TERMS OF REFFERENCE (TOR)
OF
Laboratory Analysis of Micronutrient Survey Samples

1. BACKGROUND AND JUSTIFICATION:

The first micronutrient survey in Nepal was carried out in 1998, and then after 18 years, the second Nepal National Micronutrient Status Survey (NNMSS) was carried out in 2016. The data for both surveys are out-of-date and not useful to decision makers for evidence-based planning. Since 1993, the National Vitamin A Program has focused on improving the vitamin A status of children 6-59 months through biannual vitamin A supplementation with deworming (limited to children 12-59 months); this program has consistently achieved 80-90% coverage of targeted children every six months. Universal salt iodization (USI) has reached 90% of households with iodized salt for controlling iodine deficiency disorders and to improve iodine nutrition. A new challenge of excess iodized salt was identified at the population level in the 2016 NNMSS. Iron and folic acid supplementation with deworming for pregnant and lactating women has also shown relatively high coverage although adherence needs improvement.

Since the 2016 NNMSS, there has been national scale up of several evidence-based micronutrient interventions such as micronutrient powder (MNP) / infant and young child complementary feeding (IYCF) and weekly iron folic acid supplementation to adolescent girls.

The Nepal 1998 National Micronutrient Survey assessed anaemia, clinical and subclinical indicators of vitamin A status among women (15–49 years) and young children (6–59 months), and urinary iodine (UI) among women and school aged children (6–11 years). The data are >25 years old and not useful for programmatic decision making. The Nepal Iodine Deficiency Disorders Status Survey (2005) assessed national estimates of UI among children 6–11 years.

The 2016 NNMSS also assessed (i) iodine status of children 6-9 years and women aged 15-49 years, revealing adequate iodine status for women but excess urinary iodine concentrations among children. It is important to continue monitoring the iodine status among priority populations as well as salt iodization levels to maintain effective and safe programs. The 2016 NNMSS also assessed (ii) anaemia, the status of iron, vitamin A, zinc, folate, iodine (women 15-49 years only), (iii) inflammation, blood disorders, helminths, Helicobacter (H) pylori, visceral leishmaniasis, and malaria among young children (6-59 months) and non-pregnant women (15-49 years); (vi) anaemia, iron, vitamin A and folate status, inflammation, and malaria among pregnant women (15-49 years); (v) anaemia, the status of iron, vitamin A, folate, inflammation, Helicobacter. pylori, and malaria among adolescent girls (10-19 years), and anaemia, iron and vitamin A status, inflammation, Helicobacter pylori, and malaria among adolescent boys (10-19 years). It also carried out an analysis of causes and correlates of anaemia among children, adolescents, and women. The proposed 2026 NNMS will not examine etiology of anaemia again, which is complex in nature and costly to execute and non-modifiable causes (e.g., blood disorders) would not be expected to differ from 2016.

There is political momentum, investment, and interest in support of nutrition programming in Nepal. Nepal was identified as an “early riser” by the Scaling Up Nutrition (SUN) movement and is one of the

countries to receive support from the global initiative on Renewed Efforts Against Child Hunger (REACH) to help in the SUN efforts. The Government of Nepal National Planning Commission led the development of a Multi-Sector Nutrition Plan (MSNP) I, II and III with support of partners based on lessons learned from programme implementation of key sectors, including health; agriculture; education; water, sanitation, and hygiene (WASH); and local development. The main recommendations of the Multi-Sector Nutrition Plan III (2023-2030) for the health sector are to: (1) maintain and strengthen key micronutrient interventions that have been successfully implemented at scale (e.g. vitamin A supplementation to children, iron and folic acid supplementation to pregnant women, zinc in management of diarrhoea, and salt iodization); and (2) scale-up on-going interventions (e.g. IYCF/MNPs, community management of acute malnutrition, and industrial flour fortification).

