# 2023 HIGH-LEVEL TECHNICAL ASSESSMENT WORKSHOP REPORT

NAIROBI, KENYA

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## ACKNOWLEDGMENTS

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ARI | Acute Respiratory Infection |
| BHA | Bureau of Humanitarian Assistance |
| BSFP | Blanket Supplementary Feeding Program |
| CDC | United States Centres for Disease Control and Prevention |
| CDR | Crude Death Rate |
| CHNW | Community Health and Nutrition Workers |
| CILSS | Permanent Interstate Committee for Drought Control in the Sahel |
| CMAM | Community-based Management of Acute Malnutrition |
| CVA | Cash and Voucher Assistance |
| DHS | Demographic and Health Survey |
| EBF | Exclusive Breastfeeding |
| ECHO | European Civil Protection and Humanitarian Aid Operations |
| EDHS | Ethiopia demographic and Health Survey |
| EFSA | Emergency Food Security Assessment |
| ENCU | Ethiopia Emergency Nutrition Coordination Unit |
| EVA Study | Epidemiology of Vascular Ageing Study |
| FCDO | Foreign, Commonwealth, and Development Office |
| FCS | Food Consumption Score |
| FIES | Food Insecurity Experience Scale |
| FSNMS | Food Security and Nutrition Monitoring Survey |
| GAM | Global Acute Malnutrition |
| GNC | Global Nutrition Cluster |
| HAZ | Length or Height for Age |
| Hb | Haemoblobin |
| HDDS | Household Dietary Diversity Score |
| HHS | Household Hunger Scale |

| | |
|---|---|
| HNO | Humanitarian Needs Overview |
| HRP | Humanitarian Response Plan |
| ICF | Incidence Correction Factor |
| IDP | Internally Displaced Populations |
| IPC | Integrated Phase Classification |
| IPC IGU | Integrated Phase Classification Global Support Unit |
| IYCF-E | Infant and Young Child Feeding in Emergencies |
| JME | Joint Malnutrition Estimates |
| MAM | Moderate Acute Malnutrition |
| MICS | Multiple Indicator Cluster Survey |
| MIYCN | Maternal Infant and Young Child Nutrition |
| MMS | Multiple Micronutrient Supplementation |
| MNP | Micronutrient Powder |
| MoH | Ministry of Health |
| MUAC | Mid-upper arm circumference |
| NISWG | Nutrition Information Systems Working Group |
| NNS | National Nutrition Survey |
| NuVAC | Nutrition Vulnerability Assessment in Crisis |
| PCIMA | Prise en Charge integrée de la malnutrition aiguë |
| PiN | People in Need |
| POSHAN | India |
| RCSI | Reduced Coping Strategies Index |
| RMF | Real Time Monitoring Framework |
| SAM | Severe Acute Malnutrition |
| SD | Standard Deviation |
| SDG | Sustainable Development Goal |
| SENS | UNHCR's Standardized Expanded Nutrition Survey |
| SMART | Standardized Monitoring and Assessment of Relief and Transitions |
| TEM | Technical Error of Measurement in Anthropometry |
| U5DR | Under 5 Death Rate |
| UNICEF | United Nations International Children's Emergency Fund |
| USAID | United States Agency for International Development |
| WCAR | West and Central Africa Region |
| WFP | World Food Program |
| WHO | World Health Organization |
| WHZ | Weight for Height Z-score |
| WRA | Women of Reproductive Age |

# EXECUTIVE SUMMARY

The SMART Initiative organized the 2023 High-Level Technical Assessment Workshop in Nairobi, Kenya from the 16th – 17th of November 2023. The aim of this workshop was to provide a convening for global technical experts in nutrition assessments for the advancement and continued improvement of field practices, Nutrition Information Systems (NIS), knowledge sharing, collaborative capacity building, and improved access to quality data and updates on research and innovation. There were 16 presentations in total over 2-days which covered the following topics: 1) SMART Initiative update, 2) Data in Action for countries in crisis, 3) RFM development in Yemen, 4) Panel discussion on SMART+ in action, 5) Research development and challenges with 3D/ photo, or non-invasive diagnostic tools for malnutrition or anemia, 6) Evaluating MUAC measurements, 7) IPC and caseload calculations, 8) Nutrition Vulnerability Assessment in Crisis model for improved NIS and decision-making, 9) NIS Working group inputs from the Global Data Clinic (Nov. 13 –15, 2023 in Nairobi, Kenya), 10) Joint Malnutrition Estimates (JME) database updates and recommendations for SMART from UNICEF and WHO (see Annex 1: Agenda). Participants included Government officials (Burkina Faso, Ethiopia, Kenya, Mozambique, Nigeria, Senegal, South Sudan, Sudan, Tchad), United States Centres for Disease Control and Prevention (CDC), representatives of United Nations agencies (UNHCR, UNICEF, WFP, WHO), staff of international non-governmental organizations which included Action Against Hunger Regional and Headquarter staff (Canada, Kenya, Spain, Yemen), and external consultants (see Annex 2: Participant List; Annex 3: Participant Characteristics).

Since the last TAM meetings hosted in Mombasa, Kenya in 2019, there has been considerable progress and technical capacity building for SMART Methodology across West, East, and Southern Africa, Pakistan, and Yemen. In 2019, TAM prioritized future actions for the improvement of NISs, increased capacity building for SMART trainings and surveys to address technical gaps, improved anthropometric assessments and diagnosis, and a precedent was set to explore innovative technologies to improve processes in the nutrition assessment survey life cycle. The 2023 TAM meetings highlighted progress and significant achievements towards addressing these priorities. Cross-organizational and governmental efforts are currently developing methods to strengthen NISs with NuVAC and country-specific projects; the NIS Working Group and technical group who convened prior to TAM in the Data Clinics to finalize future NIS guidance on data types and pertinent indicators for nutrition assessments. Data quality and analysis processes have been prioritized due to database validation processes with JME, RMF development in Yemen, and IPC efforts to improve analyses. Capacity building for SMART Methodology has also seen considerable growth since 2019 in West Africa, East Africa, and Pakistan. This includes comprehensive collaborative actions across organizations and governments to strengthen nutrition assessment processes and data sharing for more effective decision-making. Research and innovation have provided evidence on the feasibility of defining MUAC flags for data quality checks during anthropometric measurements, and challenges were highlighted for SAM photo scan or non-invasive anemia diagnostic technologies (see Annex 4: Presentation Citations). The official roll-out of the SMART+ innovation is seeing positive impact in the field of nutrition assessments which includes the overall survey life cycle in both Ethiopia and Nigeria.

Concurrent to progress in the sector, it was also highlighted that continued efforts to strengthen SMART technical capacity and skilled enumerators for improved data quality and data availability is needed. SMART+ has effectively curbed some of these issues in Ethiopia and Nigeria, and there is a desire to continue these efforts for improved access to timely, quality data for decision-making. However, irrespective of planning and robust systems in place, countries in crises are often met with funding challenges that slow progress towards addressing malnutrition needs. Collaborative discussions from organizations representing West and Central African Regions (WCAR) identified 5 primary challenges experienced in nutrition surveillance: 1) country insecurity and data inaccessibility, 2) lack of funding, 3) surveys over-burdened with indicators affecting data quality, 4) seasonality issues with data collection, and 5) survey result validation and timely accessibility of results. These 5 challenge areas were reoccurring themes throughout the presentations over the 2-day workshop.

**Moving forward, the following proposed recommendations should be considered:**

1. Continue to strengthen capacity building at regional levels for SMART and SMART+ at all stages of nutrition assessments.

2. Encourage narrowing the scope for indicators based on the upcoming NISS Guidance to mitigate data quality issues.

3. To mitigate varying results between the first and second half of a survey period (e.g., changing contexts, country insecurity, seasonality issues), encourage zonal level SMART+ surveys.

4. Support further exploration into the NuVAC model to bolster a systems approach to strengthen NIS and encourage open and honest data sharing and communications to support decision-making and effective programming.

5. Gaps in humanitarian funding present a serious challenge for assessment planning; therefore, resource mobilization mechanisms and collaborations with ministries require strengthening to address this gap.

6. Continue the rollout of SMART+ for a more streamlined survey life cycle and real-time access to data and transparent data sharing for decision-making.

7. Continue to develop and then scale an effective and evidence based RMF to be used in changing contexts for more frequent monitoring of malnutrition.

8. Consider conducting caseload calculations with both admissions data and Incidence Correction Factor with a cross-comparison to identify which pathway appropriately fits the context.

9. Support further discussions with the JME Team to strategically align and utilize the JME database.

## INTRODUCTION

As the SMART Global Project Convenor for the Global Nutrition Cluster, the Global SMART Team at Action Against Hunger Canada supports key nutrition stakeholders by enhancing response capacity in emergencies, development settings and displaced populations, and in high-risk contexts with an absence of reliable data. SMART also provides support by ensuring coordination and dissemination of nutrition information and advancing technical capacity to collect good quality, reliable and timely data using the SMART methodology globally.

The High-Level Technical Assessment Workshop served as an essential platform for nutrition stakeholders to convene and share new research and innovations, field experiences, lessons learned, and good practices to address solutions for nutrition information management and assessment challenges globally. Subsequently, the technical discussions and innovations shared in this workshop contributed to improvements in nutrition information systems, progressing nutrition assessments conducted in the field, real-time data frameworks in emergency contexts, and the overall advancement of the SMART methodology.

## MEETING OVERVIEW

The **Fourth High-Level Technical Assessment Workshop (TAM)** was held in Nairobi, Kenya from November 16th – 17th, 2023. The purpose of this workshop was to provide an opportunity for experts and researchers in the field to disseminate the most current progress, research, and innovations in nutrition assessments to advance field practices and bolster access and utilization of SMART data within the nutrition sector. This workshop provided a platform for presenters and participants to engage in learning and discussions focused on various countries throughout East, South, and West Africa, the Middle East, and South Asia.

**The specific objectives of the meeting were as follows:**

1. Provide an update on the progress and growth of the SMART Initiative over the 2021 – 2023 period.

2. Provide an opportunity for timely updates from countries in crisis who are implementing and utilizing specific data methods, including implementation of SMART Methodology and/ or SMART+, with a focus on Ethiopia, Pakistan, West Africa, and Nigeria.

3. Provide an update on the implementation and evolution of a Real-time Monitoring Framework taking place in Yemen.

4. Provide an opportunity to introduce and subsequently discuss the rollout of SMART+ through a panel discussion with past and current participating country or SMART technical representatives.

5. Provide an update on Auto Anthropometric 3D Technology research developments, learnings, and challenges.

6. Provide an update on the learnings and progress with the SAM Photo Diagnosis Project led by ACF Spain.

7. Discuss evaluating MUAC in humanitarian surveys.

8. Discuss acute malnutrition caseload calculations and comparisons of actual admissions with caseload calculations.

9. Provide an update and engage in discussion on the Nutrition Vulnerability Assessment in Crisis (NuVAC) joint initiative.

10. Provide an update on tracking anemia research and the latest publication by Dr. Oleg Bilukha, Kaitlyn Samson et al..

11. Provide an update on the outputs from the preceding Global Data Clinic led by the SMART Initiative and Nutrition Information Systems Working Group.

12. Provide a review of the Joint Malnutrition Estimates and its process.

To accomplish these objectives, the SMART Initiative brought together regional and global technical experts in nutrition and public health, within humanitarian and emergency contexts, to share the most recent evidence-based information and practices. The following thematic areas were covered over the course of this 2-day workshop (See Annex 1: Agenda):

- **SMART Global Progress and Growth**
- **The Rollout of SMART+ and Stories from the Field**
- **Tracking Research on Anemia and MUAC Data Quality**
- **Enabling Timely Updates for Countries in Crisis**
- **Advancing Malnutrition Digital Diagnosis**
- **Latest MUAC Research and Findings**
- **NuVAC Initiative Grounded on a NIS Diagnosis Paper**
- **IPC and SMART on Acute Malnutrition Caseload Calculations**
- **JME on Anthro Data Collection, Data Source Review, and Recommendations for Improved Survey Quality**

The workshop was attended by 99 participants, both online and in-person, with an in-person total of 74 participants (See Annex 2: Participant List). There were 24 countries represented in total with a mean attendance of 4.1 persons in attendance per country (See Annex 3: Participant Characteristics).

Overall, the thematic areas were achieved throughout this 2-day workshop with the support of information-dense presentations and participation from attendees. The 2023 High-Level Technical Assessment Meeting proved to be an enriching opportunity to bridge current challenges and learnings together to advance nutrition assessments and provide opportunity to further implement new innovations and research. Through these collaborative efforts and the diverse technical expertise of those who attended, this workshop was a success at accomplishing its overall objectives at advancing technical capacity and methods used to ensure the continued quality of nutrition assessments in the field.

