulfate digestion with the use of a microtiter plate to carry out a Sandell-Kolthoff reaction (Sandell and Kolthoff 1937) and the use of microplate reader for reading optical density. Urine samples were digested with ammonium persulfate on a heating block. Then, after the addition of arsenious acid solution, ceric ammonium sulphate solution was added, and the absorbance of yellow complex was read in a spectrophotometer at 405 nm. The concentration was calculated by extrapolating from a standard curve. All the glassware and plasticware used were acid-washed prior to use.

Salt iodine analysis

Fortified salt that contains 15 parts of iodine per million of salt (15ppm) is considered adequate for the prevention of iodine deficiency (WHO 2014). The salt collected from the households was analyzed using the titration method to determine the level of iodine in it. To measure the quantity of iodine in iodized household salt, the laboratory used solutions of sodium thiosulfate, sulfuric acid, solution of potassium iodate or iodide, soluble lime and sodium chloride solution, taking 20 grams of well-mixed salt using the titration methodology, as was described in the “Guide on external control of quality of iodized salt in salt production”, produced in 2021.

2.7 Ethical approval and consent to participate

All interviewees gave written consent before the interview. Informed consent was obtained in writing from all study participants and/or the parents/legal guardians of children between 6-59 months (Annex 4). The age of legal majority in Tajikistan is 18 years. For minor women participating in the survey (15-17 years) consent was secured from both the participant and a parent/legal guardian. Respondents were

informed that participation was voluntary and that they may withdraw from the survey at any time. Participation was uncompensated. In addition, on 24 October 2021 the MoHSP granted written approval to conduct the survey and collect field data.

No respondent at any level was exposed to any risk, and no direct benefits were provided to the respondents. It was ensured that the information obtained was kept confidential as all personal identifiers were removed from the survey and biological data. The data was analyzed at the regional level only. No personal identifiers were used for mapping sample result with data; instead, a unique ID was used for this purpose. No personal identification details were shared with any of the parties. Respondents were not contacted post-interview and sample collection, either for internal or external validation, as data quality was ensured during data collection process.

2.8 Quality and reliability of data

Quality assurance was a proactive and continuous process of systematic monitoring and evaluation of the various aspects of the project, to maximize the standards of quality attained by the survey process. Quality checks were carried out on all the key activities of the project – recruitment, field training, data collection, team movement, data compilation, etc.

Internal monitoring mechanism

A three-tier monitoring structure was followed throughout the survey. The quality control plan envisaged quality check mechanisms at the following stages:

a. **Inputs stage:** Quality check mechanisms were placed from recruitment to CAPI application testing, followed by training to ensure standardization and consistency during the field trainings.
b. **Data collection stage:** The quality at the data collection stage was primarily determined by coverage of PSU, comprehensiveness of coverage, the accuracy of information and adherence to protocol in each of the phases of data collection.
   - Supervisors conducted accompaniment/spot checks in 15 per cent of the interviews, covering all interviewers.
   - In case any issue was observed during supervisory accompaniment/spot checks related to data quality, a debriefing session was organized immediately, and all doubt was clarified.

c. **Data validation**
   A robust data monitoring and validation system was placed at various levels to ensure the quality of data collected throughout the survey.
   - IT manager ensured that a backup of the uploaded data was conducted regularly.
   - IT manager maintained a clean copy of all raw data uploaded, in case of a need to return after cleaning.
   - Server team cleaned the data/outlier based on variance report and converted it into SPSS.

2.9 Study limitations

Within this survey, quality measures were taken to ensure an acceptable to good quality of field data collection, laboratory analysis and data management. Various measures were taken to improve the reliability and validity of the results. These include the following quality assurance measures:

During the pre-survey, the quality assurance was tested. Comprehensive training was conducted for the field team (interviewers, laboratory technicians and supervisors) covering interview techniques, sampling procedure, inclusion and exclusion criteria of target population, sources of errors in taking measurements, standardizing questions in the questionnaire, the levels of precision required in measurements, handling of equipment and general courtesy in conducting a survey.

During field data collection, all the field teams were closely supervised by experts from the MoHSP and UNICEF to ensure that the field work plan and the procedures outlined in the field manual were respected and, as much as possible, standardized across the field teams. All field teams were contacted daily to address all questions or issues.

The electronic data-capturing as well as the data analysis included various quality control measures. During field data collection, the form did not allow data entry for unusual values. During the analysis, all data were checked for outliers and implausible data were handled as missing data. Using this procedure, any outliers or mistakes could be detected and either not considered in the analysis or replaced, depending on the magnitude of error.

However, the survey faced some limitations and biases, of which the below are considered the most important:

Interview quality and translation: Interviewer bias and response bias are possible areas that could have weakened the strength and quality of the data. On the guidance of the MoHSP, the questionnaire was only applied in Tajik and not in other vernacular languages such as Uzbek, the Pamiri languages or Russian. Though the field teams were closely monitored by MoHSP and UNICEF, there is a possibility that the interviews were not always conducted at the highest standard and that this could have led to inadequate responses by interviewees, particularly regarding general household characteristics, household food security and attitudes about nutrition.

Collection of biological samples, labelling, transport and storage: The survey required several thousand urine samples to be collected, labelled, transported, and stored in Dushanbe. In addition, the labelling and storage of samples presented major challenges, and during the sample analysis, some batches could no longer be linked to a unique identifier and thus had to be excluded. Other samples could not be attributed to given persons. However, for the biological analysis, at least 90 per cent of the samples of women and children could be included in the study. We consider this to be a high percentage. At the same time, it is not possible to exclude the possibility that a bias has been introduced. In which direction such a possible bias would have distorted the results is, however, impossible to indicate.

3. Results and discussion

This chapter presents the key results of the National Iodine Status Survey 2021. The results mainly focus on the size and profile of the sampled households and the respondents, use of adequately iodized salt at household level, urinary iodine level among women of reproductive age (WRA) and children from 6-59 months, knowledge of iodine deficiency and consumption of iodized salt, type and category of salt used, salt packaging, labelling and salt purchasing practices. The results have been presented at national level and across different regions. All the results presented in this chapter are based on weighted data excluding the characteristics of survey population.

3.1 Sample achievement

Against the planned sample size of 2,358 children aged 6-59 months and 2,358 non-pregnant women aged 15-49 years outlined in the study methodology, the survey data was collected for 2,345 children and 2,350 women (Figure 3). Survey information relating to 8 women and 13 children could not be collected or included in the final analysis for various reasons. In addition to this, the urine sample collection was possible for a total of 2,238 children and 2,236 women. In other words, 95,4 per cent and 95,1 per cent of urine samples could be collected and included in the analysis from the surveyed sample (Table 7). Hence, a total of 2,358 households were selected in the sample. Among all the interviewed households, 2,358 salt samples were collected and 4,474 urine samples were collected from women of reproductive age and children 6-59 months.

Figure 3. Flow chart of study population and sample achievement

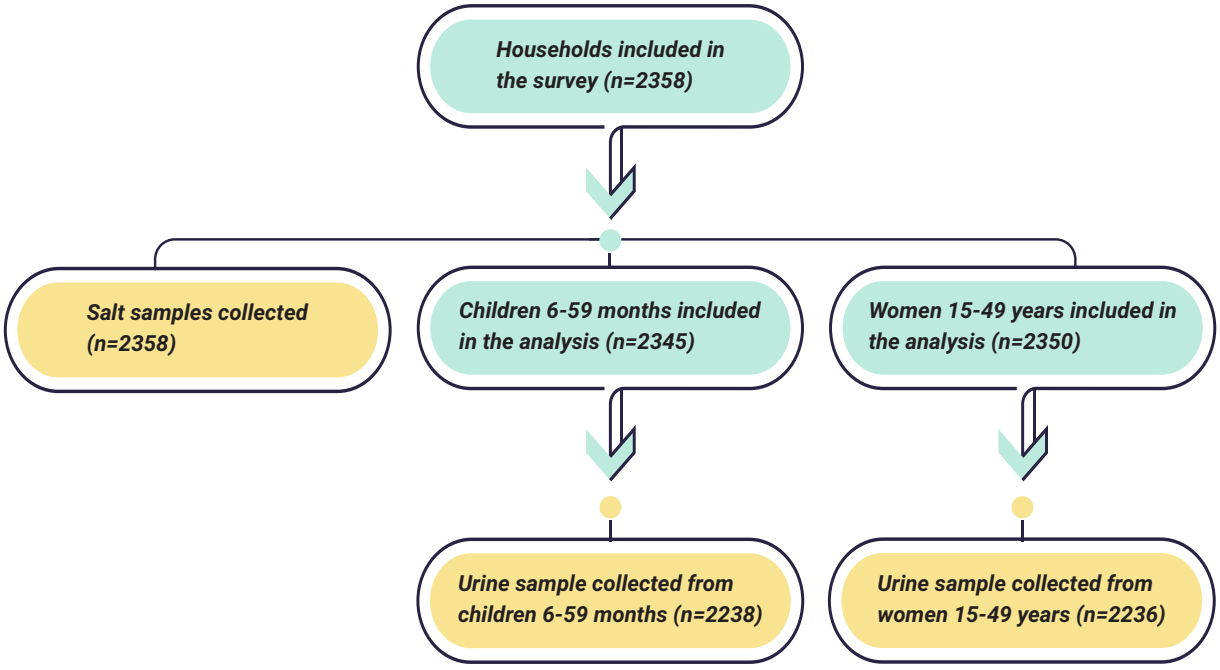


Table 7: Sample achievements for the interview, salt collection and urine collection

	Total household surveyed	Response rate for interview (%)	Salt sample from HH (%)	Children 6-59 months surveyed	Urine sample for children (%)	WRA surveyed	Urine sample for WRA (%)
Dushanbe	493	100	100	490	95.3	490	95.1
DRS	468	100	99.8	468	98.9	468	97.4
Sughd	467	100	100	462	95.7	462	97.4
Khatlon	465	100	100	461	97.6	465	96.3
GBAO	465	100	100	464	89.7	465	89.5
Tajikistan	**2358**	100	**99.9**	**2345**	**95.4**	**2350**	**95.1**

3.2 Household characteristics

3.2.1 General characteristics, income and food production

The majority of respondents (77.6 per cent) lived in rural areas, with the exception of Dushanbe where all households were considered urban (Table 8) and 10.1 per cent of households were headed by women, with Dushanbe having the highest proportion of women-headed households (16.2 per cent) and DRS having the lowest (1.5 per cent). More than 66 per cent of household heads nationally completed upper secondary/vocational/technical education, while 10 per cent completed mandatory education and another 21 per cent completed higher education. The highest proportion of household heads that had completed higher education was in Dushanbe (43.2 per cent). Remittances are an essential source of income in Tajikistan, and 30.3 per cent of households indicated this as their main source of cash income. The next most frequent main source of income was official salaries (20.3 per cent), farming/livestock (20.4 per cent) and private business (18.5 per cent). Farming (along with remittances) was an important cash income source in all regions except for Dushanbe, where regular salaries, private business and remittances were most important.

Table 8: Characteristics of households included in the survey

	Dushanbe	DRS	Sughd	GBAO	Khatlon	National (weighted)	Urban	Rural
Residence (%)								
Rural	0	80.6	81.40	8.1	91.0	77.6	-	-
Household head (%)								
Female	16.2	1.5	15	10.6	9.9	10.1	9.2	13.1
Educational attainment of household head (%)								
None	0.8	2.8	0.2	4.7	3.6	2.2	0.6	2.6
Mandatory (grades 1-9)	6.5	16.5	7.6	1.1	9.7	10.1	5.5	11.5
Upper secondary (grades 10-11)	33.9	51	73.5	45.1	46.1	54.1	48.1	55.8
Vocational/technical	15.2	11.7	7.2	19.7	15	12.1	13.9	11.5
Higher education	43.2	17.5	11.6	29.4	24.6	21	13.4	18
Don't know	0.4	0.5	0	0	1	0.5	0.5	0.5
Main source of cash income (%)								
Private business	23.3	9.9	20.8	16.5	21.1	18.5	27.2	16
Salary	55.6	18.7	8.5	36.5	20.7	20.3	39.8	14.7
Pension/social aid	6.7	0.9	5.6	6.9	7.2	5.2	6.4	4.9
Farming/livestock	0	18.1	26.4	33.1	21.3	20.4	4.4	25
Remittances	11	45.1	30.8	2.9	27.2	30.3	17.4	34
No cash income	0.4	1.2	1.4	0	0.2	0.8	0.2	1
Other	2.8	6.2	6.2	3.8	2.1	4.4	4.6	4.3

Around two in three households (69.1 per cent) were growing food crops to complement their own consumption, except for Dushanbe where only 5.3 per cent of households grew their own food (Table 9). The most common products were potatoes or other roots (68.8 per cent), green leafy vegetables (68 per cent) followed by other vegetables and fruits and yellow/orange vegetables and fruit. Cereals (wheat and rice) were produced by over a fifth of the households (22.1 per cent) predominantly in Khatlon (32.8 per cent). Pulses (beans, peas, lentils, nuts) were grown by every fifth household (22.5 percent), and most often in Khatlon and GBAO (38.1 per cent and 55.8 per cent respectively).

Table 9: Proportion of households with the production of food crops for own consumption (%)

	N	Household growing own food	Cereals	Pulses	Potatoes or other roots or tubers	Yellow/orange vegetables and fruits	Green leafy vegetables	Other vegetables
Dushanbe	493	5.3	0	0	7.7	7.7	38.5	73.1
Khatlon	468	86.9	32.8	38.1	85.4	71.5	82.3	41.7
Sughd	467	65.3	14.2	8.6	38.9	17.1	62.8	52.5
DRS	465	69.6	10.9	5.1	71.2	35.2	46	72.5
GBAO	465	89.5	25.3	55.8	85.5	75.1	77.7	27.6
National (weighted)	**2358**	**69.1**	**22.1**	**22.5**	**68.8**	**47.7**	**68.0**	**51.6**
Rural	1522	81.9	23.5	24.3	72.1	50.3	67.9	51.7
Urban	836	24.8	6.3	2.7	30.9	17.7	68.7	51.1

In case of animal breeding for meat and milk production, most popular was cattle breeding (74.2 per cent) (Table 10). Poultry and sheep farming were practiced by more than a quarter of households (30.9 per cent and 31.5 per cent, respectively).