In this context, the 2026 Nepal National Micronutrient Survey (NNMS) aims to generate high-quality biomarkers, dietary, anthropometric, and household information. To ensure accuracy and timely completion of the 2026 NNMS, UNICEF requires an institution or specialized private laboratory or consortium of laboratories to analyze biological specimens and food sample collected by the survey implementing partner and transported to selected laboratory facility/ies up to three times based on agreed schedule. The institution or the laboratory facility or consortium of laboratories are responsible to carry out analysis of the collected biological specimens and food sample for Serum Retinol (Vitamin A), Serum Zinc, Ferritin, Serum folate, Serum B12, C-reactive protein (CRP), α–1 acid glycoprotein (AGP), urinary iodine concentration and iodine in salt.

The implementing partner is responsible for specimen collection, storage, coordination with the National Public Health Laboratory (NPHL), packaging, customs clearance, transportation to laboratory facilities outside Nepal, maintain the temperature – cold chain - during specimen collection, storage, packaging and transportation in accordance with the agreed standard operating procedures (SOPs). The institution or the laboratory facility or consortium of laboratories are expected to closely work with the survey implementing partner and the survey quality assurance agency to ensure smooth and timely analysis and reporting of the results.

2. Objective of the Assignment:

The overall objective of this laboratory analysis contract is to support UNICEF and the Ministry of Health and Food Safety (MoHFS) in managing the required laboratory analysis, maintaining high quality, timely analysis and reporting of laboratory results. UNICEF and the MoHFS, through the contracted quality assurance and technical oversight institution, will oversee the quality and adherence to the internationally accepted process and operating procedures.

The institution or laboratory facility or consortium of laboratory facilities are expected to **be non-government institution/s and able to carry out** quality and timely analysis of biological specimens and food sample sent to them by the implementing partner and reporting of the analysis for the 2026 NNMS.

It is essential that the applying institution or laboratory facility or consortium of laboratories facilities has the capacity to perform or coordinate all required biomarker and food sample analyses within the specified timeline. All laboratory analyses, analytical results, associated quality assurance documentation, and the final laboratory report must be completed and submitted to UNICEF within four weeks of receipt of the final batch of samples following completion of field data collection. Field data collection is currently expected to be completed by mid-January 2027, with up to approximately two weeks allowed for preparation and shipment of the final batch of samples to the respective analytical laboratories. Based on this timeline, all analytical results and the final laboratory report are expected to be submitted to UNICEF no later than 1 March 2027. Should field data collection be completed earlier or later than currently anticipated, and consequently the final batch of samples be received earlier or later, the final submission deadline will be adjusted accordingly, while maintaining the requirement that all results and reports be submitted within four weeks of receipt of the final batch of samples.

To facilitate compliance with this tight timeline, specimens are expected to be shipped to the analytical laboratories in several batches during field data collection. It is currently anticipated that two to three shipments will be required, for example after approximately the first and second months of field data collection and following completion of fieldwork. Bidders shall specify in their Technical Proposal the number and proposed timing of shipments required to meet the four-week reporting deadline following receipt of the final batch. The proposed shipment schedule shall take into account the analytical capacity and expected turnaround time of all laboratories involved. Biomarker results produced by the institution, the laboratory facility or the consortium of laboratory facilities should be in the form of a database containing the sample identifier codes and duplicate biomarker results for all target groups. All laboratory results should also be accompanied by relevant quality control reporting.