## SUMMARY OF SESSION PRESENTATIONS

### 1. SMART (Then, Now, and the Future)

The opening presentation of TAM was led by SMART Senior Project Manager, Hailu Wondim, who provided a detailed update on the growth and capacity development achieved by the Global SMART Initiative from 2021 to 2023. There has been substantial growth within the Initiative which is especially evident in reported outputs for SMART Survey training and implementation. Over this past 3-year period a total of 23 SMART Manager Level Trainings were conducted with a total of 487 trainees. There were 11 country-specific trainings, 6 regional trainings across West, East, and South Africa, Middle East, and South Asia, and 6 virtual trainings. SMART survey support was also provided in a total of 27 countries with both SMART surveys and support for strengthening nutrition information systems. Comparing 2021 and 2023 the SMART Initiative as seen 286% growth in country capacity building over this period based on SMART Survey Support activities (compounded annual average growth estimated at 96% growth per year).

**Table 1: SMART survey support highlights**

| Year | Country | # | Survey Support Type |
|---|---|---|---|
| 2021 | Angola | 4 | SMART Surveys |
| | DRC | 4 | SMART Survey support |
| | India | 1 | Information management system POSHAN (Nutrition) COVID-19 |
| | Lebanon | 1 | National SMART Survey including refugees |
| | NE Syria | 4 | SMART Surveys |
| | Pakistan | 8 | SMART Surveys (Sindh Province) |
| 2022 | Afghanistan | 1 | National SMART Survey |
| | Burkina Faso | 2 | SMART Surveys |
| | Chad | 2 | SMART Surveys |
| | DRC | 8 | SMART Surveys |
| | Libya | 1 | Sub-national SMART Survey |
| | Mozambique | 10 | SMART Surveys (Cabo Delgado) |
| | Sudan | 7 | SMART Surveys |
| | Yemen | 1 | SMART Survey (North and South) |
| 2023 | Bangladesh | 9 | SMART Surveys |
| | CAR | 4 | SMART Surveys (remote support) |
| | Colombia | 7 | SMART Surveys |
| | Ethiopia | 8 | SMART+ Surveys |
| | Haiti | 1 | National SMART Survey |
| | Mozambique | 10 | After Shock surveys using SMART Methodology |
| | Nigeria | 25 | SMART Surveys (NE & NW) |
| | Pakistan | 12 | SMART Surveys (Baluchistan, KP, and Sindh provinces) |
| | Syria | 2 | SMART & ICYF Surveys (2 governates) |
| | Togo | 1 | Sub-national SMART Survey |
| | Uganda | 1 | FSNA tool development and survey support |
| | Yemen | 1 | MUAC data quality check for food security and livelihoods assessment - RMF development |
| | Zimbabwe | 4 | SMART Surveys with NIS Support |

Development of technical documents, research and innovation were also achieved over this period. During the COVID-19 pandemic an interim guidance note was developed to support population level surveys and household level data collection[1]; an updated MUAC data collection tool was also developed in 2020 to support improved data collection and reporting for SMART MUAC Screening.[2] Two field articles were published, with one prioritizing high quality, nationally owned NIS in Kenya,[3] and the other highlighting field evidence on adaptations to SMART Surveys during COVID-19 in Cox's Bazar, Bangladesh.[4] Two peer-reviewed research articles were additionally published, advancing evidence-based understanding of 1) measurement quality of MUAC in anthropometric surveys,[5] and 2) characteristics of haemoglobin distributions and the implications for establishing quality control criteria for haemoglobin data in field surveys.[6] Substantial innovation was equally achieved with the official launch of the SMART+, where the team piloted SMART+ in 2 countries with a subsequent roll-out in 2 countries. To date, 23 SMART+ surveys have been conducted and completed. Innovation within Nutrition Information Systems also took place in 2023 with the development of a Real Time Monitoring Framework (RMF) piloted in Yemen. The team is projected to initiate 2 additional pilots in other countries taking into consideration differing country contexts and varying access to quality data.

## 2. From Data to Action: Enabling Timely Updates for Countries in Crisis

This presentation acted as a series of updates from four presenters on current malnutrition data from countries in crises within East/West Africa and Pakistan.

### ENCO on Ethiopia

The first presentation of this series was provided by Wondayferam Gemeda from Ethiopia Emergency Nutrition Coordination Unit (ENCO) and Nutrition Cluster. Since 2000, ENCU is mandated to coordinate emergency nutrition assessments in the country, ensuring quality data and management of its survey database and rapid assessments. This has been in partnership with UNICEF/ Global Nutrition Cluster (est. 2007) and in collaboration with CMAM, NISWG, IYCF-E, and CVA technical working groups. Due to multiple shocks, such as conflict, drought, desert locusts, floods, disease outbreaks, and El Nino, Ethiopia has seen a steady increase in SAM admissions since 2018, with more than 500,000 admissions in the first three quarters of 2023.

Proactive efforts have been put in place to address the growing prevalence of malnutrition in the country. Over the past four years a new MUAC cut off was adopted to diagnose acute malnutrition and SMART, SENS-UNHCR, and Rapid Nutrition Assessments were conducted. This additionally includes a baseline food and nutrition strategy, Mini EDHS, FSNMS/ EFSA including MUAC, and

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[1] SMART. Interim Guidance on Restarting Population Level Surveys and Household Level data Collection in Humanitarian Situations during COVID-19 Pandemic. October 8, 2020.

[2] SMART. MUAC Screenings: Instructions for data collection and reporting. 2020.

[3] Lydia Ndung'u, Lucy Maina-Gathigi, Lucy Kinyua, Hassan Ali Ahmed, Kibet Chirchir and Samuel Mahinda Murage. Streamlining SMART survey processes in support of a high quality, nationally owned nutrition information system in Kenya. *Field Exchange 65*, May 2021. P38. https://www.ennonline.net/fex/65/nutritioninformationsystemkenya

[4] Md. Lalon Miah, Bijoy Sarker, Jogie Abucejo Agbogan, Brigitte Tonon, Mary Chelang'at Koech, and Md. Shahin Emtazur Rahman. Adaptations to SMART surveys in the context of COVID-19 in Cox's Bazar, Bangladesh. *Field Exchange 65*, May 2021. p60. www.ennonline.net/fex/65/smartsurveyscovid19coxsbazar

[5] Bilukha O, Kianian B. Considerations for assessment of measurement quality of mid-upper arm circumference data in anthropometric surveys and mass nutritional screenings

[6] Bilukha O, Kianian B, Samson KLI. Characteristics of hemoglobin distributions in preschool children and non-pregnant women of reproductive age and their implications for establishing quality control criteria for hemoglobin data in field surveys: evidence from 483 surveys conducted in refugee settings worldwide. *Population Health Metrics* 2023;21(20). https://doi.org/10.1186/s12963-023-00315-9

Find and Treat. ENCU/ Nutrition Cluster has prioritized further capacity building for SMART with more than 100 woreda level SMART surveys conducted since 2017. They have since changed from woreda level to livelihood zone level for more comprehensive analysis and have included IDP surveys and the collection of data using other sector indicators to better address the main drivers of malnutrition. In 2023, 14 multisectoral SMART surveys were conducted in several livelihood zones and woredas inclusive of 5 regions: Somali, Amhara, Afar, Oromia and Tigray (30% of coverage of 5 zones). The findings of the surveys show very high prevalence of global acute malnutrition by WHZ (>15%GAM) in 43% of the areas covered and high (GAM <15 and >10%) in 43% of these areas surveyed. In the IDP sites of Tigray the GAM prevalence was 26.5%. 86% of zones and woredas surveyed are experiencing critical GAM for children under 5.

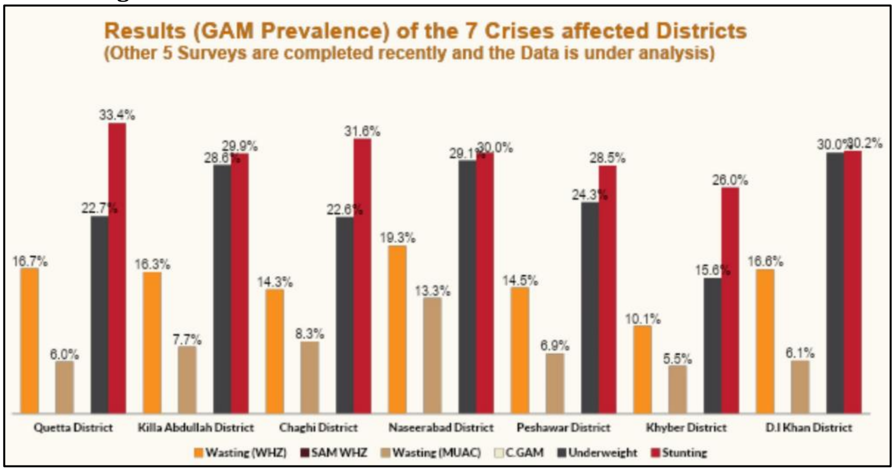
Lessons learned throughout these efforts include that the national coordinator governance-role is often overlooked with an implication on the endorsement process. This includes enumerators, survey managers and the survey coordinator. Edema photos are not easily saved or retrieved on the app and GPS readings present an issue during inclement weather. Due to time requirements and changing contexts/ seasonality, data can be affected with varying results from the first and second half of the survey period. This includes result estimations between WHZ and MUAC. Better estimations were achieved, however, with zonal level SMART+ survey which included routine admissions approximating to prevalence. As Ethiopia continues to address the high prevalence of malnutrition across various regions in the country, next steps will include building more capacity for SMART+ with a possible resumption of IPC Acute Food Insecurity and Acute Malnutrition efforts.

**Key Learnings:**
1. Proactive efforts have been put in place to address the growing prevalence of malnutrition in the country.
2. Time requirements and changing contexts/ seasonality data can be affected with varying results from the first and second half of the survey period (esp. between WHZ and MUAC). Better estimations were achieved with zonal level SMART+ surveys.
3. To address growing prevalence of malnutrition, capacity building for SMART+ survey implementation followed by IPC analyses is expected.

### SMART and UNICEF on Pakistan

Regional SMART Advisor for Asia, Muhammed Ali Jatoi, provided an update on the use of essential data within crisis-affected areas of Pakistan. Unmet MIYCN targets, shocks from natural disaster, and an increasing refugee population, met with low coverage of basic social services, are only some of the issues that challenge efforts to address malnutrition in the country. Insufficient data availability is a substantial factor disallowing decision-makers to assess progress and adequately inform nutrition programming to effectively address burden of need. Due to challenges presented from unavailable authentic data, 4/36 critical districts were excluded from the 2023 IPC AMN analysis. In several districts, plausibility checks for FSLA nutrition data could not qualify due to low availability of child MUAC/ anthropometry measurements. SMART surveys by UNICEF and RSPN filled in some data gaps for a few districts with support from IPC protocols for applying GAM prevalence from these SMART surveys. Given this critical need for quality data to inform programming and assess needs during emergencies and large-scale responses, UNICEF Pakistan, Contech, the Nutrition Directorate of Pakistan and the SMART Initiative collaborated to effectively fill this data availability gap. SMART Initiative was engaged for technical assistance, training, and data quality management. From this collaborative effort, 7 crises-affected districts were surveyed with 5 additional districts currently in the data analysis phase (See Figure 1).

**Figure 1: SMART data from 7 crisis-affected districts in Pakistan**




Plausibility reports passed with 4 surveys achieving "Excellent" and 3 surveys, "Good". Data from these surveys have since been used in the IPC AMN analysis and data from all 12 districts will provide quality data to inform the HNO and HRP. Partners will additionally have gained capacity to use available data to design and scale their existing programmes.

**Key Learnings:**

1. Insufficient data availability is a substantial factor disallowing decision-makers to assess progress and adequately inform nutrition programming to effectively address burden of need.
2. In collaboration with SMART, 7 crises-affected districts were surveyed with 5 additional districts currently in the data analysis phase.
3. Data from these SMART surveys have since been used in IPC AMN analysis and data from all 12 districts will provide quality data to inform the HNO and HRP, as well as inform existing programmes.