Table 10: Proportion of households keeping animals for meat and milk production for their own consumption (%)

	N	Cattle	Sheep	Goat	Poultry	Horse
Dushanbe	26	-	-	-	7.7	-
Khatlon	384	78.9	30.2	15.0	34.7	2.8
Sughd	295	73.6	32.9	18.6	12.9	-
DRS	338	68.4	26.3	26.8	44.1	2.8
GBAO	411	71.9	67.2	62.6	40.0	1.8
National (weighted)	**1454**	**74.2**	**31.5**	**20.1**	**30.9**	**2.0**
Rural	1274	76.8	33.1	21.4	31.6	2
Urban	180	44.3	14	5.3	21.9	1.3

One third of the households reported having had problems satisfying the food needs of household members sometimes of often since the beginning of 2021/last winter (Table 11). Significant differences were observed between regions with the highest frequencies of households facing problems in Dushanbe (42 per cent). Coping strategies for problems related to food security varied and included, among others: spending savings (41.5 per cent), taking bank credit (11.3 per cent), purchasing food on credit (9.9 per cent) and prolonging migration (8.5 per cent). The incidence of spending savings was highest in GBAO (60.2 per cent) followed by Khatlon (58 per cent).

Table 11: Proportion of households reporting having had problems satisfying the food needs of household members since the beginning of 2021/last winter and their coping strategies

	N	Never	Sometimes (1-2 times/ month)	Often (>2 then/ month)	Coping strategies			
					Spent savings	Took bank credit	Purchased food on credit	Prolonged migration
Dushanbe	493	57.6	42	0.4	28.2	16.2	7.5	1
Khatlon	468	68	30.9	1.2	58	16.2	9.4	14.3
Sughd	467	73.8	22.2	4	29.1	3.3	0	1.9
DRS	465	63.9	35.3	0.8	34.6	12.5	23.1	11.2
GBAO	465	66.6	32.9	0.4	60.2	2.8	19.2	3.8
National (weighted)	**2358**	**67.7**	**30.5**	**1.8**	**41.5**	**11.3**	**9.9**	**8.5**
Rural	1274	68.6	29.3	2	44.7	10.2	10.2	9.7
Urban	180	64.6	34.3	1.1	30.1	15.2	8.8	4.3

3.2.2 Water, sanitation and hygiene

Around one third of the interviewed households (29.5 per cent) rely on public tap water as their main source of drinking water (Annex 1, Table 1.4). The percentage of households with access to public tap water was highest in Sughd (47.4 per cent) and lowest in Dushanbe (13.8 per cent). Other important sources for households are piped-into-dwelling (38.9 per cent) and pond/rivers (13.4 per cent). Most households with piped water as the main source of drinking water have constant access (70.8 per cent, Annex 1, Table 1.5). A total of 89.5 per cent of households indicates that they had access to clear (non-turbid) water (Annex 1, Table 1.6). The percentage is highest in Sughd (98.2 per cent) and lowest in Khatlon (77 per cent).

With regard to type of toilet facility used by households, most households indicate relying on covered dry latrine (73.9 per cent at national level) except for Dushanbe (22.9 per cent) (Annex 1, Table 1.7). In rural areas, 83.1 per cent of households use covered dry latrine. Nearly all interviewees (98.1 per cent) indicated having used soap on the day of the interview or the day before (Annex 1, Table 1.8). Soap was most frequently used for washing hands before preparing food (74 per cent), washing clothes (69.3 per cent) and washing hands after defecating (69.1 per cent).

3.2.3 Eating patterns

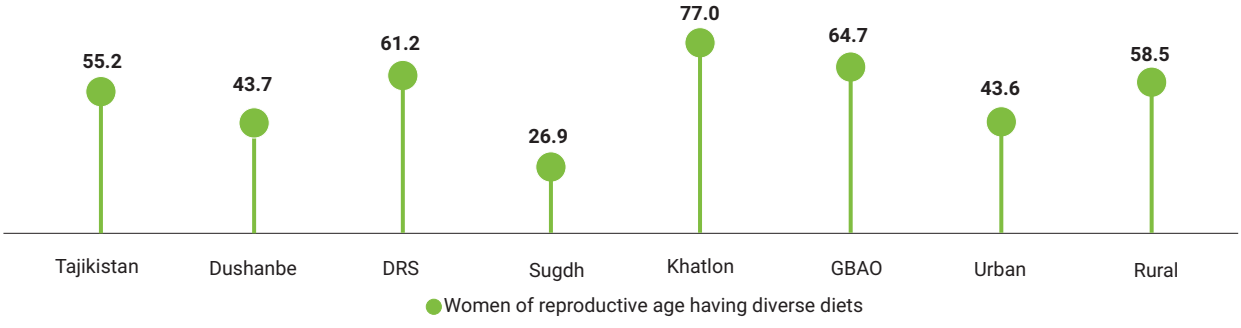
Of the 2,300 women respondents, eating patterns were characterized by the high consumption of carbohydrates and suboptimal consumption of fruits and vegetables (Table 12). Two thirds consumed dairy products and over half of respondents had some animal-source protein. Less than half (45.4 per cent) of women consumed vitamin A-rich fruits and vegetables, while only a third (32.9 per cent) of them consumed dark green leafy vegetables. Tea and coffee were more commonly consumed (79.3 per cent) than plain water (66.7 per cent). More than half of respondents had consumed sweet snacks in the past 24 hours, but the consumption of sugar-sweetened beverages/fruit juice was not common. The exception to these patterns was found in Khatlon, where the consumption of animal-source protein, vitamin A-rich fruits and vegetables, dark green leafy vegetables and dairy products was generally higher than the national average and the other regions. The food consumption pattern in Khatlon reflects the food production patterns for own consumption in the region (Table 9). The consumption of processed foods that contain salt was generally not high (cheese, tinned vegetables, ready-made meals), except for bread (67.8 per cent).

Table 12: Food consumption in the past 24 hours of the survey among women of reproductive age

	National	Dushanbe	DRS	Sughd	Khatlon	GBAO	Urban	Rural
Base	2300	490	430	462	453	465	825	1475
Foods made from grains	87.4	93.5	64	98.2	90.8	96.2	90.9	86.4
White roots and tubers	72.2	42.7	71.6	64.1	88.5	50	62.1	75.1
Pulses	52.5	37.3	43.9	44	70	35.2	40.9	55.9
Milk and milk products	67.2	87.1	61.5	47.6	79.4	97.6	67.1	67.2
Meat, poultry	56.1	68.8	57.6	28.4	73.3	76.2	57.7	55.7
Fish	5.8	1.6	1.5	2.5	12.3	3.2	4.4	6.2
Eggs	53.3	54.1	44	56.3	57.7	32.2	49.1	54.5
Vitamin A rich vegetables roots, tubers and fruits	45.4	12.2	41.5	21.6	77	33.4	26.7	51
Dark green leafy vegetables	32.9	15.1	19.9	9.6	65.5	22.2	26.5	34.8
Other vegetables	48.2	59.6	38	27.3	69.3	36.3	43.7	49.5
Other fruits	58.4	41.4	70.4	22.7	85.6	45.4	50	60.8
Nuts and seeds	33.6	8.4	21.1	13	65.9	18.7	15.6	38.9
Oil & Fats	33.1	5.5	16.9	35.2	46.8	60.2	17.5	37.7
Clear broth	52.1	83.9	43.2	31	68.1	30.6	57.2	50.6
Tea (black or green), coffee	79.3	71.6	74	65.6	97.2	61	75.7	80.3
Plain water	66.7	94.9	11.7	75.1	86.9	57	65.9	66.9
Fruit juices	5.7	5.1	2.6	2.1	10.6	7	4.7	6
Sweet soda, sugary water	10.6	7.6	7.6	6.2	17.3	4.6	8.1	11.3
Vitamins, mineral supplements, and/or any medicine	4.2	2.2	-	-	9.8	18.9	1.5	5
Sweets	56.6	46.3	63.5	12.7	91.6	49.1	46.7	59.5
Spices, condiments	18.9	1.6	1.5	-	50.9	1.7	1.4	22.3
Breakfast Cereals	1.1	0.2	-	-	2.8	2	1	1.1
Cheese	4.3	9.6	0.8	0.8	8.6	2.4	5.4	4
Tinned Vegetables	9.6	0.6	5.3	-	23.1	1.2	4	11.3
Bread	67.8	88.6	48.4	51.8	86.5	82.3	71.1	66.9
Savory Snacks	2.8	4.3	2.3	0	5.3	0.8	3.3	2.7
Microwave meals or ready to eat meals	1.5	1.4	0.2	0	3.6	0.2	0.7	1.7

Overall, 55.2 per cent of women met the minimum dietary diversity (Figure 4). Khatlon had the highest percentage (77 per cent) of women meeting the minimum dietary diversity while Sughd had the lowest percentage (26.9 per cent) of women with minimum dietary diversity. Differences between regions were statistically significant as they were between women living in urban (43.6 per cent) and rural areas (58.5 per cent).

Figure 4. *Minimum Dietary Diversity among WRAs (≥5 food groups consumed in the past 24 hours)*



3.3 Household coverage of iodized salt

2358 salt samples were tested for iodine content. Overall, 36.6 per cent of households were using iodized salt (Figure 5). Among them, only 12.8 per cent had adequately iodized salt (15-40 mg/kg). Urban households had higher coverage of iodized salt (45.1 per cent) than rural counterparts (34.2 per cent). The highest iodization of salt was found in Dushanbe (50.5 per cent, out of which 19.3 per cent adequately iodized), while the lowest iodization of salt was found in DRS (26.3 per cent, out of which 7.3 per cent adequately iodized). Households using loose crystal salt had the least percentage with adequately iodized salt (3.8 per cent) while at the same time households using sealed unbranded packages were found to have least percentage of iodized salt (3.6 per cent) (Table 13).

Figure 5. Household coverage of iodized salt by levels of iodization

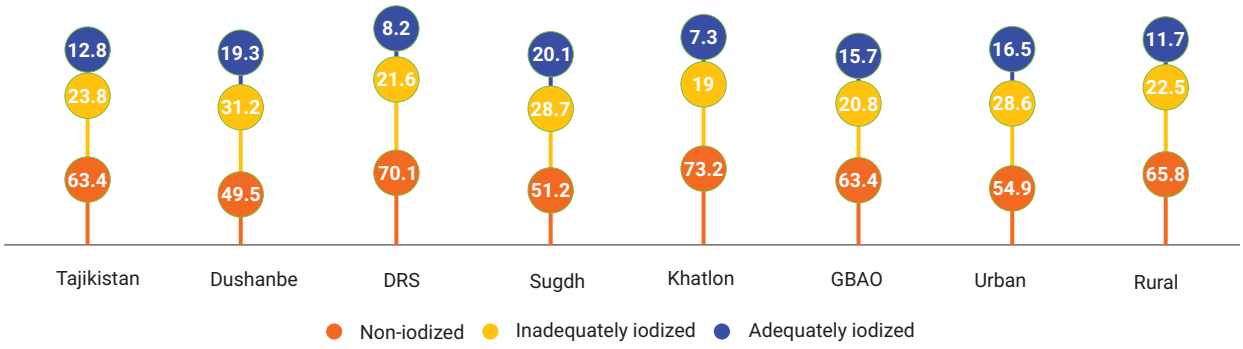


Table 13: Prevalence of households using no iodine or iodized salt according to lab test

	Total Households in the Survey	Among All Household, the percentage with		Among households with tested salt, the percentage with				
		Salt Tested	No Salt in the Household	Non-iodized (<5 mg/kg) (%)	Inadequately iodized (5-14.9 mg/kg) (%)	Adequately iodized (15-40 mg/kg) (%)	Excess Iodine (> 40 mg/kg)	Median Iodine Content (mg/kg)
National (weighted)	2358	100	0	63.4	23.8	12.8	0	11.7
Residence								
Rural	1522	100	0	65.8	22.5	11.7	0	11.71
Urban	836	100	0	54.9	28.6	16.5	0	11.7
Region								
Dushanbe	493	100	0	49.5	31.2	19.3	0	12.2
Khatlon	468	100	0	70.1	21.6	8.2	0	13.8
Sughd	467	100	0	51.2	28.7	20.1	0	13.8
DRS	465	100	0	73.7	19.0	7.3	0	9.4
GBAO	465	100	0	63.4	15.7	20.8	0	15.9
Salt Type								
Packaged Crystal	1806	100	0	63.3	23.2	13.5	0	11.7
Packaged Crushed / Powdered	274	100	0	68.9	20.7	10.3	0	11.7
Loose Crystal	146	100	0	68.1	28.0	3.8	0	9.4
Loose Crushed / Powdered	81	100	0	54.0	38.6	7.2	0	9.4
Don't Know	51	100	0	47.5	26.7	25.8	0	14.8
Packaging								
Sealed Branded Package	2157	49.5	0	62.7	24.1	13.2	0	11.7
Sealed Unbranded Package	38	60.8	0	86.8	9.6	3.6	0	13.8
No Package/ Loose	163	38.9	0	65.3	24.0	10.7	0	10.6

In Table 14, responses given by the interviewees with regard to the types of salt used were cross tabulated with the results of the lab tests. Only 14 per cent of the households who reported the use of iodized salt actually used adequately iodized salt. 38.9 per cent of households who reported the use of iodized salt actually had any level of iodized salt, whereas 47 per cent of households who reported non-use of iodized salt actually had use of any level of iodized salt.