The specific objectives are to assess the magnitude and distribution of the following:

1. Status of vitamins A, vitamin B12, iron, folate, zinc, iodine, and inflammation among pregnant women.
2. Status of vitamins A, vitamin B12, iron, folate, iodine, and inflammation among non-pregnant women 15-49 years.
3. Status of iron, folate and inflammation among adolescent girls 10–19 years.
4. Status of iron and inflammation among adolescent boys 10–19 years.
5. Iodine concentration in urine among children 6–9 years.
6. Status of vitamins A, iron, zinc, and inflammation among children 6-59 months of age.
7. Iodine in salt samples

3. SCOPE OF WORK AND KEY TASKS:

Preparation and receipt of biological specimens

- Receive biological specimens and food sample from the survey implementing partner based on agreed schedule;
- Ensure compliance with temperature control, biosafety, and chain-of-custody requirements from the time of receiving the specimens and food sample (Chain-of-custody procedures are the documented processes used to track, handle, store, transfer, and monitor samples or

evidence from the moment they are received by the laboratory/ies until they are analyzed, archived, or disposed of).
- Record information related to cold chain status and shipment duration for all shipments from time of receiving specimens and food sample.
- Coordinate with the implementing partner to ensure that the unique identification (ID) of each biological specimens is maintained throughout all stages of specimen handling, shipment, laboratory analysis, and reporting.
- Ensure that no attempt is made to identify research participants directly or indirectly.

Laboratory analyses

The institution or laboratory facility or consortium of laboratory facilities shall either perform the laboratory analyses directly or subcontract the analyses to one or more qualified analytical laboratories. Blood and urine specimens shall be analysed for the agreed biomarker panel, including Serum Retinol (Vitamin A), Serum Zinc, Ferritin, Serum folate, Serum B12, C-reactive protein (CRP), α–1 acid glycoprotein (AGP), urinary iodine concentration and iodine in salt, using standardized and validated analytical methods for detail refer table 1.

The institution or laboratory facility or consortium of laboratory facilities shall ensure that the laboratory(ies):
- Perform all analyses using internationally recognized and validated methods (please refer to table 1 of the TOR below).
- Demonstrate compliance with internationally accepted quality standards, including accreditation -, and provide documentation of internal quality control (IQC) and external quality assessment (EQA) for each biomarker under this assignment. The institution or laboratory facility or consortium of laboratory facilities need to provide recent quality assurance and assessment reports
- Implement rigorous quality assurance procedures throughout specimen receipt, analysis, data management, and reporting.
- Commence laboratory analyses immediately upon receipt of specimens and food sample, in accordance with the agreed laboratory workflow.
- Deliver complete analytical datasets within the agreed timelines.
- Report analytical results linked only to the unique specimen identification numbers.
- Comply with national and international requirements for biosafety, specimen storage, transportation, analysis, and chain-of-custody procedures from the time of receiving the specimens and food sample.
- Store samples at a temperature of −20°C or below for up to one year following completion of the analyses, after which they shall be destroyed, unless earlier destruction is approved by UNICEF Nepal.

The institution or the laboratory facility or the consortium of laboratories is expected to work closely with the Ministry of Health and Food Safety MoHFS, Family Welfare Division, the survey implementing partner and the survey quality assurance and technical oversight agency, USG State Department – Kathmandu and UNICEF.

The following tables also define the scope of work.

Table 1: Tests across different populations and geographical locations

Biological indicator	Population	Biomarker	Preferred method	National	7 provinces	3 eco-zones
Iron Status	Non-pregnant women 15-49 years	serum ferritin	Chemiluminescence or Immunoturbidimetry	Yes	Yes	Yes
	Pregnant women 15-49 years			Yes	No	No
	Adolescent girls 10-19 years			Yes	Yes	Yes
	Adolescent boys 10-19 years			Yes	Yes	Yes
	Children 6-59 months			Yes	Yes	Yes
Vitamin A status	Non-pregnant women 15-49 years	Serum retinol	HPLC Or LC-MS/MS	Yes	Yes	Yes
	Pregnant women 15-49 years			Yes	No	No
	Children 6-59 months			Yes	Yes	Yes
Iodine Status	Non-pregnant women 15-49 years	Urinary iodine	ICP or Ammonium Persulfate method	Yes	Yes	Yes
	Pregnant women 15-49 years			Yes	No	No
	Children 6-9 years			Yes	Yes	Yes
Folate status	Non-pregnant women 15-49 years	Serum folate	Microbiological Assay or Electrochemilumines cence Immunoassay	Yes	Yes	Yes
	Adolescent girls 10-19 years			Yes	Yes	Yes