### Nutrition Taskforce Update for West and Central Africa

Nutrition Information and Assessment Specialist, Fanny Cassard, provided updates on behalf of the Nutrition Taskforce for West and Central Africa regions (WCAR), a sub-group of the Technical Committee of the Cadre Harmonisé chaired by CILSS (Permanent Interstate Committee for Drought Control in the Sahel). In 2022, 6.9% of children under 5 were affected by wasting in the region, which is the second highest prevalence of wasting in the UNICEF regions after South Asia. The prevalence of wasting remains at an estimated 7- 8% and the number of children suffering from wasting continues to rise with high population growth. The total estimated burden of GAM in WCAR for 2023 is 21.1 million children under five. At the national level, the prevalence of GAM in the Sahel region for children 6-59 months, remains higher than that found along the coast. From 2021 - 2023, where 2023 data is made available, Mali, Mauritania, and Niger have a reported stable high prevalence of GAM at 10% or higher (10-13.2%) based on National Nutrition Survey (NNS) SMART data from 2021 – 2023. Prevalence of GAM has reduced in Chad and Burkina Faso with 10.1% prevalence in Chad for 2021 (survey conducted during the lean season) and 8.6% prevalence in 2022 (survey conducted during the harvest season); prevalence of GAM in Burkina Faso has reduced from 9.7% in 2021 to 7.5% in 2023 (omitting regions where data collection was not possible due to conflict). Across West and Central regions from 2018 – 2022, GAM prevalence remains stable yet at a critical level with GAM prevalence in many regions above 10%. Since 2019, WFP, UNICEF and partners conduct a joint prioritization exercise called "Food

Security and Nutrition Hotspot Analysis" using the results from the Cadre Harmonisé and IPC analysis among other information. These hotspot analyses aim to identify areas to be prioritized for Food Security and Nutrition Emergency responses with their expected number of beneficiaries. In 2023, according to the latest analysis, a total of 6.3 million cases of wasting are expected among children under 5 years old in the Sahel countries included in the analysis. Despite the observed high prevalence of GAM in WCAR, the prevalence of stunting has declined steadily since 2000. Irrespective of this, while hosting only 14.1% of the world's children, 19.6% of the global stunting burden in 2021 was recorded in WCAR. WCAR is the only region in the world where absolute number of stunted children is increasing.

Efforts to conduct SMART surveys were put in place throughout the region in 2023 but were met with financial constraints and limitations due to conflict in certain countries. In 2023, NNS were conducted in Burkina Faso, Mali, DRC, and Guinea Bissau. Rapid SMART surveys were conducted in 30 municipalities/ counties within Burkina Faso and in Mali (4 areas and IDP sites) due to strong security challenges. IPC AMN analyses were conducted in Burkina, Mali and Nigeria using results from the SMART surveys. Localized SMART and SMART+ surveys were conducted in Northwest and Northeast Nigeria, respectively. Funding gaps affected the completion of localized and Rapid SMART in Cameroon, nutrition data was then integrated into a food security survey to compensate for this gap. Mauritania and Chad had National SMART surveys scheduled that were not conducted due to funding gaps, and Niger's national Survey was paused due to a military coup in 2023.

In response to these challenges, a workshop was held in 2023 to discuss nutrition surveillance in Sahel countries. This workshop was organized by UNICEF WCARO, ACF Canada, ACF ROWCA, the IPC GSU, and the WCAR Nutrition Task Force. The objective of this workshop was to collectively identify key challenges and solutions related to SMART survey implementation and to explore feasible alternative methodologies. The following five key challenges were identified in Table 2, and recommendations were elaborated to address those challenges:

**Table 2: Five challenges identified in 2023 WCAR nutrition surveillance workshop**

| Challenge | | Key Message | Recommendation |
|---|---|---|---|
| 1 | **Insecurity and inaccessibility** | 114% more security incidents between 2018 and 2020. | Explore alternative methods – Risk Monitoring Framework (RMF) analysis for a better use of routine data; use decision tree in contexts with limited access (implementation of Rapid SMART, exhaustive/targeted MUAC screening, IPC special protocol for areas with limited access). |
| 2 | **Funding** | Funding gaps present a serious challenge.<br>There is a reduction in humanitarian funding, which present difficulties to mobilize funds for these nutrition surveys. | NNS to represent 1st administrative level.<br>Improve resource mobilization mechanisms; CILSS to organize a workshop with ministries of finance. |
| 3 | **Indicator selection and quality** | Surveys are impacted by poor indicator selection.<br><br>In recent years, more and more additional indicators have been added to the NNS creating challenges in terms of quality insurance, particularly for non-anthropometric indicators | Do not overload surveys; Only include SMART Mortality Survey in Emergency settings; Do not collect IYCF indicators annually; Support required at country level during indicator selection. |

| | | | |
|---|---|---|---|
| 4 | **Seasonality of data collection** | Poor consideration of the seasonality of malnutrition when planning SMART surveys.<br><br>Recommend that data collection takes place during lean season (first peak of malnutrition). | Need to improve resource mobilization mechanisms to limit delays in survey planning and collect data at the right period |
| 5 | **Survey result validation and use of results** | The survey process is too long. Process requires improvement in tandem with indicator selection. | Improvement of indicator selection process to facilitate analysis and reporting phases. |

Next steps for WCAR include continued efforts to rollout SMART+ in WCAR. In 2024, several presentations on the SMART+ tools will be done at the regional level to key partners. A regional SMART+ training including a SMART+ pilot survey will be planned. Several SMART surveys at different level in terms of representativity will be conducted in WCAR, funding dependant, for 2024. Additional technical support is also anticipated for 2024 from the Nutrition Task Force and the Global SMART Team to bridge capacity building and implementation of survey support.

**Key Learnings:**

1. Efforts to conduct SMART surveys (NNS SMART, localized, and Rapid SMART) and SMART+ surveys were put in place throughout the region in 2023, including capacity building efforts for nutrition assessments through several SMART trainings.
2. Financial constraints and limitations due to conflict in certain countries have presented challenges in conducting assessments.
3. A workshop was held in 2023 with partnering organizations to discuss nutrition surveillance in Sahel countries and 5 key challenges and solutions were identified to support the implementation of future surveys.
4. Continued rollout of SMART+ and SMART+ activities are scheduled for 2024.

### UNICEF on the Current Experience in Nigeria

Edward Kutondo, Information Management Officer (Data, Analytics and Evidence) from UNICEF, provided an update on the current context in Nigeria. Nigeria is currently ranked 1st in Africa and 2nd in the world in terms of number of malnourished children. In a population with an estimated 216 million people, 34 million are children under 5 years of age and 12 million of which are stunted. The largest burden of child malnutrition is found in 2 of 6 geopolitical regions: Northwest and Northeast Nigeria. Since 2016, Nutrition SMART Surveys are conducted annually during the lean season in both the Northeast and Northwest regions. DHS surveys were conducted from 1990 – 2018 and another survey is currently underway; MICS were conducted from 1995 – 2021; and a National Food Consumption and Micronutrient Survey was conducted in 2021 with a preliminary report released in 2022. Nutrition data collection reflects SMART guidance with a focus on anthropometry, mortality in emergency contexts in the Northeast, a few indicators on child morbidity, micronutrient interventions, MIYCN indicators based on 2–3-year frequency, and core WASH indicators.

These efforts concurrently align with four key components identified to strengthen Nigeria's current Nutrition Information System: 1) people (human resources), 2) data, 3) processes and procedures, and 4) technology. SMART Survey Manager and SMART+ trainings were conducted in 2023 with 15 managers and 186 data collectors trained to develop human resources. This supports quality data collection and has directly supported challenges related to stunting data and large sample size data. SMART training and SMART methodology have built strong processes and procedures with plans underway to develop a Nutrition Information Guideline. The successful rollout of SMART+ in the Northeast has additionally supported processes while using technology to streamline quality data collection. Next steps include further expansion of SMART+ methods for 2024 into the Northwest region. Existing data indicates, in some districts of Northern Nigeria, that the prevalence of GAM can range from 5 – 15% prevalence. Continued efforts to improve data quality and coverage is crucial to effectively address these critical levels of malnutrition. The use of SMART methodology and data to-date has made an impact by saving lives. For example, the use of SMART data in 2022 supported the identification and enrolment of 748 thousand children with severe acute malnutrition (SAM) and their subsequent treatment from SAM. This presentation concluded with lessons learned, indicating that the frequency of SMART surveys in the Northeast has been adjusted to one annual survey completion compared to bi-annual, and more advocacy is needed to link IPC AMN and Cadre Harmonise Food Security analyses to influence joint analyses and evidence-based information sharing.

**Key Learnings:**

1. Nigeria's current Nutrition Information System methodology prioritizes strengthening human resources, data and quality, processes and procedures, and technology.
2. SMART Survey Manager and SMART+ trainings were conducted in 2023 with 15 managers and 186 data collectors trained to develop human resources and supports quality data collection.
3. The successful rollout of SMART+ in the Northeast has additionally supported processes and technology development to streamline quality data collection, and expansion of SMART+ methods in the Northwest region are expected for 2024.
4. The use of SMART methodology and use of survey data has proven impact, with the identification of 748 thousand children with SAM and their subsequent treatment from severe acute malnutrition in 2022. Nigeria expects their NIS efforts to continue to have a positive impact on the prevention and treatment of malnutrition.

## 3. The Evolution of a Real Time Monitoring Framework in Yemen

This presentation provided compelling evidence for the use of a Real Time Monitoring Framework (RMF) as an early-warning framework in everchanging emergency contexts. SMART Nutrition Information Systems Specialist, Elijah Odundo, and CDC Associate Director of Science, Dr. Oleg Bilukha, discussed a RMF project in Yemen as a monthly malnutrition monitoring tool between SMART surveys, along with the technical steps required to validate the quality of routine data, to facilitate more real-time decision-making for early action during shocks and crises. The findings from this project are expected to provide evidence on the feasibility of a framework that supports frequent updates and a more effective early warning system for evolving malnutrition situations. The goals and objectives identified to systematically explore RMF as an option included: 1) identifying data sources for monitoring at the district level; 2) confirm availability and timeliness of these data; 3) validate data compared to SMART as a gold standard for data quality; 4) establish alert thresholds; and 5) determine how to use these different sources of data together. To address these goals and objectives the RMF project was broken in to a three-phase approach.

In Phase 1, a concept note was developed for indicator selection and validation (n=55 indicators) with support from the NITWG and Global SMART Initiative. Phase 2 required an indicator review workshop and the development of indicator selection criteria. 9 indicators were selected for the framework in total based on the following criterion: 1) evidence-based impact and relevance on the nutrition situation in Yemen (informed by IPC analysis); 2) indicator feasibility, defined by frequency of data collection, accessibility and timeliness, the data source and agency responsible for data consolidation and sharing, and the level of data available; and, 3) quality and interpretability based on whether an indicator is readily updated and identifying and whether any observed changes are due to other factors. Phase 3 included data collection, synthesis, and analysis. Analysis required a 2-step approach with 1) univariate analysis to understand data distribution and the spread of data, and 2) bivariate analysis to validate data against population-based surveys (SMART).

During this pilot run the RMF team in Yemen were met with data gaps and challenges. Irrespective of this the team identified comparable data, when compared with gold standard SMART data, to support the development of an evidence based RMF tool. Sources of data included admissions, MUAC screenings, and health facility nutrition surveillance with the inclusion of some contextual data to observe access and health services. To help identify if these three data types were adequate proxies for malnutrition prevalence in Yemen, each were analysed for correlation with SMART data (See table 3, below).

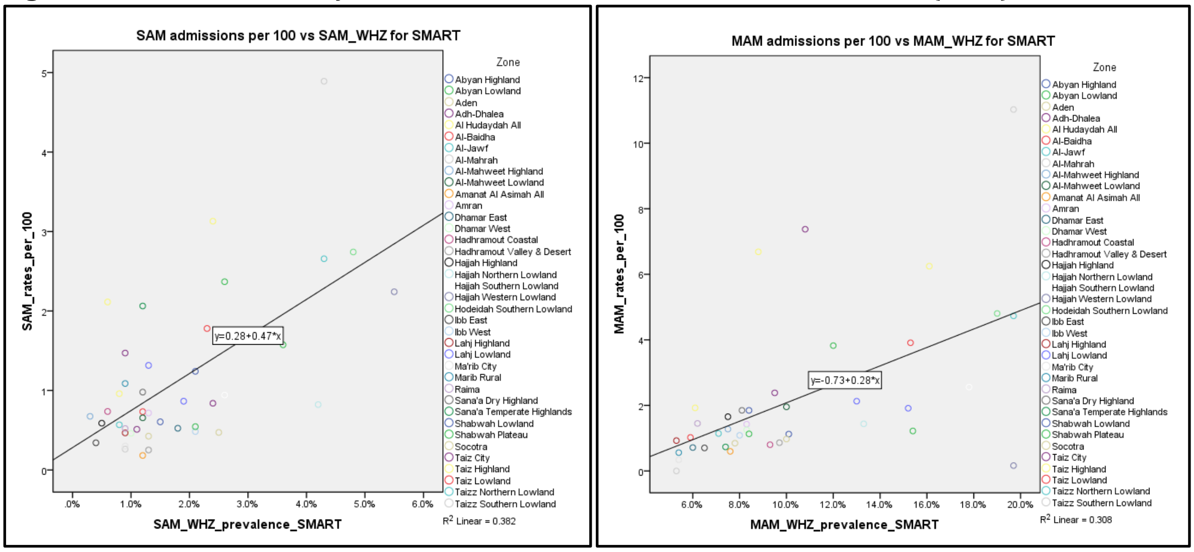
**Table 3: RMF development: Data sources & adequate proxy identification**

| Data Sources Selected for Comparison with SMART data | | |
|---|---|---|
| **1** | **Child Admissions (6-59 months)** | |
| | Create monthly rate for each district (mon. Admissions divided by pop of children 6-59 months). | |
| | Take median of 33 months rate for each district for univariate analysis. | |
| | Match district data with SMART survey zone data by time and area. | |
| | Correlate admissions rate with SMART (WHZ) for MAM and SAM. | |
| **2** | **MUAC Screening** | |
| | Four MUAC screening sources were identified as viable options for validation and comparison: | **CHNW** (Community Health and nutrition workers data) |
| | | **Fixed Health Facilities Data** |
| | | **Mobile Health Teams** |
| | | **Outreach Campaigns** (e.g., vaccination or vitamin A distribution) |
| | Determine which platform has the best quality data for comparison based on the following: | 1. Sample size of child admissions (# child screened per month per district). |
| | | 2. Quality and consistency of recorded prevalence for SAM and MAM. |
| | Compare reported MAM and SAM prevalence among platforms and describe prevalence distribution across districts. | |
| | Identify which platforms can be validated for quality data fit for comparison with SMART survey data (Gold Standard). | |
| | Correlate with SMART survey results. | |
| **3** | **Health Facility Nutrition Surveillance** | |
| | Collects and reports data monthly monitoring HAZ, WHZ, WAZ, MUAC, EBF, and anaemia. | |
| | Match data on data and place, including all surveillance sites in each survey zone. Take 3 months of surveillance data around date of SMART survey. | |
| | Weight results of surveillance data by age distribution in surveys. | |
| | Compare and correlate wasting, stunting, MUAC, and underweight with SMART survey results. | |