Table 14: Type of salt used by households according to interviewees and Titration method test result

	N	*Interviewee reported use of iodized salt (n=1924)*			*Interviewee reported non-use of iodized salt (n=56)*			*Salt status not known by interviewee (n=84)*		
		Non-iodized	*Inadequately iodized*	*Adequately iodized*	*Non-iodized*	*Inadequately iodized*	*Adequately iodized*	*Non-iodized*	*Inadequately iodized*	*Adequately iodized*
Dushanbe	493	47.7	32.3	20	33.3	33.3	33.3	100	0	0
Khatlon	468	68.4	21.6	10	100	0	10	64.5	29.8	5.7
Sughd	467	50	29.9	20.1	47.5	23.8	28.7	40.3	0	59.7
DRS	465	63.2	16	20.8	100	0	0	73.8	26.2	0
GBAO	465	72.1	20.5	8.2	57.8	8.9	33.3	0	0	100
National (weighted)	2358	61.2	24.9	14	53	21	26	64.9	28.1	7

3.4 Iodine status of women of reproductive age and children 6-59 months of age

2236 urine samples were collected from women and analyzed for median urinary iodine concentration (MUIC). The weighted national MUIC was 121.7 µg/l (Table 15). Since a threshold of 100 µg/l is considered the minimal acceptable iodine concentration in urine, the observed MUIC indicates adequate iodine intake among women of reproductive age in all regions. There was no difference between urban and rural areas. The MUIC levels nationally in 2003, 2009 and 2016 were 93.6 µg/l, 107.8 µg/l and 75µg/l, respectively. The time trend across years coincides with shift from donor procurement of KIO3 to self-procurement of the fortificant by salt producers. Therefore, the situation seems to have improved at national level since the previous surveys. There may be other sources of food other than table salt, such as industrially processed foods, that provide adequate iodine to women of reproductive age. Although assessing the use of iodized salt in processed foods and condiments and the consumption of processed foods was beyond the scope of this survey, commonly consumed industrially processed foods in Tajikistan, such as bread, dairy products, pickled vegetables, may contribute significantly or partially to salt and iodine intake among the population apart from table salt. The potential factors contributing to this improvement and the reasons for the discrepancy between poor household coverage of iodized salt and adequate MUIC among women need to be further investigated.

Table 15: Median urinary iodine concentration among women aged 15 to 49 years old and children 6-59 months old

	Women 15-49 years				*Children 6-59 months*			
	Number	*Median (µg/l)*	*25th percentile (µg/l)*	*75th percentile (µg/l)*	*Number*	*Median (µg/l)*	*25th percentile (µg/l)*	*75th percentile (µg/l)*
Dushanbe	466	134	95.3	167	467	65.5	48.0	85.9
Khatlon	456	128.6	97.2	160.2	463	47.3	32.1	65.1
Sughd	450	119.7	86	143.9	442	56.3	38.3	77.0
DRS	448	114.6	88.3	134.9	450	37.6	28.5	52.3
GBAO	416	105.5	87.4	131.6	416	31.6	22.7	45.4
National (weighted)	**2236**	**121.7**	**89.3**	**149.3**	**2238**	**48.1**	**32.7**	**69.3**
Rural	1434	121.7	89.3	149.2	1440	47.2	32.1	67.7
Urban	802	121.8	89.4	150.1	798	51.5	33.6	73.1

Cross tabulation of the household coverage of iodized salt and MUIC levels among WRAs showed that regardless of the level of salt iodization, the MUIC levels were similar (Figure 6).

On the other hand, 2238 urine samples were collected from children and analyzed for MUIC, which was at 48.1 µg/l (Table 15), indicating an insufficient iodine intake in this age group. In line with the household coverage of iodized salt where Dushanbe and Sughd had the highest levels, Dushanbe and Sughd showed the highest MUIC (65.5 µg/l and 56.3 µg/l, respectively), while GBAO showed the lowest (31.6 µg/l). The MUIC in urban areas (51.5 µg/l) was slightly better than rural counterparts (47.2 µg/l). The median urinary iodine levels in 2003, 2009 and 2016 were 73.1 µg/l, 116.5 µg/L & 87.5 µg/l respectively. The MUIC for children has thus deteriorated in the recent years. Understanding the determinants warrants further research.

Cross tabulation of the household coverage of iodized salt and MUIC levels among children aged 6-59 months showed that, similarly to the situation among women, the MUIC levels were similar across the different levels of household coverage of iodized salt (although the MUICs were marginally better among those households which had iodized salt [either inadequate or adequate] than those with non-iodized salt) (Figure 7).

Figure 6. Relationship between household coverage of iodized salt and MUIC levels among WRAs

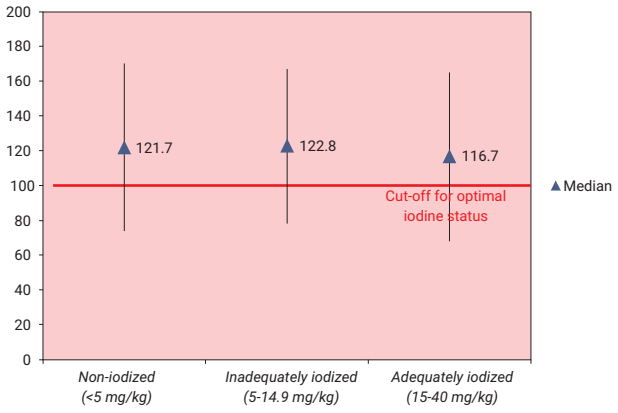
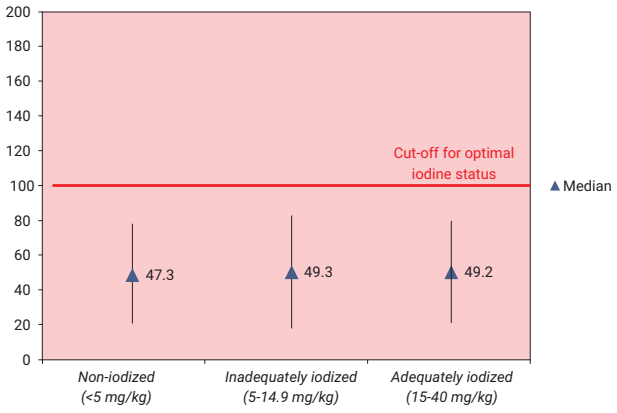


Figure 7. Relationship between household coverage of iodized salt and MUIC levels among children 6-59 months

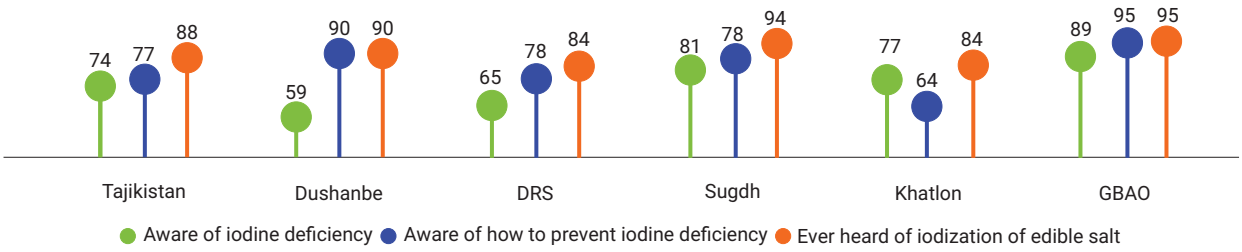


The MUICs for women of reproductive age and for children 6-59 months showed a contrasting situation of iodine nutrition status. While it was beyond the scope of the survey to conduct a determinants analysis or to further investigate these discrepancies, some hypotheses may be made. Women may have consumed more industrially processed foods which had iodized salt than young children who have consumed simple home-made meals with household salt. Adult women may have simply consumed more salt in absolute terms than young children, thus iodine intake also higher in women than children. Suboptimal breastfeeding practices might also have limited the transfer of iodine from mothers to children. However, further research is needed to understand the reasons for the discrepancies.

3.5 Knowledge, awareness and practices regarding iodized salt

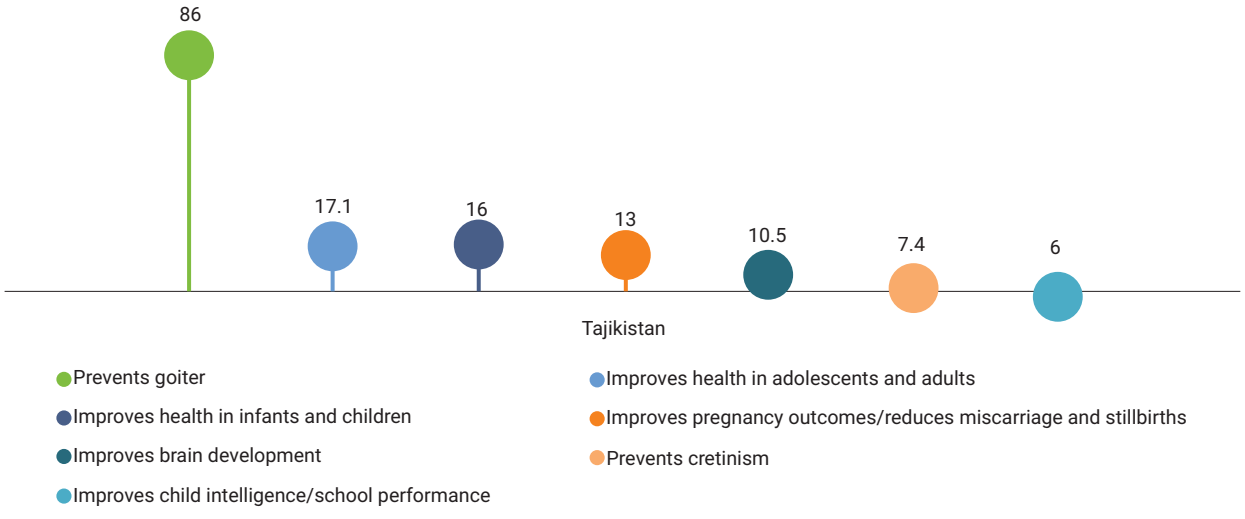
Seventy-four per cent of the interviewees were aware of iodine deficiency in humans, with the highest awareness in GBAO (89 per cent) and least in Dushanbe (59 per cent) (Figure 8) and 77 per cent of respondents stated that they knew how to prevent iodine deficiency. The highest awareness was found in GBAO, while respondents in Khatlon had the least awareness. The discrepancy between the high awareness iodine deficiency prevention (90 per cent) and the low awareness of iodine deficiency (59 per cent) in Dushanbe could be because after the respondents were asked if they knew what iodine deficiency was, interviewers might have explained, and therefore unintentionally improved the answers to the subsequent question. Nationally, 87.5 per cent of interviewees had heard about the iodization of edible salt, and generally, high proportions of respondents in all regions had heard about it.

Figure 8. Knowledge of respondents on salt iodization and iodine deficiency



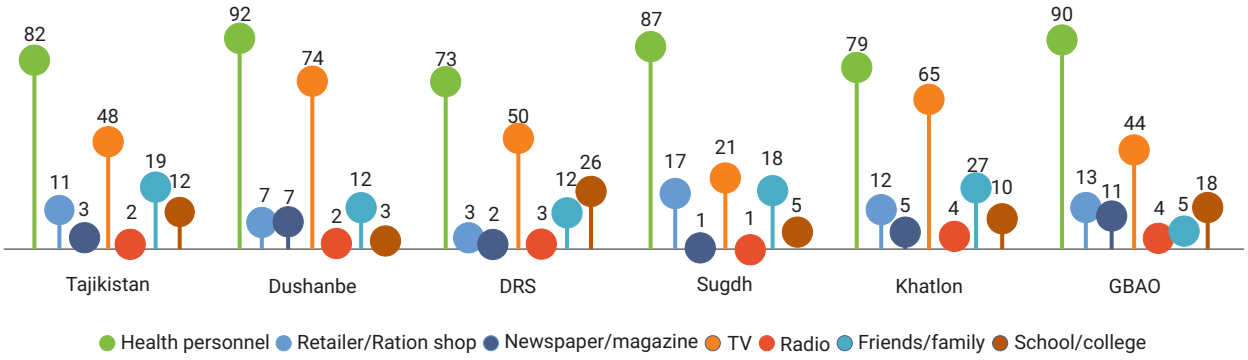
A high proportion of respondents (86 per cent) knew that one of the benefits of using iodized salt was to prevent goiter (Figure 9). However, other key benefits, such as for brain development (10.5 per cent) and positive pregnancy outcomes (13 per cent), were not known by most of the respondents.

Figure 9. Knowledge on benefits of using iodized salt



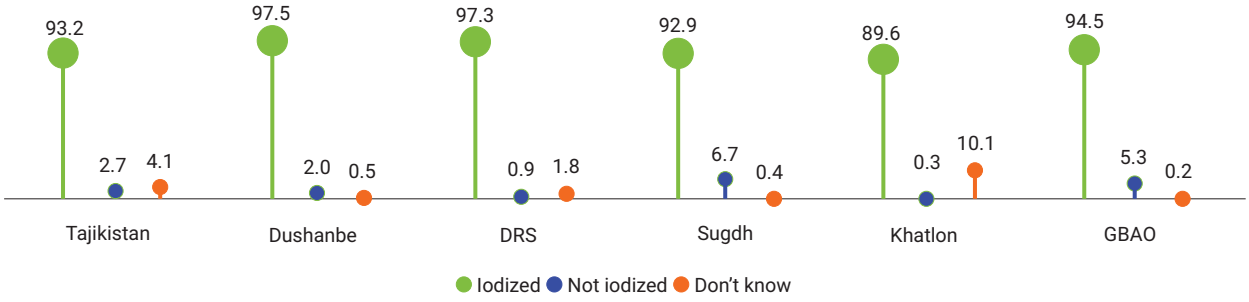
When asked about the source of awareness about iodized salt, respondents identified health personnel as the top source of information across all regions, followed by TV (Figure 10). About a fifth of respondents also identified friends and families as a source of information about iodized salt, but other sources did not come out to be critical.