	Pregnant women 15-49 years			Yes	No	No
Vitamin B12 status	Non-pregnant women 15-49 years	Serum B12	Microbiological Assay or Electrochemilumines cence Immunoassay	Yes	Yes	Yes
	Pregnant women 15-49 years			Yes	No	No
Zinc status	Non-pregnant women 15-49 years	Serum zinc	ICP-MS Or Quantitative colorimetric assay Or Atomic Absorption Spectrometry (AAS)	Yes	Yes	Yes
	Pregnant women 15-49 years			Yes	No	No
	Children 6-59 months			Yes	Yes	Yes
Inflammation and/or infection	Non-pregnant women 15-49 years	-Alpha-1-acid glycoprotei n (AGP) and -C-reactive protein (CRP)	Immunoturbidimetry	Yes	Yes	Yes
	Pregnant women 15-49 years			Yes	No	No
	Adolescent girls 10-19 years			Yes	Yes	Yes
	Adolescent boys 10-19 years			Yes	Yes	Yes
	Children 6-59 months			Yes	Yes	Yes
Iodine in the Salt		Potassium iodate	Iodometric titration	Yes	Yes	Yes

Table 2 Expected sample size and biomarkers by target group

Population group	Number of target population	Biomarker
Children 6-59 months	2,394	Retinol, ferritin, zinc, CRP, AGP
Adolescent girls	2,275	Ferritin, folate, CRP, AGP
Adolescent boys	1,916	Ferritin, CRP, AGP
Non-pregnant women	2,155	Retinol, ferritin, folate, B12, Zinc, CRP, AGP, urinary iodine
Pregnant women	288	Retinol, ferritin, folate, B12, zinc, CRP, AGP, urinary iodine
Children 6-9 years	1,436	Urinary iodine
Households	7,980	Salt iodine

Table 3 Total number of analyses by biomarker

Ser. No.	Biomarker	Estimated Number of Tests
1	Iron Status	9,028
2	Vitamin A status	4,837
3	Iodine Status	4,830
4	Folate status	4,718
5	Vitamin B12 status	2,443
6	Zinc Status	2.682
7	CRP	9,028
8	AGP	9,028
9	Salt iodine	7,980
	Grand Total	**53,623**

Note:
The qualified institution or laboratory facility or consortium of laboratories once signed the contract is responsible for receiving the biological specimens and food samples, their analysis and reporting. In addition, the qualified institution or laboratory or consortium of laboratories is expected to deliver results within the agreed time frame and budget. The bidder is also expected to provide the per sample costs and the total cost for each biomarker in the financial proposal.

Data and Materials Confidentiality

a) The qualified institution or laboratory facility or consortium of laboratories is expected to treat all clinical samples, together with all data and information relating to it, which the institution or the laboratory or the laboratory consortium obtains through its participation in this survey as confidential and proprietary to the providing country, and ensure that materials are not transferred or provided to any third party without UNICEF and MoHFS written consent from relevant authorities.

b) The qualified institution or laboratory facility or consortium of laboratories must implement and maintain appropriate technical and organizational measures to protect the confidentiality and

security of the materials, and to protect the materials from unauthorized access, theft, damage, loss, destruction or misuse.

c) Adhere to and comply with: (i) all applicable laws, statutes, rules, regulations and other legal or ethical requirements of Nepal and the country where the laboratory facilities are based; (ii) all relevant national and/or international biosafety standards; and (iii) all national and international regulations relating to the receipt, temporary storage and analysis of biological specimens and food sample.

Sustainability

Given the environmental impacts of laboratory testing and UNICEF commitment to contribute to the UN Sustainable Development Goals (SDGs) by 2030, sustainability indicators have been incorporated into a Sustainability Questionnaire, as outlined in Annex 4, to form part of the sustainability evaluation criteria.