Admissions data for SAM and MAM were analysed looking at the monthly rate, divided by the child population number for children 6-59 months. The median of 33 months rate for each district was taken for univariate analysis, then district data were matched to SMART survey zone data by time and area to correlate admissions rate with SMART (WHZ) for MAM and SAM. In testing the validity MAM admission data with MAM prevalence from SMART surveys, findings indicated a moderate correlation with high MAM from admission data and high MAM in SMART surveys (p value = 0.01); SAM was found to have a moderate correlation with slightly less significance compared to MAM data (p value = 0.05). Screening data was then analysed to not only assess its validity as a proxy for wasting but for its dual purpose of identifying individual children and referring individual children if screening is a valid data source. Four MUAC screening platforms were then selected for plausible comparison.[7] To determine which screening platform provided quality data for this exercise two variables were analysed: 1) the sample size for child admissions to determine if larger sample sizes provided more stable results (# children screened per month per district), and 2) the prevalence produced on each platform from each district for both MAM and SAM (analysed for variability in results and data collection gaps by district). Within the context of Yemen, Community Health, and Nutrition Worker data (CHNV) was identified as the MUAC screening platform with the most reliable and consistently collected data source for data comparison with SMART survey data. Health Facility Nutrition Surveillance (HFNS) data presented issues with data gaps and limitations in reported prevalence. Additionally, HFNS data may not exist in many countries and can be expensive and labour intensive. When compared to SMART survey data, surveillance data reported on average 12% higher prevalence of wasting than SMART, indicating an overestimation of wasting compared to surveys. An overestimation was also observed with MUAC (mean 8.4%) during this comparison.

After a systematically analysing each data source through bivariate analysis, the Yemen RMF team identified a weak relationship between each data source compared to SMART survey data except for child admissions compared with SMART SAM and MAM by WHZ (see figure 2 and 3, below).

**Figure 2 & 3: Bivariate analysis for child admission and SMART SAM & MAM (WHZ)**




Variability was still present in the findings but with a moderate correlation based on Pearson correlation for both SAM admissions per 100 vs SAM_WHZ for SMART (r=0.618; p<0.01; Lin reg $R^2$=0.382) and for MAM admissions per 100 vs MAM_WHZ for SMART (r=0.555; p<0.01; Lin Reg $R^2$=0.308). After this rigorous process, these findings provided evidence that admissions data in Yemen provided the most reliable proxy candidate for wasting updates in-between SMART surveys. This pilot of the RMF approach in-between SMART surveys confirmed the feasibility of a

[7] Four MUAC Screening Platforms: 1) CHNW (community health and nutrition workers); 2) Fixed health facilities; 3) Mobile health teams; 4) Outreach campaigns (e.g., vaccination or Vitamin A distribution)

RMF for more frequent malnutrition updates, given the country context provides availability and accessibility of quality data for validation and comparison with SMART survey data. Challenges include continued efforts to regularly update indicators, identifying gaps in data or the issue of non-existent data, and timeliness and reliability of data. The continued work required to finalize this pilot RMF in Yemen include piloting alert thresholds using admissions data, continued analysis of screening data, repeated comparison analysis with all 3 data sources after the next round of SMART surveys, piloting thresholds on multiple data, and the development of a Nutrition RMF Accountability Framework and documentation of the methodology.

**Key Learnings:**

1. An RMF project in Yemen is being explored as a monthly malnutrition monitoring tool between SMART surveys, to facilitate more real-time decision-making for early action during shocks and crises.
2. In phase 1, the concept note was developed with requested feedback on indicator selection (n=55, proposed indicators) and validity.
3. In phase 2, an indicator review workshop took place for the development of indicator selection criteria, resulting in a final list of 9 indicators.
4. Phase 3 included data collection, synthesis, and analysis with a 2-step approach with 1) univariate analysis to understand data distribution, and 2) bivariate analysis to validate data against population-based surveys (SMART).
5. Three data types were explored to identify if they were adequate proxies for malnutrition prevalence in Yemen, each were analysed for correlation with SMART data (i.e., admissions, screening, surveillance).
6. Child admissions data was found to have a relationship with SMART SAM/ MAM WHZ data after bivariate analysis.
7. Variability was still present, however, this RMF approach piloted in Yemen confirmed the growing feasibility for more frequent malnutrition updates, given the country context provides availability and accessibility of quality data for validation and comparison with SMART survey data.

## 4. Introduction to SMART+ Innovation

The final session of Day 1 was led by Jana Daher, creator of SMART+ and SMART Project Manager of Research, Innovation, and Technology. This presentation provided participants with a comprehensive introduction to SMART+ and was followed by a panel discussion from countries currently implementing SMART+ for SMART surveys. SMART+ was officially launched by the SMART Initiative on April 26th, 2023, in Nairobi, Kenya, and the roll-out for this innovation has since started in select countries.

SMART+ is a revolutionary digital infrastructure aimed at enhancing the way nutrition assessments are conducted and data are shared in the field.[8] It builds upon the SMART methodology, offering an end-to-end solution to address key challenges in the nutrition assessment process. These challenges include:

1. A scarcity of assessment experts, adept at navigating the fragmented systems of data collection and analysis.
2. Significant delays between data collection and analysis, limiting the timeliness of data dissemination. These delays hinder decision-making due to lengthy survey timelines.

[8] SMART+ and Tools: https://smartmethodology.org/smartplus/?doing_wp_cron=1706126799.9894230365753173828125

3. Absence of a central repository of SMART surveys leading to a lack of transparency when accessing data.
4. Absence of a tool for collecting and analysing additional indicators leading to lack of standardization, access, and transparency in data management.

To tackle these challenges, the SMART Initiative has developed four distinct tools as part of SMART+, each serving a specific purpose to digitally link data and survey processes, from start to finish, throughout the SMART survey life cycle (see Image 1 and Table 4, below):

1. SMARTcollect mobile application
2. SMART+ Platform
3. SMART+ Aggregator
4. SMART+ Dashboard

SMART+ is fully accessible free of charge and its SMARTcollect application can be used offline in the field.

**Image 1: SMART+ digital tools poster**


**Table 4: Description of SMART+ digital tools grounded in SMART methodology**

| SMART+ Tools | | Primary Function |
|---|---|---|
| 1 | SMARTcollect app | A mobile app where survey teams can record standardization test data as well as data on nutrition, food security, WASH, and other indicators. It directly links from Android devices in the field to the SMART+ Platform.<br>The app is available on Google Play Store. |
| 2 | SMART+ Platform | A centralized survey management tool to plan, monitor, and administer nutrition surveys. |
| | | Data collected in the field via SMARTcollect is tracked in real-time and automatically analysed in the Platform. Data quality is also assessed, allowing survey managers to continuously provide feedback to their teams. |
| 3 | SMART+ Aggregator | The aggregator is a central, web-based repository that stores global SMART survey data. |
| | | This tool pulls together different datasets, consolidating summary and individual-level data. |

| | | |
|---|---|---|
| | | Contributes timely data for situational analysis mechanisms such as IPC, HNO, HRP, and AI algorithms that use standardized multisectoral data for famine prediction. |
| 4 | SMART+ Dashboard | Provides a live visualization and mapping of SMART survey results, improving the decision-making process so funding can be properly allocated, and programs can be prioritized and designed accordingly. |

**Key Learnings:**
1. SMART+ officially launched in April 2023 and roll-out started in Ethiopia and Nigeria.
2. SMART+ is a revolutionary digital infrastructure that builds upon the SMART methodology and is aimed at enhancing the way nutrition assessments are conducted and data are shared in the field. It offers an end-to-end solution for addressing key challenges in the nutrition assessment process.

## 5. The Power of SMART+ in Action: A Panel Discussion

The introduction to SMART+ was followed by a panel discussion exploring the experiences of countries currently implementing SMART+ to complete SMART surveys. Panellists from Ethiopia, Kenya, and Nigeria provided insights and learnings that led to the successful and timely completion of 22 SMART surveys using SMART+ (i.e., n=11 in Ethiopia, n=1 in Kenya, and n=10 in Nigeria). This panel discussion was led by Jana Daher, SMART+ Global Lead and SMART Project Manager of Research, Innovation, and Technology, and included the following nutrition information and survey specialists as panellists: Wondayferam Gemeda, Nutrition Coordinator at Emergency Nutrition Coordination Unit Ethiopia; Abbas Kedir, Nutrition Information Officer at Disaster Risk Management Commission Ethiopia; Edward Kutondo, Information Management Officer at UNICEF Nigeria; Nura Shehu, Nutrition Assessment and Surveillance Specialist at UNICEF Nigeria; and Steven Kimanzi, SMART Emergency Survey Manager based in Kenya. Three questions were asked of the panellists to gather greater understanding of their experiences using SMART+ from start to finish while conducting SMART surveys.

1) **Why did you choose to use SMART+?**
Panellists unanimously mentioned the need for innovation in survey processes, seeking efficient, error-free methods to obtain timely, reliable data. SMART+ promised to address these challenges, offering a streamlined approach to data collection and analysis.

> **"We need a platform that streamlines the survey process, from planning to data dissemination, allowing us to make informed decisions quickly. SMART+ provides us with that solution**" – *Information Management Expert, UNICEF Nigeria*

2) **How would you sum up your experience with using SMART+?**
Panellists spoke positively of their experience using SMART+ to conduct surveys in their respective countries. Across all countries, panellists noted that the use of SMART+ helped not only improve data quality but also save time. SMART+ was praised for its user-friendly interface and efficiency gains. The platform's ability to flag data discrepancies and generate instant reports was particularly praised, allowing for timely adjustments and improved data quality. The panellists did note that they would like to see the inclusion of a "supervisor view" to allow for further survey monitoring (this new feature is currently accessible on SMART+).

> “**SMART+ has simplified our survey management, allowing us to focus on data quality and make informed decisions. It’s a game-changer**.” – *Information Management Expert, UNICEF Nigeria*

3) **How has the use of SMART+ facilitated the access of data for decision-making?**
In closing remarks, panellists highlighted the role of SMART+ in enabling real-time data sharing, informing targeted responses and donor engagements. Survey findings are readily available through the SMART+ Aggregator and provide valuable insights for decision-makers.

> “**I cannot emphasize enough the significance of SMART+ in providing real-time information to guide our donors. Access to such data is crucial for shaping our response strategies.”** – *Nutrition Coordinator, Emergency Nutrition Coordination Unit Ethiopia*

> **“SMART+ is an essential innovation. In today's world, not innovating means falling behind. So SMART+ innovation helps us plan, have good quality data, increase access to data and finally drive utilization. That's why we've embraced it in Nigeria, where we aim to not only implement it nationwide but also extend its reach to other West African countries!”** – *Information Management Officer, UNICEF Nigeria*

> “**The quick turnaround in Laikipia was striking. Data collection finished one day, the presentation was prepared the next, and presented the day after. These rapid results prompted immediate action, revealing unusual health issues and the highest-ever GAM prevalence in the area. Response plans were swiftly developed before Christmas**.” – *Emergency Survey Manager, Kenya*

**Key Learnings:**

1. Country experience using SMART+ in SMART surveys indicates that SMART+ provides a streamlined approach that enhances efficiency and data quality.
2. SMART+ has allowed countries to share estimates in real-time and facilitated a more targeted and rapid response planning, enabling immediate action.