Figure 10. Source of awareness about iodized salt



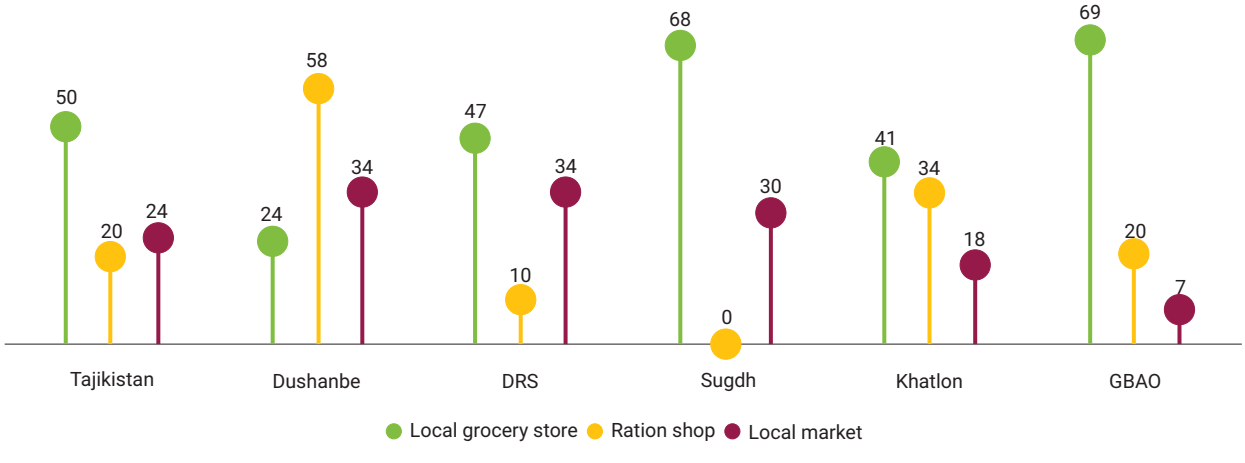
The interviewees were also asked whether their households use iodized salt (based on their perception) (Figure 11). Most of the respondents (93.2 per cent) said they used iodized salt, while 2.7 per cent said they used non-iodized salt and 4.1 per cent did not know. Their perceived use of iodized salt, in comparison to very low household coverage of iodized salt (adequately and inadequately iodized salt at 36.6 per cent), may be influenced by the falsified labeling and/logo on the package indicating adequate iodization of salt.

Figure 11. Type of salt used for cooking reported by households



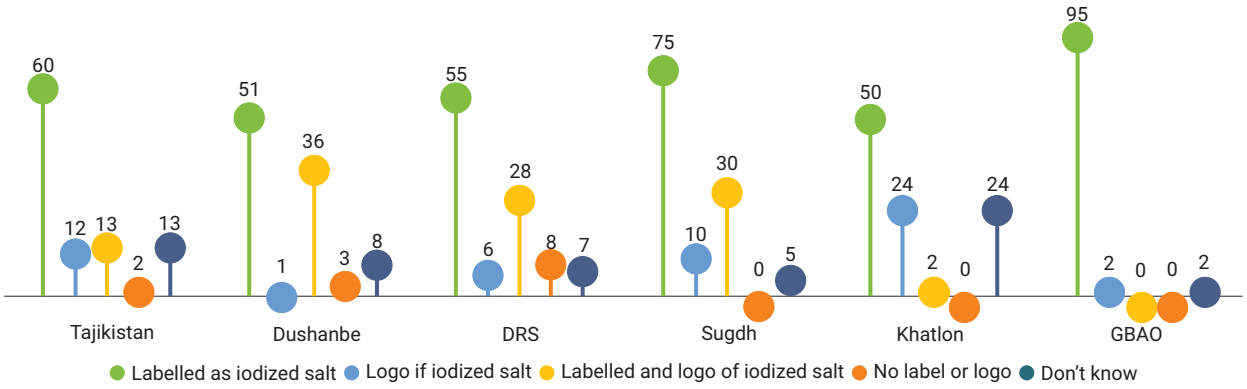
Local grocery stores dominate the source of salt purchase while Dushanbe has higher percentage of ration shops (Figure 12).

Figure 12. Place of purchase of salt



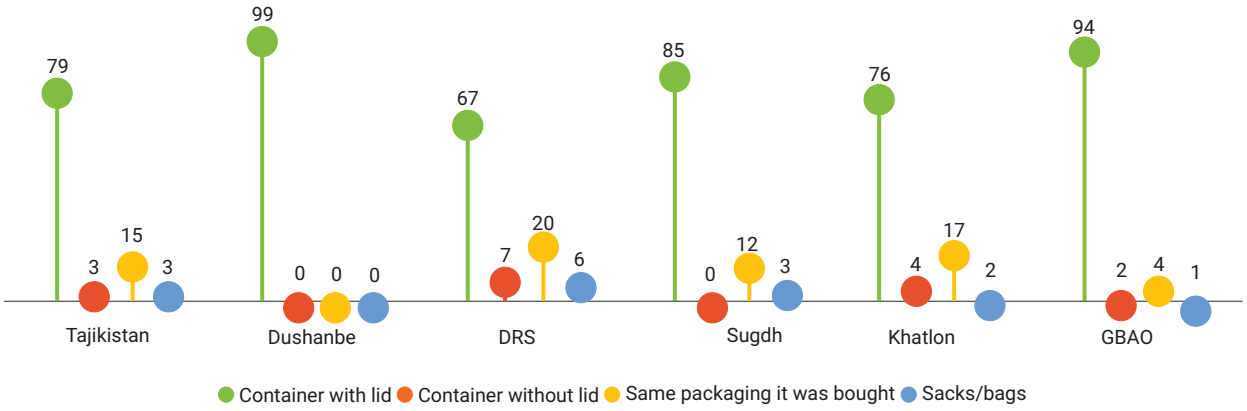
60 per cent of the salt used is labeled as iodized salt in the country while another 12 per cent had a logo indicating iodized salt (Figure 13). The highest proportion (36 per cent) of salt in Dushanbe had both a label and a logo on the package. None of the regions had iodized salt as high as the labels on the package suggest (e.g. 95 per cent of household salt package in GBAO indicate iodized salt, but only 36.5 per cent of it is either adequately or inadequately iodized).

Figure 13. Package labelling of household salt



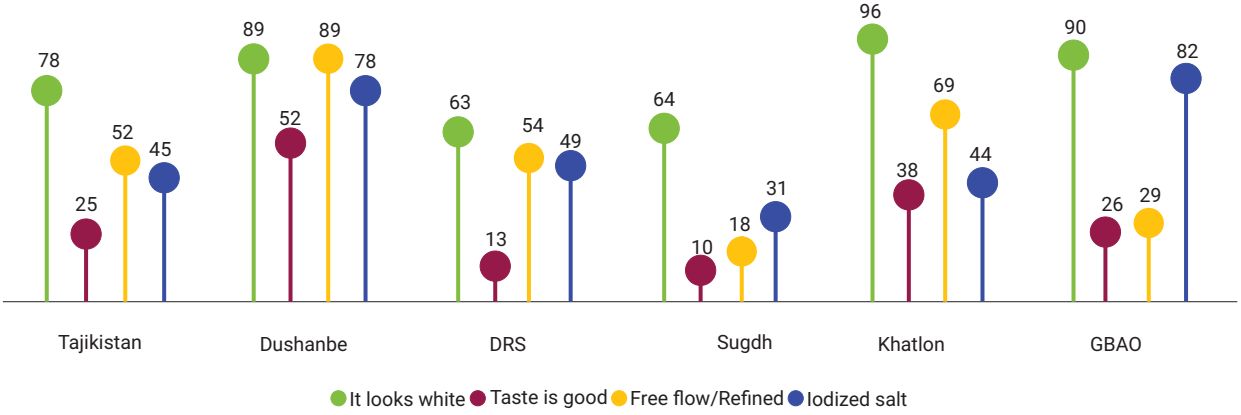
The majority of the households store their salt in a container with a lid (79 per cent) (Figure 14). More than one in ten (15 per cent) households store salt in the same packaging it was bought, but other places for salt storage were not common.

Figure 14. Place of storing salt



For majority of the respondents, looking white is the characteristic of good quality cooking salt (78 per cent) followed by freely flowing nature (52 per cent). 82 per cent and 78 per cent of respondents in GBAO and Dushanbe, respectively, recognized the presence of iodine as an indicator of good quality salt, whereas less than half of respondents in other regions mentioned iodized salt as a characteristic of good quality salt (Figure 15).

Figure 15. Characteristics of good quality cooking salt according to respondents



4. Recommendations

The nationally representative, cross-sectional iodine status survey showed that the household use of iodized salt is low, in particular that of adequately iodized salt, despite the law on mandatory salt iodization in Tajikistan. Median urinary iodine concentration in women of reproductive age indicated an adequate iodine intake in this population group, whereas median urinary iodine concentration in children aged 6-59 months showed an insufficient iodine intake. Recommendations to improve the universal salt iodization programme in Tajikistan, presented below, are categorized into five broad factors that have been identified as crucial to the sustained success of universal salt iodization programmes based on a review of global efforts towards universal salt iodization (i.e. five guiding principles).

1.Political commitment and the enabling environment

Tajikistan enacted a salt iodization law in 2002 and later a food fortification law with expanded scope in 2019, which made the iodization of edible salt mandatory for human consumption, including for industrially processed foods. The Government of Tajikistan also approved the National Programme on the Prevention of Micronutrient Deficiencies and related Diseases in 2022, in which action plans through large-scale food fortification, including universal salt iodization and wheat flour fortification, are proposed to address various micronutrient deficiencies. However, the country is losing momentum for universal salt iodization, with limited resource allocation for the universal salt iodization programme from the state budget for proper law enforcement. Proper enforcement of mandatory salt iodization creates a safe and fair environment for fortification for industry, provides an even playing field for all producers and allows for the transfer of the additional costs incurred by fortification to be passed onto consumers across the national food supply chain. Continuous advocacy to secure high political commitment for universal salt iodization along with adequate resource allocation is required for law enforcement. Salt iodization norms developed in 2008 need to be renewed after the food fortification law became effective in 2019. Currently, salt iodization norms are not easily understood and do not specify the level of iodine needed at production level, which allows flexible interpretations of the requirements by the salt producers. Ministry of Health and Social Protection of Population experts are currently revising the salt iodization norms in Tajikistan, including iodization levels at production and household level. This effort should be supported by accelerated review and approval, and the subsequent dissemination and education of salt producers and inspection agencies.

2.Partnerships and coalitions

There are three national bodies that claim to conduct qualitative and quantitative tests of salt quality (Tojikstandard Agency, SSECS, SUE Khorokuvori). At the subnational level, SSECS is responsible for working closely with salt producers to ensure quality iodization. These national and subnational bodies play key roles in the universal salt iodization programme and should be supported with adequate financial and human resources in order to ensure better coordination and technical capacity. Each body should have clear roles and responsibilities and avoids duplication of work, such as salt quality testing, so that subnational SES can strengthen its role. While financial commitment from the government is essential, additional support from donors and development partners is still needed if any tangible result is to be achieved. Since the beginning of the universal salt iodization programme in Tajikistan, donors and partners have dropped salt iodization as a priority in recent years, resulting in lost momentum and underfunding. Also critical is better coordination and collaboration between all stakeholders, including such key ministries as the Ministry of Health and Social Protection and the Ministry of Industries and New Technologies. The Food Safety Coordination Council under the Government, which has the obligation to maintain systematic monitoring of quality and safety assurance of food products through coordination and promoting accountability, should play a more active role in coordinating and holding stakeholders accountable to ensure the population has access to quality iodized salt. The Coordination Council for the National Programme on the Prevention of Micronutrient Deficiencies and related Diseases exists, but stronger leadership and active engagement through the Council with salt stakeholders will be useful to ensure successful implementation of the national programme. Multi-sectoral stakeholder meetings should also be held at subnational level to regularly review progress, identify bottlenecks and suggest a way forward in terms of the implementation of universal salt iodization and the national programme more broadly. While the active stakeholders in the universal salt iodization programme are currently limited in number, the country may consider expanding their partnership such as with the civil society and non-governmental organizations to provide additional push-factor for quality iodized salt.

3. Availability of adequately iodized salt

Ensuring availability and access to adequately iodized salt for everyone – and in particular, vulnerable population groups – remains a challenge in Tajikistan, as shown in the current survey. All salt producers, including small- and medium-scale producers, need to be educated on the adequate amount of potassium iodate to be added at the production level and their technical capacity enhanced to conduct quality iodization. Access to the required amount of potassium iodate has also become increasingly difficult for small- and medium-scale salt producers due to price increases and supply disruptions following significant global events in recent years. Although the price of potassium iodate is about US$50/kg (according to the UNICEF Supply Catalogue), salt producers in Tajikistan are citing almost double this cost considering the relatively small amount of potassium iodate they need (i.e. they are unable to achieve economy of scale), taxes, customs duty, transport costs and other payments they make at various points in the supply chain. While the procurement of the fortificant is the sole responsibility of the salt producers, the government may provide support through the removal of import taxes and fees on potassium iodate and other fortification inputs (e.g. equipment) to keep the costs of fortification as low as possible and to facilitate the transfer of fortification costs to consumers.

4. Strengthening the monitoring system and surveillance

Considering the results of the survey, monitoring of salt iodization at all levels needs to be strengthened and systematized at frequency appropriate to ensure public health. Small- and medium-scale producers need to be trained to strengthen their internal monitoring for quality control with necessary follow-ups. External monitoring and inspection activities should not only test the iodization level in salt with a quantitative method but also include audits of production and iodization records and facilities. Although verification of the level of iodine in salt collected at the time of a single visit is important, it is more effective to verify that the production facility has adequate supplies, equipment and systems to consistently produce adequately iodized salt. At the national level, the monitoring and review of key indicators of the national programme should be conducted to facilitate stronger government oversight and coordination of the programme. Key monitoring indicators may include external regulatory monitoring data on compliance and production practices at salt production sites and quantitative analysis of iodine content of household salt and iodine status among key population groups with appropriate stratification. These indicators should be regularly and jointly reviewed by stakeholders through the national programme Coordination Council so that timely adjustments and a way forward can be proposed for the programme. Although national-level surveys are resource-intensive, surveillance on the iodine status needs to be strengthened, such as through targeting a population group that is logistically easier and less costly to reach (e.g. school-age children) or through targeting regions that are more severely affected.