Completion of the Sustainability Questionnaire is mandatory; however, it will not be used as a basis to disqualify bidders during this tender process. Instead, responses will serve as performance evaluation criteria. Accordingly, all bidders are required to complete the Sustainability Questionnaire and submit it as part of the supporting documentation for the Technical Proposal.

For any sustainability indicators implemented by institution or laboratory facility or consortium of laboratories, bidders must include the relevant internal policies and provide statements detailing how commitments made in the questionnaire are being met or otherwise addressed.

Table 4: Sustainability Indicators

	Sustainability Indicators						
			Level 3 Indicators				
	Level 1 Indicators	Level 2 Indicators	Sourcing/pre-qualification of bidders	Minimum mandatory technical specifications and tender requirements	Evaluation criteria	Contract terms & conditions, KPIs and Performance evaluation	Other
Environment	Prevention of pollution	- Requirement for a corporate environmental policy or an environmental management system (ISO 14001 or equivalent)					
		- Requirements about the proper use, storage, movement and disposal of environmentally hazardous materials and chemicals					
		- Requirement for air emissions generated from operations to be characterized, monitored, controlled or/and treated (e.g. volatile organic compounds, aerosols, corrosives,					
		- Requirements for solid waste management and reporting on waste generated/recycled/etc.					

		- Requirements for wastewater management and prevention of effluents reaching water bodies including ground water.					
Society	Human rights and Labour issues	- Requirement of a health and safety management system (e.g. ISO 18001 or equivalent)					
	Inclusion of persons with disabilities	- The requirement has been reviewed and potentially adapted to ensure accessibility for persons with disabilities					
		- Vendors need to be disability- inclusive					
	Gender issues	- Requirement of bidders to demonstrate commitment to integrate gender mainstreaming in the project's approach and personnel structure;					
	Social health and well-being	- Avoidance of chemicals potentially hazardous to users of the product, like volatile organic compounds (VOCs) etc.					
		- Require labelling of included/used hazardous chemicals					
General	Generic additional indicators	- Does your tender incorporate contract conditions/KPIs that stipulate verification of suppliers' environmental and social claims through "spot checks" and audit provisions?					

4. Methodology:

The qualified institution or laboratory facility or consortium of laboratories shall apply internationally accepted and validated analytical methods for all biomarkers while adhering to internationally recognized quality assurance (QA) and quality control (QC) standards. Where analyses are subcontracted, the institution or the laboratory or the consortium of laboratories shall ensure that all analytical laboratories are appropriately accredited or participate in recognized international QA programs, where applicable, and comply with all relevant national and international requirements and all relevant documentation are submitted as part of the application process. The qualified institution or laboratory facility or consortium of laboratories shall ensure proper specimen receipt, and chain-of-custody procedures to maintain specimen integrity from receiving the specimens and food sample throughout the analytical process.

The implementing partner is responsible for specimen collection, storage, coordination with the National Public Health Laboratory (NMPL), packaging, customs clearance, transportation to laboratory facilities outside Nepal, maintain the temperature – cold chain - during specimen collection, storage, packaging and transportation in accordance with the agreed standard operating procedures (SOPs). The institution or the laboratory facility or consortium of laboratories are expected to closely work with the

survey implementing partner and the survey quality assurance agency to ensure smooth and timely analysis and reporting of the results.

All activities shall be conducted in accordance with national and international biosafety regulations and ethical standards to protect both study participants, personnel involved in specimen receiving, temporary storage and laboratory analysis.