## 6. Auto Anthropometry 3D Technology

Dr. Oleg Bilukha, CDC Associate Director of Science, started day 2 of this workshop discussing the findings and challenges of research and technology development for Auto Anthropometry 3D Imaging Technology. Anthropometric measurements are met with challenges due to the cost of height boards, the frequency by which they wear down, and child movement during measurements. For this reason, Auto Anthropometry measurements using 3D imaging technology were explored for feasibility and measurement accuracy. In the primary stages of this body of work findings indicated some promise but weak levels of accuracy and feasibility were reported in field level studies. A study by Concle et al from 2016 –2017 tested the accuracy and reliability of a low-cost, handheld 3D imaging system for child anthropometry within a target population of US children in Atlanta, USA.[9] This study showed promise in a controlled setting with height/ length 95% LoA roughly between a range of –0.7 to 1.9 cm (single measurement) with a

[9] Conkle J, Suchdev PS, Alexander E, Flores-Ayala R, Ramakrishnan U, Martorell R. Accuracy, and reliability of a low-cost, handheld 3D imaging system for child anthropometry. *PLoS ONE* 2018;13(10): e0205320. https://doi.org/10.1371/journal.pone.0205320

length bias of 0.6 cm and length for TEM at 0.6 cm.[10] Challenges subsequently presented themselves in later field validation and evaluation studies within low-resource settings. A paper by Leidman et al., evaluating the accuracy of 3D imaging for child anthropometry in South Sudan, presented findings with a height/ length 95% LoA difference of −23.9 to 22.9 cm in a single measurement and a Length TEM of 8.4 cm.[11] The drastic difference and error in measurement presented in these findings indicated that scan-derived measurements from 3D imaging technology did not provide the accuracy required for future use.[12] A similar finding was depicted in a validation study by Bougma et al., which attempted to validate the accuracy of handheld 3D imaging in Guatemala, Kenya, and China, concluding that further research is required to understand factors attributing to insufficient scan results.[13] The presentation concluded by identifying the high quality of rigour and clarity involved in the methodology and development of this innovative technology, and how insufficient accuracy found in 3D imaging concurrently affects future funding needed to explore further research and development of this technology. Irrespective of the outcomes reported in this body of work, its learnings provide greater insight into what is possible at this current point in time.

**Key Learnings:**
1. Anthropometric measurements are met with challenges due to the cost of height boards, the frequency by which they wear down, and child movement during measurements.
2. Auto Anthropometry measurements using 3D imaging technology were explored for feasibility and measurement accuracy.
3. In the primary stages of this body of work findings indicated some promise but weak levels of accuracy and feasibility were reported in field level studies.

## 7. Advancing Malnutrition Digital Diagnosis with SAM Photo Diagnosis

For this presentation, Amador Gomez de Arriba, Dr. Juan Burgos-Soto, and Dr. Laura Medialdea from the SAM Photo Diagnosis App(C) Program from Action Against Hunger Spain, presented on their preliminary research and development of a SAM photo screening tool. The objectives of this project are to improve the time and precision by which children are screened with SAM, provide accurate and timely measurements by use of a camera phone for ubiquitous accessibility, including intra and inter-observer error prevention, and increase coverage for nutritional screening. The evidence for this project is based in geometric morphometric methods applied to the study and estimation of nutritional status. Three validation studies by Medialdea et al., were discussed looking at child body shape, nutritional status, and SAM morphological patterns using geometric morphometric techniques.[14][15][16] The SAM photo diagnosis tool is designed to take

[10] Concle et al., 2018.

[11] Leidman E, Jatoi MA, Bollemeijer I, Majer J, Doocy S. Accuracy of fully automated 3D imaging system for child anthropometry in a low-resource setting: effectiveness evaluation in Malakal, South Sudan. *JMIR Biomedical Engineering* 2022;7(2): e40066. https://biomedeng.jmir.org/2022/2/e40066

[12] Leidman et al., 2022.

[13] Bougma K, Mei Z, Palmieri M, Onyango D, Liu J, Mesarina K, Akelo V, Mwando R, Zhou Y, Meng Y, Jefferds ME. Accuracy of a handheld 3D imaging system for child anthropometric measurements in population-based household surveys and surveillance platforms: an effectiveness validation in Guatemala, Kenya, and China. *American Journal of Clinical Nutrition* 2022; 116:97-110. https://pubmed.ncbi.nlm.nih.gov/35285874/

[14] Medialdea L, Bazaco C, D'Angelo del Campo, MD, Sierra-Martinez C, Gonzalez-Jose R, Vargas A, Marrodan MD. Describing the children's body shape by means of Geometric Morphometric techniques. *American Journal of Physical Anthropology 2019;*1-14. https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.23779

[15] Medialdea L, Vargas A. Approaching nutritional status by means of geometric morphometric methods (p11-129-19). *Cur Dev Nutri* 2019;13;3(Suppl 1):nzz048.P11-129-19. https://doi.org/10.1093%2Fcdn%2Fnzz048.P11-129-19

[16] Medialdea L, Bogin B, Thiam M, Vargas A, Marrodan Maria D, Dossou NI. Severe acute malnutrition morphological patterns in children under five. *Scientific Reports 2021;* 11:4237. https://www.nature.com/articles/s41598-021-82727-x.

visual data from a photo and respond with a binary diagnosis result of either SAM or Optimal Nutrition Condition (defined as -0.5 to 0.5 WHZ/ 135 to 165 MUAC). The detection of cases with oedema is not considered by this tool given the simple identification procedure of this medical complication. MAM and risk of acute malnutrition are not included in the function of this app at its present stage of development but are currently under study. The team is currently exploring the study of shape for diagnosis in the field of chronic malnutrition. Their research is at a non-operational level requiring further research before advancing into the next stages of development. A technical validation of the tool will be carried out during the first half of 2024 in the field in Senegal to identify the performance metrics of the tool outside the controlled trial context (which already has published evidence). During the second half of 2024, they will carry out case-control studies to assess the use of the tool during active and passive screening among different users. Feasibility, acceptability, adaptability, and cost-effectiveness components of the app will also be assessed at this time. Concurrently, an interpopulation study is also underway to assesses 1) the different population phenotypes of the SAM Photo across contexts, and 2) the ability of the unique algorithms designed for this app to identify nutritional status.

**Key Learnings:**

1. ACF Spain presented on their preliminary efforts towards the development of a SAM photo diagnostic tool.
2. In its nascent stages, this project aims to improve the time by which children are diagnosed with SAM, providing accurate and timely measurements by use of a camera phone.
3. Moreover, SAM photo vision is:
    1) To provide a rapid, accurate and life-saving screening, improving the coverage of nutritional screening fostering the autonomy of community health workers.
    2) To strengthen local health information systems, making available quality data to improve decision making processes. SAM Photo web application serves as an aggregator of nutritional data from its first detection.
    3) To foster community implication in child nutritional screening to improve the availability of more precise and updated information about child nutritional status at community level.
4. The evidence for this project is currently based in geometric morphometric methods applied to the study and estimation of nutritional status.
5. The team is currently exploring the study of shape for diagnosis in the field of malnutrition, noting that their research is at a non-operational level requiring further research and development.

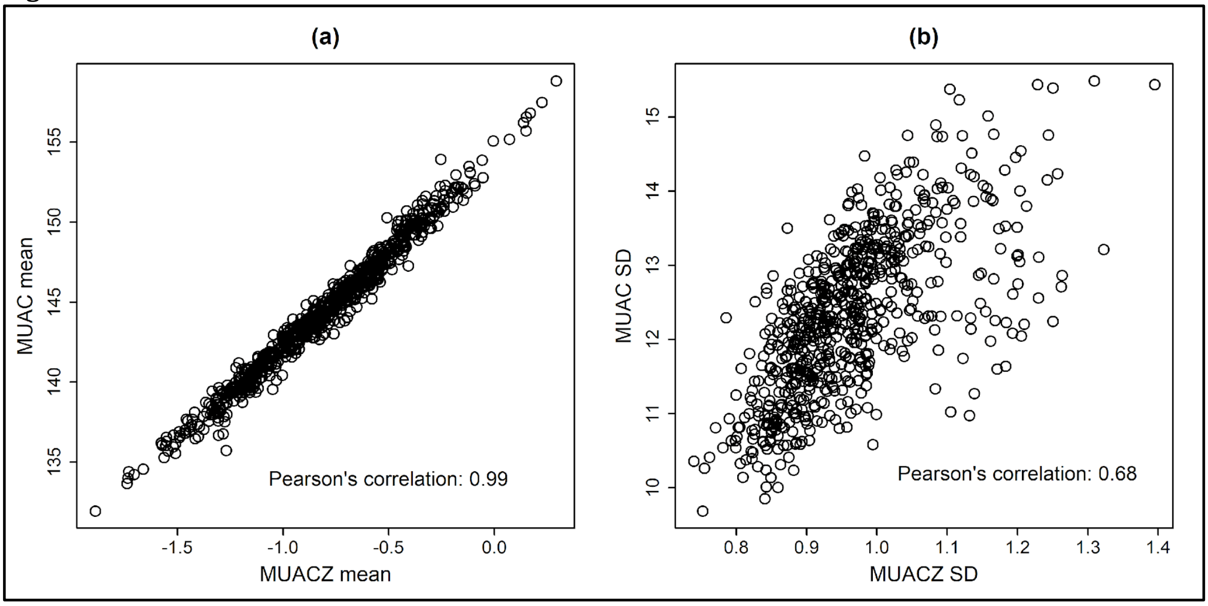
## 8. Precision Matters: Evaluating MUAC in Humanitarian Surveys

In this presentation, Dr. Oleg Bilukha discussed a recently published paper on the evaluation of MUAC measurement quality in anthropometric surveys and nutritional screenings within humanitarian and refugee settings.[17] Bilukha and Kianian authored this paper for two primary reasons: 1) there is a lack of defined flags for cleaning MUAC data which would allow values of 20mm or 600mm to be included in an analysis; and 2) there are no advanced criteria for assessing MUAC quality in SMART plausibility checks. Data used for this evaluation included SMART or SENS Surveys from 2011 – 2019 (n=701) that were conducted in 40 different countries with a total of over 380,000 child records. MUAC vs MUAC-for-Age (MUACZ) flags were analysed looking first at how many flags exist with different flagging ranges. Results from this work indicated that there were very few flags with different flagging ranges. Only 2.7% of surveys had >2% of flags

[17] Bilukha O, Kianian B. Considerations for assessment of measurement quality of mid-upper arm circumference data in anthropometric surveys and mass nutritional screenings conducted in humanitarian and refugee settings. *Maternal & Child Nutrition* 2023*;* 19(2): e13478. DOI: 10.1111/mcn.13478

when using a +/-3 range, continuing with this range would then permit a total of 2% of flags during SMART Plausibility Checks. Most flags during this analysis fell along the lower tail with 81.7% for ±4 MUACZ, 76.7% for ±3 MUACZ, and 82.6% for MUAC at 10 - 20 cm. The average Standard Deviation (SD) was 0.96, within the appropriate range for SD of 0.8 - 1.2; however, SD for MUAC only assessments fell roughly within a range of 10.5 - 14.5 with a few SD values falling on the outside edge of the ideal range.[18] These results were followed by a bivariate analysis of MUAC vs MUACZ for mean and SD. MUAC mean and SD were both found to be highly correlated based on Pearson's Correlation values with the following results: (a) r = 0.99 and (b) r = 0.68, respectively (see figure 4 & 5).[19]

**Figure 4 & 5: MUAC vs MUACZ mean and SD**




Findings from this paper identified that it is feasible to define MUAC flags based on MUACZ distribution that do not deviate from other flagging methods. The use of high-quality data during this evaluation further indicated that flagging criteria do not change the mean and SD and have very little effect on prevalence.

**Key Learnings:**

1. Dr. Oleg Bilukha discussed his recently published paper on the evaluation of MUAC measurement quality in anthropometric surveys and nutritional screenings within humanitarian and refugee settings.
2. Data used for this evaluation included 701 SMART or SENS Surveys from 2011 – 2019 that were conducted in 40 different countries with a total of over 380,000 child records.
3. MUAC vs MUAC-for Age (MUACZ) flags were analysed and results from this work indicated that there were very few flags overall with different flagging ranges.
4. Findings from this paper identified the feasibility of defining MUAC flags based on MUACZ distribution which do not deviate from other flagging methods.

[18] Bilukha et al, 2023.

[19] Bilukha et al., 2023.