5. Continuous education and communication

The importance of universal salt iodization needs to be continuously communicated and advocated among all stakeholders, including relevant ministries, inspection agencies, salt industries and consumers. Emphasis on the impact on brain development, school performance, and economic productivity in particular can command the attention of families, politicians and policy makers. Once the revised salt iodization norms have been approved, salt producers and inspection staff need to be educated on the right level of iodization at the production level to ensure compliance. Continued awareness raising and demand creation among consumers is also important to sustain appropriate practices on salt purchase, storage and consumption.

5. Annexes

Annex 1:
Detailed results – Household characteristics

Table 1a: Type of dwelling of households (%)

	Number	Communal flat	House	Other
Dushanbe	493	64.7	35.3	0.0
DRS	465	15.1	84.9	0.0
Sughd	467	2.4	97.6	0.0
GBAO	465	5.4	94.6	0.0
Khatlon	468	2.7	97.0	0.4
National (weighted)	**2,358**	**13.5**	**86.4**	**0.1**
Rural	1522	2.0	98.0	0.0
Urban	836	43.4	56.0	0.6

Table 2a: Persons per household (%)

	Number	Less than 2 persons per household	3 to 4 persons per household	5 to 6 persons per household	More than 7 persons per household
Dushanbe	493	1.0	14.6	48.5	35.9
DRS	465	0.0	8.6	39.9	51.5
Sughd	467	0,00	12.0	39.8	48.2
GBAO	465	0.8	16.2	45.9	37.1
Khatlon	468	0.0	10.1	34.0	55.9
National (weighted)	**2,358**	**0.1**	**10.9**	**38.7**	**50.3**
Rural	1522	0.0	9.9	36.5	53.6
Urban	836	0.5	14.2	46.2	39.1

Table 3a: Ethnic background of households (%)

	Number	Tajik	Uzbek	Russian	Kyrgyz	Afghan	Other
Dushanbe	493	97.8	2.0	0.2	0.0	0.0	0.0
DRS	465	83.0	10.9	0.2	4.4	1.2	0.3
Sughd	467	66.3	33.7	0.0	0.0	0.0	0.0
GBAO	465	89.9	0.0	0.2	9.9	0.0	0.0
Khatlon	468	80.3	19.6	0.1	0.0	0.0	0.0
National (weighted)	**2,358**	**78.7**	**19.6**	**0.1**	**1.3**	**0.3**	**0.1**
Rural	1522	74.4	23.5	0.1	1.6	0.4	0.0
Urban	836	93.5	6.0	0.2	0.0	0.0	0.3

Table 4a: Main source of drinking water for household members by region (%)

	Number	Piped-in dwelling	Public tap	Tube well or borehole	Protected dug well or protected spring	Unprotected dug well or spring, rainwater	Pond, river or stream	Tanker/truck	Bottled water	Vodochaska
Dushanbe	493	86.2	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DRS	465	68.1	15.0	2.2	3.6	0.4	5.8	5.0	0.0	0.0
Sughd	467	22.8	47.4	7.3	10.0	0.0	9.0	3.3	0.2	0.0
GBAO	465	35.6	40.4	10.1	1.1	0.2	12.6	0.0	0.0	0.0
Khatlon	468	20.1	27.8	1.5	4.1	2.2	25.2	4.1	0.0	15.0
National (weighted)	**2,358**	**38.5**	**29.5**	**3.4**	**5.2**	**0.9**	**13.4**	**3.6**	**0.1**	**5.4**

Rural	1522	28.0	33.1	3.7	6.7	1.1	16.0	4.6	0.1	6.75
Urban	836	75.1	17.2	2.5	0.2	0.0	4.1	0.0	0.0	1.0

Table 5a: Regularity of water availability among those households with piped water access by region (%)

	Number	Constant	Once a day	Every two or more days	Depends on season	Stops daily at certain hours
Dushanbe	425	70.8	4.2	2.6	17.6	4.9
DRS	312	81.4	1.1	5.0	12.3	0.3
Sughd	120	11.3	5.1	1.4	66.5	15.7
GBAO	177	61.8	0.0	0.0	38.2	0.0
Khatlon	118	75.1	13.6	1.2	1.2	8.9
National (weighted)	**1,152**	**70.8**	**4.2**	**2.6**	**17.6**	**4.9**
Rural	484	66.3	5.6	4.0	19.5	4.6
Urban	668	76.6	2.4	0.7	15.1	5.3

TABLE 6a: Clearness (non-turbidity) of water used by households by strata (%)

	Number of answers	Yes	No	Sometimes
Dushanbe	493	94,3	0,6	5,1
DRS	465	96,4	3,6	0,0
Sughd	467	98,2	1,3	0,5
GBAO	465	87,7	11,8	0,4
Khatlon	468	77,0	9,5	13,5
National (weighted)	**2,358**	89,5	5,0	5,5
Rural	1522	88,0	6,0	5,9
Urban	836	94,8	1,4	3,8

Table 7a: *Type of toilet facility used by household members by strata (%)*

	Number of answers	Flush to sewage system	Flush to septic tank	Pour flush latrine	Covered by dry latrine (luftcloset)	Uncovered latrine	No facilitiesat all
Dushanbe	493	76.9	0.0	0.2	22.9	0.0	0.0
DRS	465	5.6	0.4	14.4	78.4	1.2	0.0
Sughd	467	5.6	0.0	0.2	60.2	33.9	0.0
GBAO	465	3.6	0.7	11.8	83.2	0.7	0.0
Khatlon	468	3.4	0.0	1.3	94.5	0.7	0.0
National (weighted)	**2,358**	**11.4**	**0.1**	**4.2**	**73.9**	**10.4**	**0.0**
Rural	1522	3.6	0.1	1.3	83.1	11.8	0.0
Urban	836	38.3	0.1	14.1	42.0	5.5	0.0

Table 8a: Use of soap today or yesterday by interviewee by region (%)

	Number of answers	Yes	No
Dushanbe	493	99.0	1.0
DRS	465	97.8	2.2
Sughd	467	96.3	3.7
GBAO	465	99.4	0.6
Khatlon	468	99.4	0.6
National (weighted)	**2,358**	**98.1**	**1.9**
Rural	1522	98.1	1.9
Urban	836	98.1	1.9

Annex 2:
List of clusters included in the survey

Region / Oblast	District / rayon	Jamoat	Village or Street	Type	Populationin cluster
DRD					
DRS	Varzob	Ayni	Kharrangoni Bolo	rural	1,592
DRS	Gissar	Gissar	Gissar	urban	24,400
DRS	Gissar	Almosi	Sugdiyon (Chagatoy)	rural	1,090
DRS	Gissar	Mirzo Rizo	Hochildiyor	rural	2,459
DRS	Gissar	Mirzo Tursunzoda (Karamkul)	Avzikent	rural	3,193
DRS	Gissar	Navabad	Davlatmanka	rural	1,298
DRS	Gissar	Somon (Khonakokh)	Gayratabad	rural	3,105
DRS	Rudaki	Gulistan	Sabzikor	rural	2,284
DRS	Rudaki	Chimteppa (Okkurgon)	Obchakoron (Pakhtakor)	rural	4,501
DRS	Rudaki	Chorgulteppa (Kuktosh)	Zarnisor (Iangiabad)	rural	3,283
DRS	Rudaki	Chorgulteppa (Kuktosh)	Pakhtakor (Kyzyl Pakhtakor)	rural	2,884
DRS	Tursubzoda	Tursubzoda	Tursunzoda	urban	46,700
DRS	Tursubzoda	Tursuna Tuychieva (1 May)	Buston (Kungurot)	rural	214
DRS	Tursubzoda	Karatog	Karatog	rural	4,953
DRS	Tursubzoda	Navabad	Shulum	rural	944
DRS	Shahrinav	Shahrinav	Oktiabrskiy	urban	5,900
DRS	Vahdat	Vahdat	Vahdat	urban	40,600
DRS	Vahdat	Bahor	Gulistan	rural	1,377
DRS	Vahdat	Bahor	Shakhraki shifo (Shifo)	rural	967
DRS	Vahdat	Gulistan (Karasu)	Kishovarz (Itok)	rural	2,169
DRS	Vahdat	Gulistan (Karasu)	Tilloi Safed (Teshiktosh)	rural	3,081
DRS	Vahdat	Abdullo Abdulvosieva	Chillamazor	rural	3,272
DRS	Vahdat	Karima Ismoilova	Muminabadi Poyon	rural	1,064
DRS	Vahdat	Simigandzh	Diiamon	rural	798
DRS	Vahdat	Chuiangaron	Dzhavoni (Dahanai Chorbog)	rural	1,761
DRS	Fayzabad	Fayzabad	Fayzabad	urban	8,700
DRS	Fayzabad	Vishgard	Lolagi	rural	2,429
DRS	Fayzabad	Miskinabad	Saroy	rural	2,237
DRS	Nurabad	Izagullo Halimova (Yahakiust)	Kumbak	rural	385
DRS	Nurabad	Mudzhiharf	Mekhnat	rural	480
DRS	Rasht	Nusratullo Makhsum (Kaznok)	Kaznok	rural	2,181
DRS	Rasht	Dzhafr	Nimich	rural	1,560
DRS	Rasht	Kalaisurkh	Chorchurog	rural	331
DRS	Rasht	Rakhimzade	Podgey (Podgey poyon)	rural	1,288
DRS	Jirgital	Alga	Achik Alma	rural	736
DRS	Jirgital	Iangishakhr	Iangishakhr	rural	1,550

Khatlon					
Khatlon	Bokhtar	Kurgan-Tube	Kurgan Tube	urban	75,500
Khatlon	Bokhtar	Oriyon (Avangard)	Komintern	rural	3,943
Khatlon	Bokhtar	Navbahor	Navdidor (Navobod)	rural	1,052
Khatlon	Vakhsh	Tajhikabad	Havaskor	rural	1,640
Khatlon	Vakhsh	Kirov	Chorgulteppa	rural	531
Khatlon	A.Jomi	Dusti (Oktiabr)	Galaba	rural	3,144
Khatlon	A.Jomi	Iakkatut	Krasnaia Zvezda	rural	2,879
Khatlon	Yavan	Norin	1 Maia	rural	4,554
Khatlon	Yavan	Obimuki	Obimuki	rural	4,356
Khatlon	Yavan	Obimuki	Parchasoy	rural	5,025
Khatlon	J.Rumi	Uzun	Telman (Gandzhina)	rural	1,091
Khatlon	Qumsangir	Qumsangir	Dusti	urban	14,500
Khatlon	Qumsangir	Piandzh	Pioner	rural	4,724
Khatlon	Panj	Mekhvar (Kuldiman)	Burhiyon (Iukoritemez)	rural	1,360
Khatlon	Panj	Nuri Vakhdat (Tugul)	Gulabad	rural	2,048
Khatlon	Panj	Ozodagon (Sarmantoy)	Turdishaykh	rural	1,548
Khatlon	Shahrituz	Shahrituz	Shahrituz	urban	14,700
Khatlon	Shahrituz	Saiyod	Saiyod	rural	3,764
Khatlon	Shahrituz	Pakhtaabad	Sultonabad	rural	4,405
Khatlon	Jillikul	Garavuti	Shakhrinav	rural	4,551
Khatlon	Kubodien	imeni Nosira Hisrava	Hishtkupruk	rural	3,201
Khatlon	Kulob	Kulob	Kulob	urban	95,000
Khatlon	Kulob	Dahana	Oltovul	rural	2,595
Khatlon	Kulob	Zarbdor	I.Ibrohimova	rural	1,223
Khatlon	Kulob	Zarbdor	Sariosiyo	rural	2,018
Khatlon	Voce	Voce	Vose	urban	20,600
Khatlon	Voce	Gulistan	Kurbonshahid	rural	8,647
Khatlon	Voce	Mirali Makhmadalieva (Aral)	Hulbek	rural	4,746
Khatlon	Shuronod	Shuroobod	Shuroobod*	rural	1,136
Khatlon	Muminobod	Balhobi	Bogihabib	rural	1,661
Khatlon	Farkhor	Farkhor	Farkhor	urban	21,500
Khatlon	Farkhor	Watan	Sebisurkh	rural	1,531
Khatlon	Norak	Dukoni	Chashma	rural	1,026
Khatlon	Temurmalik	Karakamish	Dahaninamak	rural	1,277
Khatlon	Temurmalik	Karakamish	Karakamish	rural	1,502
Khatlon	Temurmalik	Kushkiya	Mooreodbakhsh	rural	530