The Technical Proposal shall include a comprehensive description of the proposed laboratory procedures, from specimen receiving to the final analyse and reporting including:

- specimen receipt and processing procedures;
- the analytical methods and testing platforms to be used for each biomarker (refer table number 1).
- Blood samples for ferritin, folate, vitamin B12, CRP, and AGP will be collected in 8.5 mL yellow-cap serum separator Vacutainer tubes, from which serum will be aliquoted into 0.5 mL cryotubes for laboratory analysis. For zinc analysis, blood will be collected separately in 6 mL royal blue-cap trace element–free Vacutainer tubes. Serum obtained from these tubes will be aliquoted into 0.5 mL cryotubes designated specifically for zinc analysis to minimize the risk of trace element contamination. Urine samples for urinary iodine analysis will be aliquoted into 1.5 mL cryotubes and shipped to the designated analytical laboratory. Salt samples will be shipped in their designated sample containers for iodine analysis. The bidder should specify in the Technical Proposal the number of aliquots required per participant for each specimen type and target group specific biomarker panel, taking into account the available aliquot sizes and the analytical volume required for each assay.
- specimen analysis procedures;
- internal quality control (IQC) and external quality assessment (EQA) procedures;
- laboratory accreditation and quality assurance arrangements;

5. Activities, Deliverables, and expected timeline

Table 5:Activities, Deliverables, and expected timeline

No	*Deliverable*	*Estimated Completion Date* [1]
1	**Inception report** containing: a) specimen receipt and processing procedures; b) the analytical methods and testing platforms to be used for each biomarker (refer table number 1); c) laboratory analyses plan, including internal quality control schemes planned for each biomarker; d) the laboratory's capacity, including the availability of qualified personnel and the number of samples that can be analyzed within the required timeframe; e) the timeline Gant chart for delivery of biomarkers results on rolling basis.	3 weeks from signing of the contract.
2	**Midpoint progress report**: Summary of number of samples analyzed, internal QC performance (means, SDs, CVs), and corrective actions for out-of-range results.	4 weeks after receipt of the

[1] Timeline will be updated during kick off meeting after awarding the contract.

		firsts sample batch
3	**Final Laboratory Report & Clean Dataset**: Analytical summary (samples received, analyzed, rejected; turnaround times; number of samples per biomarker and target group), final dataset with data dictionary/codebook compatible with STATA/SPSS.	4 weeks after receipt of the final sample batch.

6. DURATION:

The total duration for the completion of all deliverables shall be 170 calendar days from the date of effectiveness of contract. The timeline of each deliverable will be fixed during kick-off meeting.

7. WORKING LOCATIONS:

The qualified institution or laboratory facility or consortium of laboratories can work from its office/workstation and should be in close contact with the Survey implementing partner, the quality assurance and technical oversight agency, MOHFS. Family Welfare Division, and UNICEF virtually when required.

8. PROPOSED PAYMENT SCHEDULE

No	*Deliverable*	*Percentage of payment*[2]
1	Inception report	20%
2	Midpoint progress report	50%
3	Final Laboratory Report & Clean Dataset	30%
4	Payment of lab report will be paid at cost	

The payment schedule shall be based on completed deliverables accepted by the Contract Supervisor and the quality assurance and technical oversight agency. Payments for laboratory analyses shall be based on the actual number of participants whose samples are received by the respective analytical laboratories and the associated analyses performed, using the agreed unit prices specified in the Purchase Order. The final number of samples requiring analysis is expected to remain within ±20% of the estimated sample numbers stipulated in this ToR. Billing and payment terms shall be 30 days net upon receipt and approval of the invoice. The estimated number of samples and associated analyses is provided in Table 3.

[2] Amount excluding lab test

9. CONTRACT SUPERVISION:

The Monitoring and Evaluation Officer of the Nutrition Section, UNICEF will be responsible for the management of these tasks and provide supervision and guidance to the qualified institution or laboratory or consortium of laboratories with support from the survey manager who is responsible for coordination, day to day management of the survey and documentation. The Nutrition Section Chief will provide overall oversights and guidance for these assignments. In addition, the qualified institution or laboratory or consortium of laboratories will work closely with the Survey implementing partners, the quality assurance and technical oversight agency and UNICEF.