## 9. Counting the Cost: Revisiting the Approach to Malnutrition Caseload Calculation

Douglas Jayasekaran, IPC Nutrition Specialist at IPC Global Support Unit (IPC GSU), and Tomás Zaba, IPC Nutrition Specialist at Action Against Hunger Canada, seconded to the IPC GSU, presented on acute malnutrition caseload calculations with admissions data as a comparison proxy. Caseload calculations were approached with 2 pathways using the following calculations: 1) Incidence Correction Factor (ICF): *= Population x Prevalence x ICF x Coverage*, and 2) Program Admissions Data: *= Admissions* $(T_0)$ *x* $Population_1$ / $Population_0$ *x* $Prevalence_1$/ $Prevalence_0$ *x* $Coverage_1$/ $Coverage_0$. Currently, the former is the most used pathway for calculating caseload. The objective of this analysis was to utilize these two approaches, compare results with actual admissions, and identify the caseload calculation approach that yields the most realistic estimates within the context of 4 selected countries (Yemen, Uganda, Mozambique, and Somalia). This analysis was conducted using retrospective country-specific input data from 2019 – 2021. Criteria for evaluation of caseload performance (or deviation in predicting caseload against the actual admissions) were then categorized and colour-coded as either green for optimal (within 95 –110% of the actual caseload), yellow for sub-optimal (>85% and <95% or >110 and <125 of actual caseload), or red for Poor (<85% or >125% of the actual caseload). Findings from this analysis indicated that caseload calculations on programme data were better aligned to the actual number of programme admissions in most areas. Caseload calculated by ICF was better aligned with actual admissions in some areas. Overall, these reported findings suggest that it would be useful for programmes to calculate caseloads using both approaches to support selecting the best option across contexts.

**Key Learnings:**

1. IPC explored using admission data for acute malnutrition caseload calculations.
2. A 2-pathway approach was explored for this comparison using admissions data and Incidence Correction Factor (ICF is currently the most used pathway for caseload calculations).
3. This analysis concluded that caseload calculations better aligned to the actual number of programme admissions in most areas; caseload calculated by ICF was better aligned with actual admissions in some areas.
4. Utilizing this 2-pathway analysis supports identifying the best option per context for calculating caseload.

## 10. Nutrition Vulnerability Assessment in Crisis (NuVAC)

The Nutrition Vulnerability Assessment in Crisis (NuVAC) approach is a joint initiative led by UNICEF and WFP to ensure predictable and reliable information on nutrition vulnerabilities for better and timelier decision-making in humanitarian nutrition responses. Marijka van Klinken, WFP NIS Specialist, and Anne-Celine Delinger, UNICEF Nutrition in Emergencies and NIS Specialist, presented on NuVAC as a new collaborative approach, currently in the piloting phase, designed for strengthening nutrition information systems. In response to detected gaps, this approach is designed to produce three outcomes: 1) strong, relevant, and agile governance; 2) reliable nutrition security analysis; and 3) better and timelier decision-making by use of effective and more comprehensive communications. The strategic approach is to utilise and further develop systematic, integrated, transparent, and accountable linkages across the NIS data value chain. From 2022 – 2023, Phase 1 was conducted in the Eastern and South African regions (I.e., South Sudan and Madagascar) as an official piloting phase. Phases 2-3 will be conducted from 2024- 2026.

Phase 1 has prioritized a systemic lens to better capture learnings throughout this validation process. Decision-makers and end users were consulted to identify gaps and areas of improvements for more tailored communication. Expected results from the Phase 1 include the following: 1) development of a project plan produced by the NuVAC pilot implementation; 2) an established global governance structure with strong engagement for next phases; 3) tested and improved frameworks for holistic analysis; and 4) high quality nutrition information and analysis products aimed to enhance better decision-making at all levels. A governance structure was successfully established in Phase 1 to address strategic and technical discussions at global and regional levels, providing capacity for mutual activities, relevant communication, and continued support. Next steps include defining a shared NIS strategic vision with clear accountability, leadership and working principles, followed by co-design based on new governance principles, and facilitation for capacity building, localization, and fundraising. The national work plan for this phased approach will then include a comprehensive approach for analysis of nutrition vulnerabilities at country level. This includes the development of thresholds for monitoring routine data, predictive modelling outputs on prevalence of malnutrition based on the MERIAM modelling approach, and end-user relevant nutrition information product (See table 5).

**Table 5: NuVAC joint initiative National Work Plan overview**

| NuVAC Work Plan Category | Activities |
|---|---|
| **System Strengthening and Capacity Building** | Develop data access and sharing protocols btw UNICEF/ WFP and national authorities |
| | Set-up centralized repository for all data with clear guidelines |
| | Develop capacity building plan for line ministries under responsibility of MoH |
| **Analytical Framework** | Identify criteria for NuVAC implementation |
| | Identify key indicators to be used for nutrition vulnerabilities and monitoring |
| | Define thresholds to monitor contributing factors |
| **Communication Products** | Conduct interviews with key stakeholders to help understand informational needs |
| | Develop communication and advocacy plans that involve development partners and other sectors |

This presentation was followed by breakout groups for participants to collaboratively discuss the challenges, roles, and priorities for strengthening NIS at each level proposed in the NuVAC approach.

**Key Learnings:**

1. NuVAC as a new collaborative approach designed for strengthening nutrition information systems.
2. Designed as a model to produce three outcomes: 1) strong, relevant, and agile governance, 2) reliable nutrition security analysis, and 3) better and timelier decision-making by use of effective and more comprehensive communications, NuVAC is currently piloting this multi-phased approach for validation.
3. Once validated this NuVAC model is anticipated to further develop systematic, integrated, transparent, and accountable linkages across the NIS data value chain for a stronger NIS for the sector.

## 11. Precision Pulse Tracking Anemia Research and MUAC Data Quality

This presentation provided updates on anemia measurements and research in the field of global health malnutrition. Kaitlyn Samson, Research Officer at Action Against Hunger, and Dr. Oleg Bilukha (CDC) discussed haemoglobin (Hb) measurement and anemia diagnosis, and the challenges found in field surveys and establishing quality parameters. Anemia is a condition where the number of red blood cells are insufficient to support physiologic needs. Common underlying mechanism include ineffective erythropoiesis, hemolysis, and blood loss. Anemia is associated with increased morbidity and mortality in women and children, poor birth outcomes, decreased work productivity, and impaired cognitive and behavioural development.[20] Progress towards global targets have stagnated with global estimated prevalence rates at 40% for children 6-59 months, 30% for non-pregnant women of reproductive age (WRA), and 36% for pregnant women.[21][22] Diagnosis of anemia at sea level is typically based on Hb concentrations based on WHO cut-offs guidelines; however, practitioners can expect updates to WHO cut-off guidelines within the next year to account for recent evidence. In the coming year the sector can expect 1) changes to cut-offs for very young children; 2) updates for pregnant women stratified by trimester; 3) a recalculation for diagnosis of severity based on these revised cut-offs; 4) new adjustments for elevation and smoking with possible impact on automatic analysis software (e.g., SMART+); and, 5) identification of Hb as an adequate measurement assessment marker for the impact of iron interventions.[23] It will be important to wait for the updated guidance from WHO before revising protocols for assessing anemia in the field.

In field research on anemia and Hb measurements, drop capillary and venous samples are both used for Hb measurement; however, recent findings have called global estimates of anemia prevalence into doubt based on noted differences detected in results generated from drop capillary samples for Hb measurement.[24][25] Single drop measurements have been questioned due to recent detection of high random error which can result in poor estimates of anemia. Considering portable photometric devices are the current standard for anemia measurements, forthcoming results from the USAID HEME Project have found that most variations in measurement come from blood collection specimens rather than device models. Adjusting for device bias any HemoCue device can be used, but without adjustments for device bias HemoCue

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201+ is the most reliable option.[26][27] Non-invasive pulse co-oximeter devices have been tested as a potential alternative; however, reviews have found these devices to display more variation than HemoCue devices when compared with lab references.[28] Rad-67, an updated, portable pulse co-oximeter device, was analysed in both a clinical and field-readiness context for validity as a non-invasive method. In both analyses biases and/ or precision issues were found, concluding that non-invasive methods are not yet acceptable clinically or for field surveys.[29][30] There is an overall need to identify reliable, reproducible, and comparable equipment for rapid and inexpensive Hb quantification within the field and in clinical practice.

Quality parameters for field studies are another recent issue within anemia research. Experts have called for quality controls for monitoring data collection, recording, cleaning, adjusting, and analysing Hb results. There is a current lack of clear guidance on Hb data quality parameters and plausible flagging ranges for population-representative surveys. Acceptable values that are commonly cited have an acceptable SD range of 1.1-1.5 g/dl with minimum/ maximum values of 4.0-18.0 g/dl; however, there is a need to establish what is considered low data quality and what are intrinsic statistical properties of Hb distributions. A recent collaboration between the CDC and the SMART Initiative explored the statistical characteristics of Hb distributions (i.e., SD, skewness, and kurtosis) with exclusion ranges in UNHCR population-representative surveys and were compared with characteristics from DHS Methodological Report 18.[31][32] Findings from this analysis indicated that it is possible to start formulating quality parameters in field surveys. Survey Hb distributions with any of the following characteristics may be flagged for further quality investigation: 1) skewness above +0.2 and or kurtosis below –0.5; 2) SD in children (6-59 month) below 1.10 or above 1.55 g/dl; and 3) SD in non-pregnant WRA below 1.10 or above 1.65 g/dl. These parameters additionally have potential to inform future Hb plausibility checks. Updated guidance from WHO is needed before further revising protocols for assessing anemia in the field. Population representative anemia assessment may be best suited to micronutrient-specific surveys, rather than SMART surveys, at this time.

**Key Learnings:**

1. We need to wait for the updated guidance from WHO before further revising protocols for assessing anemia in the field.
2. Current research on non-invasive devices indicate that non-invasive methods are not acceptable for use in field surveys at this time.

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3. Surveys with the presented parameters compared with DHS (SD, Skewness, and Kurtosis) may require further quality investigation but have the potential to inform an Hb plausibility check.

## 12. 2023 Data Clinic Outputs

Led by the Nutrition Information Systems Working Group and SMART Initiative, the 2023 Global Data Clinic convened in Nairobi, Kenya prior to the High-Level Technical Assessment Workshop. The purpose of this data clinic was to discuss and produce technical guidance on the current National Nutrition Information System (NNIS) and its core concepts outlined by the UNICEF and WHO NIS team in 2021. The objectives for this clinic were to provide guidance on key NNIS components and the indicator selection process for assessments. Hailu Wondim, SMART Senior Project Manager, provided an update on the outputs from these discussions that took place over 2 sessions. In session 1, specifics of key NNIS were discussed, highlighting the following key components: 1) methods and rationale, 2) goals, 3) types of data that are generated and collected, 4) contextual settings (development vs. emergencies), and 5) reliability and quality of information. The technical group discussed various forms of data used in NNIS (i.e., routine, survey, surveillance, contextual, and financial data) and narrowed these discussions down to both routine and survey data. Concurrently, key components of these data were then discussed to collectively decide on appropriate guidance.

In session 2, a decision tool to facilitate indicator selection in nutrition assessments was discussed. Assessments over-burdened by additional indicators were identified as a pressing issue with an impact on data quality and consistency in reporting. Too much data additionally has an impact on resource mobilization and cost-effectiveness of nutrition surveys which are already challenged by decreasing financial resources and humanitarian funding. In response to these identified challenges, this technical group systematically reviewed common routine and survey-related indicators based on the following criteria: 1) data needs, 2) secondary sources inclusive of criteria for defining indicators based on level of representativity, 3) programmatic and political relevance, 4) frequency of collection criteria and proof of meaningful change over time, 5) suitability for methods used, and 6) costs related to inclusion of specific indicators (e.g., anemia). They then proceeded to identify the most relevant indicators required to manage data quality and the contexts where specific indicators should or should not be included. Four scenarios were considered in this group analysis to identify contextual need for each indicator (i.e., Scenario 1: National SMART Survey & high wasting prevalence; Scenario 2: National SMART Survey & low wasting prevalence; Scenario 3: SMART survey in acute emergencies; Scenario 4: SMART Survey (baseline/ end line survey/ end of funding cycle)); 24 indicators were selected in total for the NNIS guidance (see table 6).

**Table 6: 2023 Global Data Clinic identified NNIS indicators**

| Identified NNIS Indicators | | |
|---|---|---|
| Anthropometry (WHZ) | IYCF | Health Seeking Behaviours |
| Anthropometry (MUAC) | Demography/ Mortality (CDR & U5DR) | Measles Vaccination |
| HDDS | Women Anthropometry (MUAC) | Vitamin A Supplementation |
| FCS | Women BMI | Deworming |
| HHS | Adolescents BMI-Age | IFA Supplementation/ MMS |
| FIES | Older People (BMI/ MUAC) | WASH |
| RCSI | Anemia | Nutrition Program Coverage - SAM, MAM, BSFP, MNP |

| | | |
|---|---|---|
| Livelihood CS | Morbidity (ARI, fever, Diarrhoea) | Counselling – Nutrition Education Session |

The final outputs from this 2023 Global Data Clinic were very concrete, providing the guidance needed to identify NNIS components and types of data required in the field, alongside clear guidance on the types of indicators that should be used in population-level nutrition assessments. An updated NNIS guidance will be available for use in the field in 2024.