Sughd					
Sughd	B.Gafurov	Khujand	Khujand PSU#1	urban	40,700
Sughd	B.Gafurov	Khujand	Khujand PSU#2	urban	40,700
Sughd	B.Gafurov	Khujand	Khujand PSU#3	urban	40,700
Sughd	B.Gafurov	Khujand	Khujand PSU#4	urban	40,700
Sughd	B.Gafurov	B.Gafurov	Gafurov	urban	16,900
Sughd	B.Gafurov	Dadoboi Holmatov (Pakhtakor)	Kuybyshev	rural	4,294
Sughd	B.Gafurov	Zarzamin (Katagan)	Katagan	rural	10,647
Sughd	B.Gafurov	Ismoil	Kurgoncha	rural	1,297
Sughd	B.Gafurov	Ismoil	Chordara	rural	1,682
Sughd	B.Gafurov	Isfisor	Isfisor	rural	30,893
Sughd	B.Gafurov	Undji	Okarik	rural	7,095
Sughd	B.Gafurov	Undji	Undzhi	rural	16,178
Sughd	B.Gafurov	Histevarz (Kistakuz)	Kistakuz	rural	51,779
Sughd	Maschoh	Paldorak	Paldorak	rural	16,010
Sughd	Asht	Mekhrobod (Kamyshkurgon)	Bakhmal	rural	1,118
Sughd	Asht	Shaydon	Dahana	rural	2,383
Sughd	Asht	Shaydon	Mullomir	rural	2,055
Sughd	Gonchi	I.Somoni (Kalininabad)	Kalachai Hodzhi	rural	2,452
Sughd	Gonchi	Iakhtan	Iakhtan	rural	2,004
Sughd	Spitamen	Sarband (Kushtegirmon)	Kushtegirmon	rural	7,855
Sughd	J.Rasulov	Gulakandoz	Gulakandoz	rural	36,848
Sughd	Zafarobod	Ravshan	Guliston (Ai`ni)	rural	8,928
Sughd	Istaravshan	Istaravshan	PSU#1	urban	27,350
Sughd	Istaravshan	Istaravshan	PSU#2	urban	27,350
Sughd	Istaravshan	Gulisurkh	Tapkok	rural	3,035
Sughd	Istaravshan	Zarhalol (Kommunizm)	Dzharkurgon	rural	6,217
Sughd	Istaravshan	Poshkent	Iakkabog	rural	3,679
Sughd	Istaravshan	Sabriston (Frunze)	Rugund	rural	7,397
Sughd	Shahriston	Shakhristan	Firdavsi (Buragen)	rural	1,878
Sughd	Isfara	Isfara	Isfara	urban	42,900
Sughd	Konibodom	Konibodom	Konibodom	urban	46,500
Sughd	Konibodom	Puloton	Sarikuy	rural	10,855
Sughd	Panjakent	Loik Sherali (Kolhozchiyon)	Mazor	rural	1,300
Sughd	Panjakent	Mogiyon	Puligirdob	rural	2,097
Sughd	Panjakent	Sarahzm (Chimkurgon)	Abdusamad	rural	1,504
Sughd	Panjakent	Sudzhina	Sudzhina	rural	8,830

GBAO					
GBAO	Darvoz	Nulvand	Sangevn	rural	273
GBAO	Ishkashim	Askar Zamirov (Andarob)	Khaskhorugh	rural	185
GBAO	Ishkashim	Ptup	Zumudg	rural	819
GBAO	Ishkashim	Vrang	Vrang	rural	1,722
GBAO	Ishkashim	Vrang	Shirgin	rural	829
GBAO	Murghab	Alichur	Alichur	rural	1,223
GBAO	Murghab	Gojo Berdiev (Konakurghan)	Konakurghan	rural	723
GBAO	Murghab	Murghab	Mamazair	rural	445
GBAO	Murghab	Murghab	Murghab	rural	6,259
GBAO	Roshtqala	Barvoz	Zanudge	rural	204
GBAO	Roshtqala	Kurbonsho Gadoliev (Tavdem)	Bodomi-bolo	rural	278
GBAO	Roshtqala	Kurbonshoh Gadoliev (Tavdem)	Kayonen	rural	296
GBAO	Roshtqala	Tusen	Devlokh	rural	174
GBAO	Roshtqala	Sejd	Shoshdararuya	rural	161
GBAO	Rushon	Basid	Basid	rural	609
GBAO	Rushon	Muminshokh Abdulvosiev(Shidz)	Shidz	rural	784
GBAO	Rushan	Muminshoh Abdulvosiev(Shidz)	Dikh	rural	400
GBAO	Rushan	Nazarsho Dodkhudoev (Bakhrushan)	Barzud	rural	1,192
GBAO	Rushan	Nazarsho Dodkhudoev (Bakhrushan)	Bachrushan	rural	2,233
GBAO	Rushan	Nazarshoh Dodkhudoev (Bakhrushan)	Vamd	rural	722
GBAO	Rushan	Rushan	Rushan	rural	4,031
GBAO	Shugnan	Garibshoh Shakhbozov (Darmorakht)	Pish	rural	621
GBAO	Shugnan	Navabad	Mun	rural	1,268
GBAO	Shugnan	Navabad	Rivak	rural	656
GBAO	Shugnan	Navabad	Turbat	rural	483
GBAO	Shugnan	Porshnev	Churudge	rural	305
GBAO	Shugnon	Vankala	Imom	rural	323
GBAO	Khorog	Khorog	Khorog	urban	
GBAO	Khorog	Khorog	Khorog	urban	
GBAO	Khorog	Khorog	Khorog	urban	28,100
GBAO	Khorog	Khorog	Khorog	urban	
GBAO	Khorog	Khorog	Khorog	urban	
GBAO	Vanj	Mahmadullo Abdulloev(Vandge)	Gushkhun	rural	1,279
GBAO	Vanj	Mahmadullo Abdulloev(Vandge)	Panjshanbeabad	rural	391
GBAO	Vanj	Rovand	Vanvani-bolo	rural	322
GBAO	Vanj	Rovand	Starg	rural	287

Dushanbe					
Dushanbe	Somoni	Not applicable	PSU#1	urban	Dushanbe
Dushanbe	Somoni	Not applicable	PSU#2	urban	Dushanbe
Dushanbe	Somoni	Not applicable	PSU#3	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#10	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#11	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#12	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#13	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#14	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#7	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#8	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#9	urban	Dushanbe
Dushanbe	Shohmansur	Not applicable	PSU#4	urban	Dushanbe
Dushanbe	Shohmansur	Not applicable	PSU#5	urban	Dushanbe
Dushanbe	Shohmansur	Not applicable	PSU#6	urban	Dushanbe
Dushanbe	Shohmansur	Not applicable	PSU#15	urban	Dushanbe
Dushanbe	Shohmansur	Not applicable	PSU#16	urban	Dushanbe
Dushanbe	Somoni	Not applicable		urban	Dushanbe
Dushanbe	Somoni	Not applicable		urban	Dushanbe
Dushanbe	Somoni	Not applicable		urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#20	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#17	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#18	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#19	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#24	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#25	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#26	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#27	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#28	urban	Dushanbe
Dushanbe	Sino	Not applicable	PSU#29	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#30	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#31	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#32	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#33	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#34	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#35	urban	Dushanbe
Dushanbe	Firdavsi	Not applicable	PSU#36	urban	Dushanbe

Annex 3: Questionnaire

1. HOUSEHOLD IDENTIFICATION NUMBER				OBLAST	CLUSTER		HOUSEHOLD
				|__|	|__|__|__|		|__|__|__|
1.1.	Type of dwelling SINGLE ANSWER	1		Communal flat			
		2		House			
		88		Other → specify: | | | | | | | || | |			
1.2.	How many people live in this household? OPEN						
1.3.	Ethnic group SINGLE ANSWER	1		Tajik			
		2		Uzbek			
		3		Russian			
		4		Kyrgyz			
		88		Other → specify: | | | | | | | | | |			
1.4.	Gender of the household head? SINGLE ANSWER	1		male			
		2		female			
1.5.	What is the household head's highestlevel of education? SINGLE ANSWER	1		none			
		2		primary (Grades 1-9)			
		3		secondary (Grades 10-11)			
		4		vocational/technical education			
		5		higher education (e.g.university)			
		99		don't know			
1.6.	What is your household's main sourceof cash income? SINGLE ANSWER	1		private business			
		2		salary			
		3		pension/social assistance			
		4		farming/livestock			
		5		remittances			
		7		no cash income			
		88		other			
		99		don't know			
1.7.	Do you grow food or animals for your own consumption? SINGLE ANSWER IF CODE 2 GO TO 1.10	1		Yes			
		2		no			
1.8.	What do you grow for your own consumption? MULTIPLE ANSWER	1.8.1		Wheat, rice			
		1.8.2		Beans, peas, lentils, nuts			
		1.8.3		Potatoes or other routs or tubers			
		1.8.4		Yellow or orange coloured vegetables (pumpkins, carrots) or fruits (yellow plums or apricots)			
		1.8.5		Green leafy vegetables			
		1.8.6		Other vegetables and fruits			
		99		I do not			
1.9.	Do you keep animals for meat and milk production for your	1.9.1		Cows			
		1.9.2		Sheep			

	ownconsumption? MULTIPLE ANSWER CHECK: The answer "I do not grow" cannot be checked in both 1.8 and 1.9, because in 1.7 it is marked "Growing"	1.9.3		Goats
		1.9.4		Chickens / poultry
		1.9.5		Horses
		99		I do not
1.11.	What is the main source of drinkingwater for members of your household? SINGLE ANSWER IF 1 GO TO 1.13	1		Piped into dwelling
		2		Public tap
		3		Tube well or borehole
		4		Protected dug well or protected spring
		5		Unprotected dug well or spring, rainwater
		6		Pond, river or stream
		7		Tanker/truck
		8		Bottled water
		88		Other → PLS SPECIFY: | | |
1.12.	How many minutes does it take you to go to the source of water and to bring water back?		OPEN	
1.13.	If there is a pipe, how often do youhave water? SINGLE ANSWER	1		constantly
		2		once a day
		3		every two or more days
		4		depends on the season
		5		stops daily at certain hours
		99		don't know
1.13a	ASK IF 1.13 = 5 You said that your water supply stops every day at certain times. Indicate from what to what hour you do not have water:			Stops from ____ hour Until ____ hours
1.14.	Is the water you use in your household clear / not turbid? SINGLE ANSWER	1		yes
		2		no
		3		sometimes
1.15.	Before drinking, do you boil the water? SINGLE ANSWER	1		yes
		2		no
		3		sometimes
1.16.	What kind of toilet facility do members of your household usuallyuse? **IF MORE THAN ONE, REFER TO THE ONE MOST RECENTLY BUILT** SINGLE ANSWER	1		Flush to sewage system
		2		Flush to septic tank
		3		Pour flush latrine
		4		Covered dry latrine
		5		Uncovered latrine
		6		No facilities at all
1.17.	Did you use soap today or yesterday? SINGLE ANSWER	1		yes
		2		no

	IF CODE 2 GO TO QUESTION 2.1			
1.18.	What did you use soap for today oryesterday? MULTIPLE ANSWER	1.18.1		Washing clothes
		1.18.2		Washing my body
		1.18.3		Washing my children
		1.18.4		Washing my children's hands
		1.18.5		Washing hands after defecating
		1.18.6		Washing hands before feeding the child
		1.18.7		Washing hands before preparing food
		1.18.8		Washing hands before eating
		1.18.9		Other → SPECIFY: FILL IN

2.	**FOOD SECURITY COPING STRATEGIES**		
2.1.	Since the beginning of 2021 / last winter how often have you had problems satisfying the food needs of the household members? SINGLE ANSWER	1	never
		2	Sometimes (1-2 times/months)
		3	often (more than 2 times/months)
2.2.	Since the beginning of 2021 / last winter have you had to deal orcope with the following problems? MULTIPLE ANSWER	2.2.1.	Relied on less preferred and less expensive food
		2.2.2.	Borrowed food, or relied on help from friends or relatives
		2.2.3.	Purchased food on credit, incurring debts
		2.2.4.	Decreased your amount of food consumption
		2.2.5.	Restricted consumption by adults in order for small children to eat
		2.2.6.	Restricted consumption by women
		2.2.7.	Restricted consumption by children
		2.2.8.	Reduced number of meals eaten in a day
		2.2.9.	Spent entire days without eating
		2.2.10.	Consumed seed stocks held for the next season
		2.2.11.	Increased the production of food products for your own consumption
		2.2.12.	Decreased the buying some non-food products
		2.2.13.	Sold domestic items (radio, furniture, carpet)
		2.2.14.	Sold productive assets (farm implements, sewing machine, land, motorbike)
		2.2.15.	Sold more animals than usual
		2.2.16.	Decreased expenditure on healthcare and drugs
		2.2.17.	Withdrew from or postponed admission to school
		2.2.18.	Had children work outside of the home for additional income
		2.2.19.	Sought alternative employment
		2.2.20.	Increased the number of household members out of the village in search ofwork (migrants)
		2.2.21.	Spent savings
		2.2.22.	Prolonged migration, men do not return from seasonal migration

		2.2.24	Took bank credit	
		2.2.23.	Other:	
2.3.	Household composition	2.3.1.	How many non-pregnant, non-lactating women aged 15-49 years live in the household?	OPEN
		2.3.2.	How many children aged 6-59 months live in the household?	OPEN
		2.3.3.	How many children under six months of age live in the household?	OPEN
		2.3.4	How many children with disabilities under the age of five are in this household?	OPEN
2.4	Which of the following disorders do children under the age of five in this household have? MULTIPLE ANSWER, 99 AND 999 EXCLUSIVE	1.10.1	Blindness	
		1.10.2	Deafness	
		1.10.3	Movement disorders	
		1.10.4	Mental disorders	
		999	Other	
		99	Do not know	

FORM 2: TO BE ANSWERED BY CARER OF CHILD (AGED 6-59 MONTHS)

3.CHILD HEALTH FOR ALL CHILDEN AGED 6-59 MONTHS (START WITH THE YOUNGEST)RESPONDENT: CARETAKER				
	HOUSEHOLD IDENDIFICATION NUMBER	**OBLAST** |__|	**CLUSTER** |__|__|__|	**HOUSEHOLD** |__|__|__|
3.1.	ID CODE of the CHILD (AGED 6-59 MONTHS) FROM REGISTRATION FORM			|__|__|
3.2.	Date of birth of child			DD/MM/YY
3.3.	Does your child have a birth certificate? SINGLE ANSWER	1	yes	
		2	no	
3.4.	What was your child's birth weight? **Enter child's birth weight inLg**	OPEN 99=don't know		
3.5.	Has the child had diarrhea (more than three loosestools per day) in the past 2 weeks? SINGLE ANSWER	1	yes	
		2	no	
		3	don't know	

3.6. In general, when your child has diarrhea does thechild drink any of the following items
SINGLE ANSWER IN A ROW

		Yes	No	Don't know
3.6.1.	Breast milk	1	2	99
3.6.2.	Soup	1	2	99
3.6.3.	Herbal tea (camomille, fennel, hibiscus)	1	2	99
3.6.4.	Tea (black or green)	1	2	99
3.6.5.	ORS packet solution	1	2	99
3.6.6.	Other milk or infant formula	1	2	99
3.6.7.	Water, with feeding during some parts of the day	1	2	99