**Key Learnings:**

1. This Global Data Clinic convened to discuss and produce technical guidance on the current National Nutrition Information System (NNIS) and its core concepts outlined by the UNICEF and WHO NIS team in 2021.
2. Together they provided guidance to identify key NNIS components and produce an indicator selection process for assessments.
3. A decision tool was utilized to identify 24 indicators for nutrition assessments, narrowing the scope for indicator inclusion to effectively mitigate over-collection of data impacting data quality.
4. Guidance finalized in this clinic will be released in 2024 for practitioner's use.

## 13. Joint Malnutrition Estimates Review Process & Update

The final presentation for TAM was provided by Robert Johnston, Nutrition Monitoring and Evaluation Specialist from UNICEF, and Dr. Elisa Dominguez, Nutrition Technical Officer from WHO, who are responsible for reporting and tracking country progress towards achieving SDG 2.2 (i.e., indicators for stunting, wasting, and overweight). Together they presented on the Joint Malnutrition Estimates (JME) database, a project led by UNICEF/ WHO/ World Bank Group to effectively provide the most up to date data and best practices for anthropometry data collection. Data from the JME database is used to obtain modelled data estimates at the national level, as well as regional and global levels for key SDG 2.2 indicators. This JME presentation provided updates on the JME overview process with recommendations for improved survey quality in National SMART surveys.

The JME overview process is conducted to ensure data sources and final estimates provided in the database are of sufficient quality. The overview process includes a 2-step approach by 1) effectively reviewing and inputting all country input data from point of collection to final review, and 2) operationalizing these data for modelling, aggregation, and dissemination. During the review of new data sources, a standardized in-depth analysis is conducted to review the following criteria: sampling, response rates, training, field teams, equipment, data quality, estimates and trends, program context and information. Based on this an overall assessment is done and a decision for inclusion or not of the data source is made. Following this systematic review, if data sources are found to be of sufficient quality, they are added to the JME database and used to obtain modelled estimates at the national level for stunting and overweight indicators. JME has disseminated estimates for 159 countries in total; 157 of these countries have data for both stunting and overweight estimates, while 43 countries have no record of publicly shared input data for the JME.

In May 2023, the regional and global estimates on stunting and overweight figures by JME were released with the inclusion of wasting trends. Based on the data sources review, main data quality issues found were poor precision in the measurement of height/length (rounding), inaccurate household sampling representation when household mapping is not done at central level ahead of the data collection and management of re-measurements. Reporting of birth dates was also an issue to estimates with accuracy children age. Lastly, some countries were unable to make microdata available thus data quality could not be assessed. Results from this review led to 5 key recommendations areas for the improvement of nutrition surveys and overall data quality (see Table 7).

**Table 7: Recommendations from JME review to improve nutrition assessments**

| | JME Recommendations for Improved Data Quality in Nutrition Assessments |
|---|---|
| **1.** | **To mitigate poor data quality found in young child measurements, careful training and supervision will lead to improved data quality for youngest children. Training should include:** |
| (1) | Include younger children in practice sessions during training, including infants (each sub-age group will require different measurement techniques); |
| (2) | During standardization tests ensure half of the children are under 2-years old, and the remaining half are 2-5-years of age. |
| **2.** | **To mitigate sample and reporting issues for household response rates JME recommends survey teams/ enumerators to:** |
| (1) | Ensure the plan for sample households is followed with consistent reporting on interview status per household; |
| (2) | Ensure each eligible child is listed during data collection whether they are home or not; |
| (3) | Response rates should be calculated based on eligible children and not an expected eligible number; |
| (4) | Follow correct methods for calculations and reporting; |
| (5) | Report response rates by cluster, household, and children. |
| **3.** | **To address poor labelling and duplicate measurement issues, include and clearly label all height and weight measurements in the data set to prevent recording errors and duplicates. This includes clear labelling for the following:** |
| (1) | Initial measurements; |
| (2) | Random measurements; |
| (3) | Remeasurement due to flags; |
| (4) | Final measurement to use for malnutrition estimates. |
| **4.** | **Attempt to record month and year of birth to address recording issues for date of birth. Focus on improving the following:** |
| (1) | When birth certificates are not available, record the estimated month and year of birth using the events calendar; |
| (2) | Provide complete documentation when local calendars are used. |
| **5.** | **Advocacy for public access to individual level microdata was recommended to improve data quality and support continued review of surveys for transparent assessments and use of quality data.** |

Ongoing work from this JME team includes continued modelling of data for the calculations of seasonally adjusted trends on child wasting. Disaggregation by sex and other covariates will additionally be used to test stunting and overweight models for robustness on estimate calculations (i.e., disaggregates for rural/ urban, age, socio-economic status, and mother's education). The objective of this work is to strengthen coordination and collaboration among partners to improve data quality, address data gaps, and actively consider data sources for global reporting. The JME group anticipates an organized technical discussion with the Global SMART Initiative Team in early 2024.

**Key Learnings:**

1. The UNICEF/ WHO/ World Bank Group JME database is tasked to report on the SDG 2.2 nutrition-related indicators.
2. The JME overview process is a rigorous systematic review conducted to ensure data sources and final estimates provided in the JME database are of sufficient quality for the nutrition sector.
3. Estimates and findings produced from this review provided quality recommendations for the improvement of nutrition assessments.

## CONCLUSION AND A WAY FORWARD

The 2023 High-Level Technical Assessment Workshop (TAM) provided 2-days of comprehensive and rich information sharing to bolster the quality and capacity of nutrition assessments across the sector. These collaborative sessions highlighted the progress and significant achievements that have been made across the sector at field-level and in research and innovation. Cross-organizational and governmental efforts are currently developing methods to strengthen NISs with NuVAC and country-specific projects; the NIS Working Group's Global Data Clinic convened to finalize future NIS guidance on data types and pertinent indicators for nutrition assessments. Data quality and analysis processes have been prioritized due to database validation processes with JME, RMF development in Yemen, and IPC efforts to improve analyses. Capacity building for SMART Methodology and SMART+ has seen considerable growth and capacity building to strengthen the survey life cycle. This progress is also met with challenges highlighted throughout the 2023 TAM presentations.

### Moving forward, the following proposed recommendations should be considered:

1. Continue to strengthen capacity building at regional levels for SMART and SMART+ at all stages of nutrition assessments.

2. Encourage narrowing the scope for indicators based on the upcoming NISS Guidance to mitigate data quality issues.

3. To mitigate varying results between the first and second half of a survey period (e.g., changing contexts, country insecurity, seasonality issues), encourage zonal level SMART+ surveys.

4. Support further exploration into the NuVAC model to bolster a systems approach to strengthen NIS and encourage open and honest data sharing and communications to support decision-making and effective programming.

5. Gaps in humanitarian funding present a serious challenge for assessment planning; therefore, resource mobilization mechanisms and collaborations with ministries require strengthening to address this gap.

6. Continue the rollout of SMART+ for a more streamlined survey life cycle and real-time access to data and transparent data sharing for decision-making.

7. Continue to develop and then scale an effective and evidence based RMF to be used in changing contexts for more frequent monitoring of malnutrition.

8. Consider conducting caseload calculations with both admissions data and Incidence Correction Factor with a cross-comparison to identify which pathway appropriately fits the context.

9. Support further discussions with the JME Team to strategically align and utilize the JME database.

# ANNEXES

## ANNEX 1: AGENDA

| NOVEMBER 16 – DAY ONE | | |
|---|---|---|
| TIME (GMT+3) | PRESENTATION | DESCRIPTION |
| 9:00 AM – 10:15 AM | Welcome<br><br>SMART Initiative Update | Introduction of Participants & welcome from Special Guests<br><br>SMART (Then, Now, and the Future) - Hailu Wondim |
| COFFEE BREAK – 30 MINS | | |
| 10:45AM – 1:00PM | From Data to Action – Enabling Timely Updates for Countries in Crisis | -Presentation by ENCO on Ethiopia - Wondayferam Gemeda<br>-Presentation by UNICEF on Pakistan - Muhammad Ali<br>-Presentation by WCARO Assessment Working Group on West Africa - Fanny Cassard<br>-Presentation by UNICEF on Nigeria – Edward Kutondo |
| LUNCH – 1 HOUR | | |
| 2:00 PM – 3:00 PM | Monitoring in Motion – A Journey of Innovation and Collaboration | Evolution of Real Time Monitoring Framework in Yemen: How it came about, and how to replicate in other contexts<br><br>Presentation by CDC, SMART & UNICEF Yemen: Elijah Odundo/ Dr. Oleg Bilukha |
| 3:00 PM - 3:30 PM | SMART+ Innovation | Presentation by Jana Daher (SMART+ Global Lead) |
| COFFEE BREAK – 15 MINS | | |
| 3:45 PM – 4:30 PM | The Power of SMART+ in Action: Tales from the Field Panel | Panel Discussion with Countries who have used SMART+ - led by Jana Daher<br><br>Panel: Stephen Kimanzi, Nuha Shehu, Edward Kutondo, Wondayferam Gemeda, Abbas Kedir |
| NOVEMBER 17 - DAY TWO | | |
| 9: AM - 10:15 AM | Auto Anthro 3D Technology<br><br>From Pixel to Progress: Advancing Malnutrition Digital Diagnosis | Presentation by Dr. Oleg Bilukha<br><br>Presentation by Amador Gomez Arriba/ Juan Burgos-Soto, Laura Medialdea (SAM Photo Diagnosis) |
| COFFEE BREAK – 15 MINS | | |
| 10:30AM – 11:30AM | Precision Matters: Evaluating Mid-Upper Arm Circumference Measurements in Humanitarian Surveys | Presentation by CDC – Dr. Oleg Bilukha |
| 11:30AM- 12:30PM | IPC and SMART Joining Forces for Better Outcomes: Counting the Cost: Revisiting the Approach to malnutrition Caseload Calculation | Presentation by IPC AMN Team – Douglas Jayasekaran/ Tomas Zaba |
| 12:30PM – 1:00PM | Nutrition Vulnerability Assessment in Crisis (NuVAC) | Presentation by UNICEF and WFP – Marijka van Klinken and Anne-Céline Delinger |
| LUNCH – 1 HOUR | | |
| 2:00PM – 2:30 PM | Nutrition Vulnerability Assessment in Crisis (NuVAC) - Breakout Room Discussion | Presentation by UNICEF and WFP – Marijka van Klinken and Anne-Céline Delinger |
| 2:30 PM – 3:30 PM | Precision Pulse: Tracking Anemia Research and MUAC data quality Anemia Research | Presentation by SMART and CDC – Kaitlyn Samson /Dr. Oleg Bilukha |
| COFFEE BREAK – 10 MINS | | |
| 3:40PM -4:00PM | Data Clinic Outputs | Presentation by Hailu Wondim |
| 4:00PM - 4:30PM | Levels and Trends in Child Malnutrition: JME Review Process & Updates | Presentation by UNICEF and WHO – Elisa Dominguez and Robert Johnston |

## ANNEX 2: PARTICIPANT LIST

| ID | First name | Last name | Organization | Country | Title |
|---|---|---|---|---|---|
| 1 | Abbas | Kedir | ENCU | Ethiopia | Information Management Officer/Regional ENCU |
| 2 | Abdullahi | Abdulleh Farah | Save the Children | Somalia | Head of Monitoring and Evaluation |
| 3 | Adamu | Abubakar Yerima | UNICEF | Kenya | Nutrition Information Systems in Emergency Consultant |
| 4 | Adan | Yusuf Mahdi | Save the Children | Somalia | Nutrition Program Manager |
| 5 | Alexandra | Humphreys | ACF Canada | Portugal | GNC Assessment Advisor |
| 6 | Ali | Muhammad | ACF Canada | Canada | Public Health Nutritionist / Reg. SMART Survey Advisor |
| 7 | Amador | Gomez Arriba | ACF Spain | Spain | Director of Research and Innovation |
| 8 | Amina | Mohamed Abdille | UNHCR | Kenya | Nutritionist |
| 9 | Anatascia | Maluki | Farm to Markey Alliance | Kenya | Monitoring and Evaluation Specialist |
| 10 | Anne-Celine | Delinger | UNICEF | Global | NIS in Emergency |
| 11 | Bernard | Thuo | Uni. Research Network | Kenya | Co-Founder of URN |
| 12 | Bernet | Ravelomanana | ACF Spain | Canada | IPC Nutrition Specialist |
| 13 | Big | Queziasse | SETSAN | Mozambique | Nutritionist |
| 14 | Brian | Asande | Feed the Children | Kenya | Monitoring and Evaluation Officer |
| 15 | Damien | Pereyra | ACF Canada | France | IPC Nutrition Specialist |
| 16 | Douglas | Jayasekaran | IPC Global Support Unit | Canada | IPC Nutrition Specialist |
| 17 | Dr. Antonio | Pacheco Dias Lima | SETSAN | Mozambique | Director of Food and Nutrition |
| 18 | Dr. Bassam | Al Dokhani | ACF Yemen | Yemen | Regional SMART Survey Manager - Yemen |
| 19 | Dr. Oleg | Bilukha | CDC | USA | Associate Director of Science |
| 20 | Ebtisam | Dayah | IMC | Yemen | Nutrition Coordinator |
| 21 | Edward | Kutondo | UNICEF | Nigeria | Information Management Officer |
| 22 | Elijah | Odundo | ACF Canada | Canada | NIS Specialist |
| 23 | Elisa | Dominguez | WHO | Global | Nutrition Technical Officer |
| 24 | Faith | Nzioka | GNC | Kenya | GNC Coordinator, Rapid Response Team |
| 25 | Fanny | Cassard | ACF Canada | Canada | NIS and Assessments Specialist |