	3.6.8.	Water alone	1	2	99
	3.6.9.	Soft drinks (with gas)	1	2	99
	3.6.10.	Sugary water or fruit juices	1	2	99
	3.6.11.	Antibiotics/anti-diarrheal drugs	1	2	99
	3.6.12.	other → PLS SPECIFY: FILL IN	1	2	99

3.7.	In general when your child has diarrhea does he/she drink much less, about the same, or morethan usual? SINGLE ANSWER	1	Much less or none
		2	About the same
		3	More
		99	Don't know
3.8.	Has your child been diagnosed with severewasting? SINGLE ANSWER IF CODE 2 OR 99 GOTO 3.11	1	yes
		2	no
		99	don't know
3.9.	Did your child receive or is your child receiving any medical treatment for severe wasting? SINGLE ANSWER IF CODE 2 OR 99 GOTO 3.11	1	yes
		2	no
		99	don't know
3.10.	Where did you receive medical treatment for severewasting? MULTIPLE ANSWER	1	Health house
		2	Rural health centre
		3	Polyclinic
		4	Rayon hospital
		5	Oblast hospital
		88	Other (specify): FILL IN
	Does your child have vision problems at night? (vision adaptation to darkness – night blindness) SINGLE ANSWER	1	yes
		2	no
		99	don't know
3.12.	Did your child have or have had a goiter? SINGLE ANSWER	1	yes
		2	no
		99	don't know
3.13.	Has your child received iron syrup or tablets at any time in the past three months? SINGLE ANSWER	1	yes
		2	no
		99	don't know
3.14.	Has your child received a Vitamin A capsule in thepast six months? SINGLE ANSWER	1	yes
		2	no
		99	don't know
3.15.	Has your child received Vitamin D in the past 6months? (can be liquid or tablets) SINGLE ANSWER	1	yes
		2	no
		99	don't know
3.16.	Has your child received de-worming tablets in thepast 6 months? SINGLE ANSWER	1	yes
		2	no
		99	don't know
3.17.	Has your child received any food other than breastmilk since this time	1	yes
		2	no

	yesterday? SINGLE ANSWER IF CODE 2 GO TO 3.20		
3.18.	How many times has the child received solid, semi-solid or soft foods since this time yesterday?	Enter number of times	

3.19. What has the child **eaten** or **drunk** since this timeyesterday

DO NOT READ THE ANSWERS, EXCEPT FORSPRINKLES. SHOW SPRINKLES

SINGLE ANSWER IN A ROW

			Yes	No	Don't know
3.19.1.	Foods made from grains:	Wheat, barley, buckwheat, oats, maize, rice, sorghum, wheat flour, rye flour, other flour, bread, rice pasta, biscuit	1	2	99
3.19.2.	White roots and tubers:	Potatoes, turnip (red, yellow, white), radish (red, green) or other roots or tubers	1	2	99
3.19.3.	Pulses:	Beans, peas, lentils	1	2	99
3.19.4.	Milk and milk products:	Milk or milk products	1	2	99
3.19.5.	Meat, poultry:	Meat, liver, kidney, chicken.	1	2	99
3.19.6.	Fish:	Fish (fresh, frozen, canned,smoked, dried), caviar	1	2	99
3.19.7.	Eggs:	Eggs	1	2	99
3.19.8.	Vitamin A rich vegetables roots, tubers and fruits:	Yellow or orange coloured vegetables (pumpkins, carrots,red sweet pepper (bulgori), squash) or fruits (yellow plums or apricots)	1	2	99
3.19.9.	Dark green leafy vegetables:	Spinach, checkri, rov, roshak, siyoalaf, bargi salat. Dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel [Consider as DGLV when at least one table spoon of these vegetable(s) consumed per day. Otherwise, go to **point 3.19.23 Spices, condiments**	1	2	99

		3.19.10.	Other vegetables:	Other vegetables: Cabbage, cauliflower, garlic, cucumber, leek, tomato, onion, eggplant, beetroot, mushrooms fresh and dried, anzur, green beans, green pepper	1	2	99	
		3.19.11.	Other fruits:	Other fruits (fresh and dried): Apple, banana, lemon, watermelon, mandarin, grapes, pears, melon, muskmelon, 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	1	2	99	
		3.19.12.	Nuts and seeds:	Sesame seeds, pistachios, almonds, pumpkin seeds, sunflower seeds, walnuts, peanuts, apricot seeds, hazelnuts, pecans	1	2	99	
		3.19.13.	Oils and fats:	Fats, oils, butter	1	2	99	
		3.19.14.		Clear broth	1	2	99	
		3.19.15.		Tea (black or green), coffee	1	2	99	
		3.19.16.		Plain water	1	2	99	
		3.19.17.		Fruit juices	1	2	99	
		3.19.18.		Sweet soda, sugary water	1	2	99	
		3.19.19.		Infant formula	1	2	99	
		3.19.20.		Vitamins, mineral supplements, and / or any medicine	1	2	99	
		3.19.21.		Sprinkles (show the sample)	1	2	99	
		3.19.22.	Sweets:	Sugar, honey, candies, chocolate, cakes,	1	2	99	

				biscuits, jam, halva, baklava, obinabot (Crystalised sugar), nishollo, shirim initut (Tajik Snicker, mulberry paste with sugar)			
		3.19.23.	Spices, condiments	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 less than one tablespoon is consumed a day. Otherwise, go to **point 3.19.9. Dark green leafy vegetables**	1	2	99
		3.19.24.	Other:		1	2	99

3.20.	What do you regularly use to feed your child? **DO NOT READ THE ANSWERS** MULTIPLE ANSWER	3.20.1.	Fork
		3.20.2.	Spoon
		3.20.3.	Cup
		3.20.4.	Bottle with nipple
		3.20.5.	Hand

COLLECT URINE samples

3.26.	Urine collected and placed in Tube SINGLE ANSWER	1	Yes
		2	no
		88	refused

FORM 3: TO BE ANSWERED BY WOMEN (15-49 YEARS)

5. WOMAN INTERVIEW (ONLY FOR WOMAN AGED 15 – 49 YEARS)				
	HOUSEHOLD IDENTIFICATION NUMBER	**OBLAST** |_|	**CLUSTER** |__|__|	**HOUSEHOLD** |_|__|
5.1.	ID CODE of the WOMAN FROM REGISTRATION FORM (15-49 years)			|_|__|
5.2.	Date of birth of woman			DD/MM/YY

5.3.	What is your highest level of education? SINGLE ANSWER	1	none
		2	primary (Grades 1-9)
		3	secondary (Grades 10-11)
		5	vocational/technical education
		6	higher education (e.g. university)
		99	don't know

5.4.	Did you ever have a goitre or iodine deficiencydisorders? SINGLE ANSWER	1	yes	
		2	no	
		99	don't know	
5.5.	Have you ever taken iron tablets in the past sixmonths? SINGLE ANSWER	1	yes	
		2	no	
		99	don't know	
5.6.	Have you taken any iodine supplements in the pastsix months? SINGLE ANSWER	1	yes	
		2	no	
		99	don't know	
5.7.	Have you taken any folic acid tablets in the past sixmonths?	1	yes	
		2	no	
		99	don't know	
5.8.	Have you eaten or drunk the following since this time yesterday? MULTIPLE ANSWER	5.8.1.	Foods made from grains:	Wheat, barley, buckwheat, oats, maize,rice, sorghum, wheat flour, rye flour, other flour, bread, rice pasta, biscuit
		5.8.2.	White roots and tubers:	Potatoes, turnip (red, yellow, white),radish (red, green) or other roots or tubers
		5.8.3.	Pulses:	Beans, peas, lentils
		5.8.4.	Milk and milk products:	Milk or milk products
		5.8.5.	Meat, poultry:	Meat, liver, kidney, chicken.
		5.8.6.	Fish:	Fish (fresh, frozen, canned, smoked, dried), caviar
		5.8.7.	Eggs:	Eggs
		5.8.8.	Vitamin A rich vegetables roots, tubers and fruits:	Yellow or orange coloured vegetables (pumpkins, carrots, red sweet pepper (bulgori), squash) or fruits (yellow plumsor apricots)
		5.8.9.	Dark green leafy vegetables:	Spinach, checkri, rov, roshak, siyoalaf, bargi salat. Dill, coriander, mint, parsley, blue basilica, green garlic, green onion, sorrel [Consider as DGLV when at least one tablespoon of these vegetable(s) consumed per day. Otherwise, go to 5.8.21. **point Spices, condiments**
		5.8.10.	Other vegetables:	Other vegetables: Cabbage, cauliflower,

				garlic, cucumber, leek, tomato, onion, eggplant, beetroot, mushrooms fresh and dried, anzur, green beans, green pepper
		5.8.11.	Other fruits:	Other fruits (fresh and dried): Apple, banana, lemon, watermelon, mandarin, grapes, pears, melon, muskmelon, berries, raisins, oranges, cherries, figs, plum, pomegranate, prune, quince, raspberries, strawberries, blackberries, mulberries, king mulberries, yellow cherry, plum (orange colour), sinjid, chelon, dulona, kiwi, pineapple, grapefruit, simorodina
		5.8.12.	Nuts and seeds:	Sesame seeds, pistachios, almonds, pumpkin seeds, sunflower seeds, walnuts, peanuts, apricot seeds, hazelnuts, pecans
		5.8.13.	Oils and fats:	Fats, oils, butter
		5.8.14.		Clear broth
		5.8.15.		Tea (black or green), coffee
		5.8.16.		Plain water
		5.8.17.		Fruit juices
		5.8.18.		Sweet soda, sugary water
		5.8.19.		Vitamins, mineral supplements, and / orany medicine
		5.8.20.	Sweets:	Sugar, honey, candies, chocolate, cakes, biscuits, jam, halva, baklava, obinabot (crystalized sugar), nishollo, shirim initut (Tajik Snicker, mulberry paste with sugar)
		5.8.21.	Spices, condiments	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 less than one tablespoon consumed a day. Otherwise, go to **point 5.8.9. Dark green leafy vegetables**
		5.8.22	Breakfast Cereals	
		5.8.23	Cheese	
		5.8.24	Tinned Vegetables	
		5.8.25	Bread	
		5.8.26	Savory Snacks such as crisps, sausage rolls, pies, pasties.	
		5.8.27	Microwave meals or ready to eat meals	
		5.8.28.	Other:	

8. Awareness and Practices related to IDD and Iodized Salt			
AP1:	Have you ever heard of iodine deficiency in human beings? SINGLE ANSWER ***IF 0, SKIP TO AP5***	*1*	Yes
		0	*No*
AP2:	Can you give benefits of having optimal iodine nutrition? *(Tick **All** that apply)* MULTIPLE ANSWER	*1*	*Prevents goitre*
		2	*Improves child intelligence/school performance*
		3	*Improves pregnancy outcomes /Reduces miscarriages and stillbirths*
		4	*Improves health in infants and children*
		5	*Improves health in adolescents and adults*
		6	*Improves child growth*
		7	*Improves brain development*
		8	*Prevents cretinism*
		77	*Other*
		88	*Don't know any*
AP3:	Do you know of any way to prevent iodine deficiency? SINGLE ANSWER ***IF 0, SKIP TO AP5***	*1*	Yes
		0	*No*

AP4:	Please state the <u>most effective</u> way to prevent iodine deficiency *If multiple ways are mentioned, probe to find the most effective one* *(enter **one** code only)* SINGLE ANSWER *IF 01, SKIP TO AP6*	1	*Use iodized salt*
		2	*Take iodine supplements*
		3	*Eat seafood/seaweed*
		77	*Other, specify: _____*
		88	*Don't know*
AP5:	Have you heard of iodized salt? ***IF 0, SKIP TO IS1***	*1*	Yes
		0	*No*
AP6:	From whom/Where did you hear about iodized salt? *(tick all that apply)* MULTIPLE ANSWER	*1*	*Health personnel (e.g. doctor, ANM, ASHA, AWW)*
		2	*Retailer/Ration shop*
		3	*Newspaper/magazine*
		4	*TV*
		5	*Radio*
		6	*Friends/family*
		7	*School/college*
		77	*Other*
		88	*Don't know*
AP7:	Do you use iodized salt [for cooking] in your household? SINGLE ANSWER ***IF 01 OR 88, SKIP TO IS1***	1	yes
		2	no
		99	don't know
AP8:	What is the <u>main</u> reason why you do not use iodized salt [for cooking]? *Select <u>one</u> option only. If more than one response is given please probe to find the most important reason* SINGLE ANSWER	*1*	*Not readily available*
		2	*More expensive than non-iodized*
		3	*I/household members don't like the taste/tasteless/salty*
		4	*I/household members do not want to use it*
		5	*Changes the colour and/or texture of food*
		6	*Not available in small quantities*
		7	*I/household members prefer coarse salt*
		77	*Others*
		88	*Don't know*

9. Use of Iodized Salt & Processed food consumed I am now going to ask about the salt currently being used in the household. At the end of this section I would like to collect a sample of household salt for analysis of iodine concentration			
IS1:	Is the salt <u>currently used for cooking</u> in your household in the packet in which you bought/obtained it? *Could be in a plastic bag or other packaging (e.g. other bag, tin, shaker)* *OBSERVE: Ask to see the packet in which salt obtained and record IS1a and* SINGLE ANSWER ***IF 3, SKIP TO IS8***	*1* *0* *3* *88*	*Yes* *No* *No salt in the house* *Don't know*
IS1a	What type of salt you are using currently for cooking in your house? SINGLE ANSWER	*1* *2* *3* *4* *88*	*Packaged Crystal* *Packaged Crushed/Powdered* *Loose Crystal* *Loose Crushed/Powdered* *Don't know*
IS3:	What is the brand of salt <u>currently used to cook meals</u> in your household? *If the brand does not correspond to one of the top brands here then choose "**Other brand**".* *If the salt is still in its original packaging (IS1), check the response given with the package. If the salt is in a container/jar, ask whether they recall the brand name from the time of purchase.* SINGLE ANSWER	*1* *2* *3* *4* *5* *6* *7* *8* *9* *10* *11* *12* *13* *14* *15* *10* *88*	*JSC Khoja Mumin* *LLC Sorbon A* *LLC Dilovar N* *LLC Emomtarifi* *LLC Sunatullo* *LLC Baqo (Shamsiddinov)* *Shuhrat LTD* *Aloqa* *Dushanbe* *Namakdon* *Ittifoq* *Yovon* *Namaki Asht* *«Снежинка» или другое производство России* *unbranded* *Other brand (Specify_____)* *Don't know*
IS4:	Is the salt <u>currently used to cook meals</u> in your household labelled as iodized salt (logo or labelled as iodized)? ***If the salt is still in its original packaging (IS1), check the response given with the package. If the salt is in a container/jar, ask whether they recall a label/logo from the time of purchase.*** SINGLE ANSWER	*01* *02* *03* *00* *88*	*Yes, label only* *Yes, logo only* *Yes, label and logo both* *No, no label or logo* *Don't know*
IS5:	When the salt <u>currently used to cook meals</u> in your household was obtained, did you look for or ask for iodized salt?	*01* *00* *03*	*Yes* *No* *Someone else purchased the salt*

	SINGLE ANSWER ***IF 00 OR 88, SKIP TO IS7.*** ***IF 03 OR 0, 4, SKIP TO IS8***	*04*	*Salt was collected locally at site of production*
		88	*Don't know*
IS6:	How did you know the salt was iodized? SINGLE ANSWER	*01*	*Labelled as "iodized"/ logo*
		02	*Salt was tested for iodine*
		03	*I heard this brand was iodized*
		77	*Other*
		88	*Can't give a reason*
IS7	At the time of purchase was there any information about iodine displayed alongside the salt in the store/market? *e.g. danglers, boards/other signs* SINGLE ANSWER	*1*	*Yes*
		0	*No*
		88	*Don't know*
IS8:	Approximately how often do you obtain salt for human consumption (cooking, table salt, and others)? SINGLE ANSWER ***IF 8, SKIP TO FF1***	*1*	*More than once a week*
		2	*Every week*
		3	*Two to three times a month*
		4	*Once a month*
		5	*Once in 2 to 3 months*
		6	*Once in 4 to 6 months*
		7	*Less than once in 6 months*
		8	*Don't use salt*
		88	*Don't know*
IS9:	On average, what quantity of salt do you buy for human consumption (cooking, table salt, and others)? SINGLE ANSWER	*1*	*Less than 100g*
		2	*100g to 200g*
		3	*200g to 400g*
		4	*500g*
		5	*1kg*
		6	*2 Kg*
		7	*3-5 Kg*
		8	*more than 5 Kg*
		77	*Other*
		88	*Don't know*
IS9a	Source from where you procure salt? SINGLE ANSWER	*1*	*Local Grocery Store*
		2	*General Store*
		3	*PDS/Ration Shop*
		4	*Vendor/Salesman*
		5	*Local market*
		77	*Others*
		88	*Don't know*
IS9b	Where do you store the salt? SINGLE ANSWER	1	Container with lid
		2	Container without lid
		3	In the same packaging it was bought
		4	In sack/bags
		77	Other (Specify_____)
IS9c	How do you perceive the quality of cooking salt used at your household?	1	*Good*
		2	*Average*

	SINGLE ANSWER	3	*Poor*
IS9d	In your perception what are the characteristics of good quality cooking salt? **Do not prompt** MULTIPLE RESPONSE	1	It looks white
		2	Look is attractive
		3	Taste is good
		4	Packaged/branded salt
		5	Loose/unbranded salt
		6	Powdered salt
		7	Granular/crystal salt
		8	Less moisture content
		9	Free flow/Refined
		10	Iodized salt
		77	Other (Specify_____)
IS9e	Amount you paid to buy 1 kg salt [Enumerator should probe here and arrive at the cost of 1 Kg of salt – calculate for 1 Kg salt]	*TJS*_____ *999 Don't Know*	
IS9f	Are you willing to pay more for 1 Kg of good quality iodized salt? SINGLE ANSWER ***IF 0 SKIP TO IS10***	*1*	*Yes*
		0	*No*
IS9g	How much you are willing to pay for 1 kg of good quality iodized salt? ***IF NO SALT IN THE HOUSE (IS1=3), END INTERVIEW***	*TJS.*_____	
IS10:	May I please have a sample of the salt used to prepare last meal? This will be tested for iodine content in a laboratory. *If no salt was used to prepare last meal, ask for a sample of the most commonly used salt in the household* SINGLE ANSWER ***IF 0 STATE THE REASON THEN, END INTERVIEW***	*1*	*Yes*
		0	*No*
IS15:	*Was a salt sample collected?*	*1*	*Sample collected*
		2	*Sample <u>not</u> collected*

Thank the interviewee and end the interview

Annex 4:
Participant information and informed consent

Informing participants and informed consent – Women

Survey Name: 2021 National Iodine Deficiency Survey in Tajikistan

Participating organizations: UNICEF Tajikistan, Ministry of Health and Social Protection of the Population of the Republic of Tajikistan (MZSZN RT) (including Tajik Research Institute of Preventive Medicine of the Ministry of Health of the Republic of Tajikistan), NielsenIQ Russia.

Identification number of this survey: No.__ [to be determined] (order from the MHSZN RT).

Why are we giving you this form?

We give you this form to provide you with information about this scientific research. Once you learn more about the study, you can decide whether you wish to participate in the survey or not.

Who can participate?

Children aged 6-59 months with their guardians and women of reproductive age (15-49 years), with the exception of pregnant and lactating women.

The purpose of this scientific research

Malnutrition or malnutrition among children and women remains a major problem for Tajikistan. With this survey, we aim to assess nutritional status and micronutrient content in children and women, identify risk factors for deficiency and identify possible strategies to improve the overall nutritional situation in Tajikistan. For this reason, we are conducting this survey.

We are going to assess the severity of iodine deficiency among children aged six to 59 months and women of childbearing age (18-49 years), with the exception of pregnant and lactating women in all five geographical regions of Tajikistan (Khatlon region, districts of republican subordination (RRP), Sughd region, Gorno-Badakhshan Autonomous Region (GBAO), and Dushanbe), such as iodine deficiency. We expect more than 4,000 individuals to participate in this survey.

If you choose to participate in this survey, the following procedure is followed:

1. We will ask you a number of questions about the situation in your household and food security, and your diet.
2. Next, we will take one sample of biomaterial (urine) from you to determine the amount of iodine excreted from the body.
3. As well as a sample of edible iodized salt, which you use at home in cooking....
   3.1 Where and how do you buy dietary iodized salt?
   3.2 Where and how do you store dietary iodized salt?
   3.3 During what cooking period do you use salt, during frying (zirbak-TJ translation), after boiling water or before you have already removed food from the heat?
   3.4 What diseases can occur due to a lack of iodine in the body?
   3.5 List them please...

Surveying and collecting samples takes about 30 minutes.

Possible risks and discomfort
The urine you provide in plastic cups poses no risk.

Advantages
Your participation in this survey can benefit the health of the population in Tajikistan. It improves the understanding of the severity of iodine deficiency on a national scale. UNICEF, together with the Ministry of Health and Social Protection of the Population of the Republic of Tajikistan, can start activities at the national level in order to reduce the burden of iodine deficiency.

Confidentiality, voluntary participation
Your participation in this survey is purely voluntary, and is gratuitous. Our survey was reviewed and approved by the Ministry of Health and Social Protection of the Population of the Republic of Tajikistan. If you agree to participate in this survey, the study group may proceed with the above procedure.
Your information and your personal data are undoubtedly confidential. The results are evaluated and presented only without specifying personal information. The data is encoded before analysis. Encoding means that your name will not appear anywhere, and that your personal data is replaced by an identification code, thereby eliminating the possibility of links in reports to your name. Only the research team has access to your data. In addition, experts from relevant authorities may have access to your data for testing and monitoring purposes. You can stop the survey and participation at any time and without giving reasons, or you can withdraw completely from the survey. Data and biological samples collected before you leave can be used for analysis. The collected data can also be used for further research.

If you do not participate in the survey, decide to stop the survey before its completion, decide not to take biological samples or withdraw completely from the examination, you, in any case, will not remain in a losing situation.

If you have questions or reasons for concern, talk to the research team visiting you today. If you have any questions about the examination after the group leaves, you can contact our country coordinator by phone + [(+992) 93-570-57-75] or your local health care leader/Primary Health Care (PHC) manager, GVC, CHZ, RS.
We would greatly appreciate your support and participation in our survey.

Survey Name: National Iodine Survey

- I was informed of the objectives of the survey.
- I read and understood the essence of the information provided.
- I know that my personal data remains confidential and is only used in coded form for scientific research purposes, and that any references in reports to my name are excluded.
- I participate in this survey voluntarily. I may withdraw my consent to participate at any time and without giving reasons.
- I understand that the data and biological samples collected from me prior to my departure can be used for analysis.

Names (in block letters)	
Place, date	Signature

In the case of minor participants (15-18 years old), obtain the consent of the guardian, in addition to the consent of the participant.

Names (in block letters)	
Place	Signature of an adult guardian (if the target person is aged 15-18 years)

Informing participants and informed consent – Children

Survey Name: National Iodine Survey in Tajikistan 2021

Participating organizations: UNICEF Tajikistan, Ministry of Health and Social Protection of the Population of the Republic of Tajikistan (MZSZN RT) (including tajik research institute of preventive medicine MZSZN RT), NielsenIQ Russia.

Identification number of this survey: No.__ [to be determined] (letter of authorization from the MoHSZN RT).

Why are we giving you this form?

We give you this form to provide you with information about this scientific research. After you learn more about the study, you can decide whether you, as a caregiver, would like the child toparticipate in the examination.

Who can participate?

Children aged 6-59 months with their guardians and women of reproductive age (15-49 years), with the exception of pregnant and lactating women.

The purpose of this scientific research

Malnutrition or malnutrition among children and women remains a major problem for Tajikistan. With this survey, we aim to assess the nutritional status and iodine content of children and women, identify risk factors for deficiency and identify possible strategies to improve the overall nutritional situation in Tajikistan. For this reason, we are conducting this survey.

We are going to assess the severity of iodine deficiency among children aged six to 59 months and women of childbearing age (18-49 years), with the exception of pregnant and lactating women in all five geographical regions of Tajikistan (Khatlon region, districts of republican subordination (RRP), Sughd region, Gorno-Badakhshan Autonomous Region (GBAO), and Dushanbe), such as iodine deficiency. We expect more than 4,000 individuals to participate in this survey.

If you agree that a child (aged 6-59 months) participates in this examination, the following procedure is followed:

1. We will ask you a number of questions about the situation in the household, food security, child health, seeking medical care for the protection of the child's health, breastfeeding and nutrition of the child.
2. Next, we will take one sample of urine from a child to determine the amount of iodine excreted from the body. If possible, we will take this sample from the traditional cradle of the child (govara).
3. As well as a sample of edible iodized salt, which you use at home in cooking....

Surveying and collecting samples takes about 40 minutes.

If you have a baby under six months of age, we would also like to include it in this survey, but only for the purpose of clarifying the characteristics of feeding. The survey and measurements take a maximum of 10 minutes. If you agree that a child (aged 6-59 months) participates in this examination, the following procedure is followed:

We will ask you a number of questions about the features of breastfeeding

Possible risks and discomfort

Urine taken from a child and placed in plastic cups does not pose any risk, and it, as an alternative, can be taken from the traditional cradle of the child(govara).

Advantages
Your participation and the participation of your child in this survey can benefit the health of the population in Tajikistan. It improves understanding of the severity of iodine deficiency nationwide. The UNICEF office in Tajikistan, together with the Ministry of Health and Social Protection of the Population of the Republic of Tajikistan, can start activities at the national level with a view to lowering the burden of this deficit.

Confidentiality, voluntary participation
Your participation and the participation of the child in this examination is purely voluntary, and is free of charge. Our survey was reviewed and approved by the Ministry of Health and Social Protection of the Population of the Republic of Tajikistan. If you agree that you and your child should participate in this survey, the research team may proceed with the above procedure.

The information, your data and the child's data are undoubtedly confidential. The results are evaluated and presented only without specifying personal information. The data is encoded before analysis. Coding means that your name and the child's name will not appear anywhere, and that the personal data, your and the child's, is replaced by an identification code. This eliminates the possibility of links in reports to your name or the name of your child. Only the research team has access to the data. In addition, experts from relevant bodies may have access to data for testing and monitoring purposes. You can stop interviewing and participating your child at any time and without giving reasons, or you can withdraw completely from the survey. Data and biological samples collected from you or your child before you leave may be used for analysis. The collected data can also be used for further research.

If you do not agree that the child participated in the examination, decide to stop the survey before its completion, decide not to take biological samples of the child or withdraw completely from the examination, you or your child, in any case, will not remain in a losing situation.

If you have questions or reasons for concern, talk to the research team visiting you today. If you have any questions about the examination after the group leaves, you can contact our coordinator in the country by phone + [(+992) 93-570-57-75] or your local health manager/phC manager, GCZ, SCZ, RS.
We would greatly appreciate your support and participation in our survey.

Written statement of consent to participate in the National Survey of MicroelementContent in Tajikistan 2021

Survey Name: National Iodine Survey

- I was informed of the objectives of the survey.
- I read and understood the essence of the information provided.
- I know that my personal data and that of the child remain confidential, and are used only in coded form for scientific research purposes, and that any reference in reports to my name or the name of the child is excluded.
- My child and I participate in this survey voluntarily. I may withdraw my consent to participate at any time and without giving reasons.
- I understand that the data and biological samples collected from me and the child prior to my departure can be used for analysis.

Child's name (in block letters)	
Relationship of guardian and child	
Guardian's legal names (in block letters)	
Place, date	Guardian's signature

Thank you

FINAL REPORT
October 2023