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| 26 | Firaol | Bekele | EDRMC | Ethiopia | Nutrition Focal Point, Early Warning and Response Directorate |
| 27 | Florence | Mugo | MoH Kenya | Kenya | Research and Capacity Development Manager |
| 28 | Gerald | Kombo | SKR&D | Kenya | Researcher |
| 29 | Gezahegn | Shimelis Taddesse | ACF SSD | Ethiopia | Nutrition Surveillance Expert |
| 30 | Hailu | Wondim | ACF Canada | Canada | SMART Senior Project Manager |
| 31 | Halima | Saadhiya Hillow | ACF USA | Somalia | Emergency Coordinator |
| 32 | Hassan | Ahmed | ACF Canada | Canada | SMART Global Lead |
| 33 | Irene | Kwamboka | World Vision | Kenya | Technical Advisor Nutrition |
| 34 | Ismael | Ngnie Teta | UNICEF Kenya | Kenya | Chief of Nutrition, UNICEF Kenya |
| 35 | Issack | Manyama | UNICEF | Sudan | Nutrition Cluster Coordinator, Sudan |
| 36 | Jalaa | Abdalrahman | ACF Canada | Canada | Project Officer |
| 37 | James | Lual | MoH SSD | South Sudan | NIWG Chair |
| 38 | Jana | Daher | ACF Canada | Canada | SMART+ Global Lead/ SMART Project manager of Research, Innovation and Technology |
| 39 | Joel | Makii | FAO | Yemen | Nutrition and Food Systems Officer |
| 40 | Joseph | Waweru | FewsNet | Kenya | Regional Nutrition Specialist |
| 41 | Joseph | Mandre | ACF Uganda | Uganda | Nutrition Surveillance Expert |
| 42 | Joycelyn | Kathembe | Aga Khan University | Kenya | Dietician |
| 43 | Juan | Burgos-Soto | ACF Spain | Spain | Global Health Specialist/ Project Manager |
| 44 | Judith | Munga | ACF Canada | Canada | IPC Nutrition Specialist |
| 45 | Justine | Marie Francoise Briaux | UNICEF WCARO | West Africa | Nutrition Specialist in Wasting, Prevention, and Care |
| 46 | Kaitlyn | Samson | ACF Canada | Canada | Research Project Officer |
| 47 | Kerow | Maalim | Save the Children | Kenya | Nutrition Coordinator |
| 48 | Khamisa | Jubata | MoH South Sudan | South Sudan | Director for Nutrition Department |
| 49 | Laura | Medialdea | ACF Spain | Spain | Principle Investigator of SAM Photo Program |
| 50 | Leila | Akinyi Odhiambo | Moh Kenya | Kenya | Deputy Head of Nutrition and Dietetics Unit |
| 51 | Lilian | Kaindi | ACF HEARO | Kenya | Survey and Surveillance |
| 52 | Lucy | Kinyua | MoH Kenya | Kenya | Public Health Specialist |

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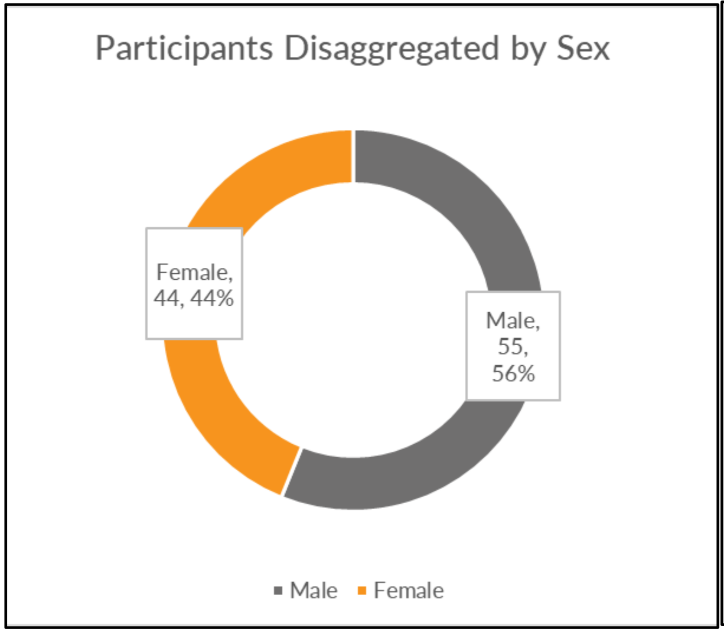
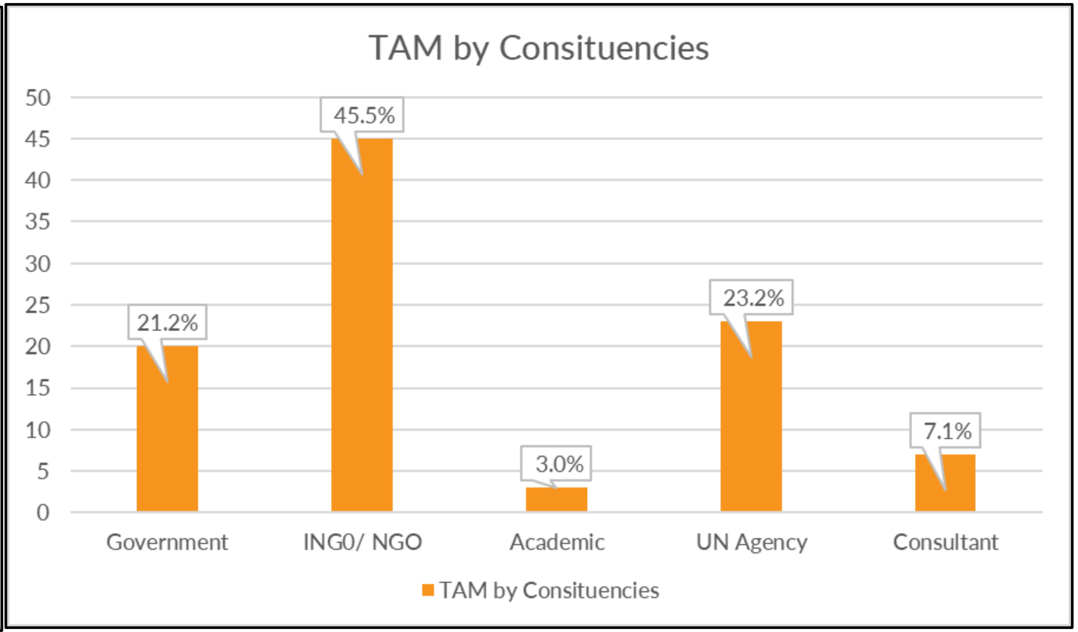
|---|---|---|---|---|---|
| 53 | Lucy | Maina | UNICEF | Kenya | Nutrition Specialist, Information System and M&E |
| 54 | Mahamat | Garba Issa | MoH Tchad | Tchad | Chef de service Surveillance Nutritionnelle et Gestion des Données |
| 55 | Marijka | van Klinken | WFP | Netherlands | Early Warning & NIS Specialist |
| 56 | Martin | Njoroge | REACH-HQ | Kenya | Nutrition Assessment Specialist |
| 57 | Mary | Muriuki | MoH Kenya | Kenya | Principle Secretary for Public Health |
| 58 | Maureen | Wachira | ACF HEARO | Kenya | Intern |
| 59 | Megan | Brown Wollenberg | ACF Canada | Canada | Project Officer |
| 60 | Nancy | Mikia | Independent | Kenya | Clinical Nutritionist |
| 61 | Nijiru | Kanyuira | Independent | Kenya | Nutrition Consultant |
| 62 | Noha | Salheen | MoH Sudan | Sudan | National Nutrition Program Director |
| 63 | Nuha | Abdelfattah | MoH Sudan | Sudan | MoH Sudan |
| 64 | Nura | Shehu | UNICEF | Nigeria | Nutrition Assessment and Surveillance Specialist |
| 65 | Ouedraogo | Moussa | MoH Burkinabe | Burkina Faso | Nutritionniste/ Service Surveillance Nutritionnelle |
| 66 | Robert | Johnston | UNICEF | Global | Nutrition Specialist |
| 67 | Saidou | Adamou Magagi | WFP Regional Bureau | West Africa | Food Systems and Nutrition Analyst |
| 68 | Samuel | Murage | MoH Kenya | Kenya | Health Information Management |
| 69 | Serge | Roderique Kouame | MoH Burkinabe | Burkina Faso | Director of Nutrition |
| 70 | Stephen | Kimanzi | ACF Canada | Canada | SMART Emergency Survey Manager |
| 71 | Taslim | Mohammed | Independent | Canada | Public Health Nutritionist |
| 72 | Tomas | Zaba | ACF Canada | Canada | IPC Nutrition Specialist |
| 73 | Victoria | Mwenda | UNICEF | HQ | Deputy Nutrition Cluster Coordinator |
| 74 | Wondayferam | Gemeda | ENCU | Ethiopia | ENCU Coordinator/ NIWG Lead/ Nutrition Specialist |
| ONLINE | | | | | |
| 1 | Abdou | Bagoudou Nouradine | CILSS | Niger | Nutritionist |
| 2 | Adamu | Abubakar | UNICEF | Kenya | Nutrition Information Systems in Emergency Consultant |
| 3 | Adelaide | Challier | ACF France | France | Nutrition and Surveillance Advisor |
| 4 | Alexandra | Rutihauser | ACF UK | France | Head of Nutrition |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Alinoor | Farah | Reach Initiative | Ethiopia | Senior Assessment Officer |
| 6 | Andi | Kendle | ACF Canada | Canada | GNC Technical Support Team Coordinator |
| 7 | Celine | Soulier | IRC | Mozambique | Regional Nutrition Technical Advisor |
| 8 | Clemence | Malet | ACF France | France | Technical Advisor Nutrition |
| 9 | Deepak | Kumar | University of Oslo | Pakistan | Consultant |
| 10 | Dina | Aburmishan | USAID | Washington | Senior Nutrition Advisor |
| 11 | Dr Mohamed | Sheikh Omar | ACF Somalia | Somalia | Head of Health & Nutrition Department |
| 12 | Elhadji | Mahaman | USAID/ BHA | Senegal | Regional Nutrition Specialist |
| 13 | Endalamaw | Tessema | Reach Initiative | Somalia | Nutrition Specialist |
| 14 | John | Mungai | Independent | Kenya | Data Science and Nutrition Student |
| 15 | Lawan | A. Gambo | ACF Nigeria | Nigeria | SMART Survey Manager |
| 16 | Lenka | Blanarova | ACF UK | Slovakia | Senior Nutrition Assessment Coordinator |
| 17 | Mirta | Kilian | WFP | Mozambique | Nutrition Monitoring and Evaluation Associate |
| 18 | Mohamed | Abdi Brole | FAO/ FSNAU | Somalia | Nutrition Analyst |
| 19 | Philip | McKinney | Independent | Ireland | Food and Nutrition Systems Specialist |
| 20 | Sayed Rahim | RASTKAR | WFP | Afghanistan | Nutrition Manager |
| 21 | Tahira | Gul | Contech International | Pakistan | Public Health Consultant |
| 22 | Terry | Theuri | UNHCR | Kenya | Senior Nutrition Advisor |
| 23 | Uwimana | Sebinwa | ACF UK | French | Senior Nutrition Assessment Advisor |
| 24 | Victoria | Sauveplane-Stirling | University of Toronto | Canada | Research Officer |
| 25 | Yengi | Emmanuel | Save the Children | South Sudan | Nutrition Survey Manager |

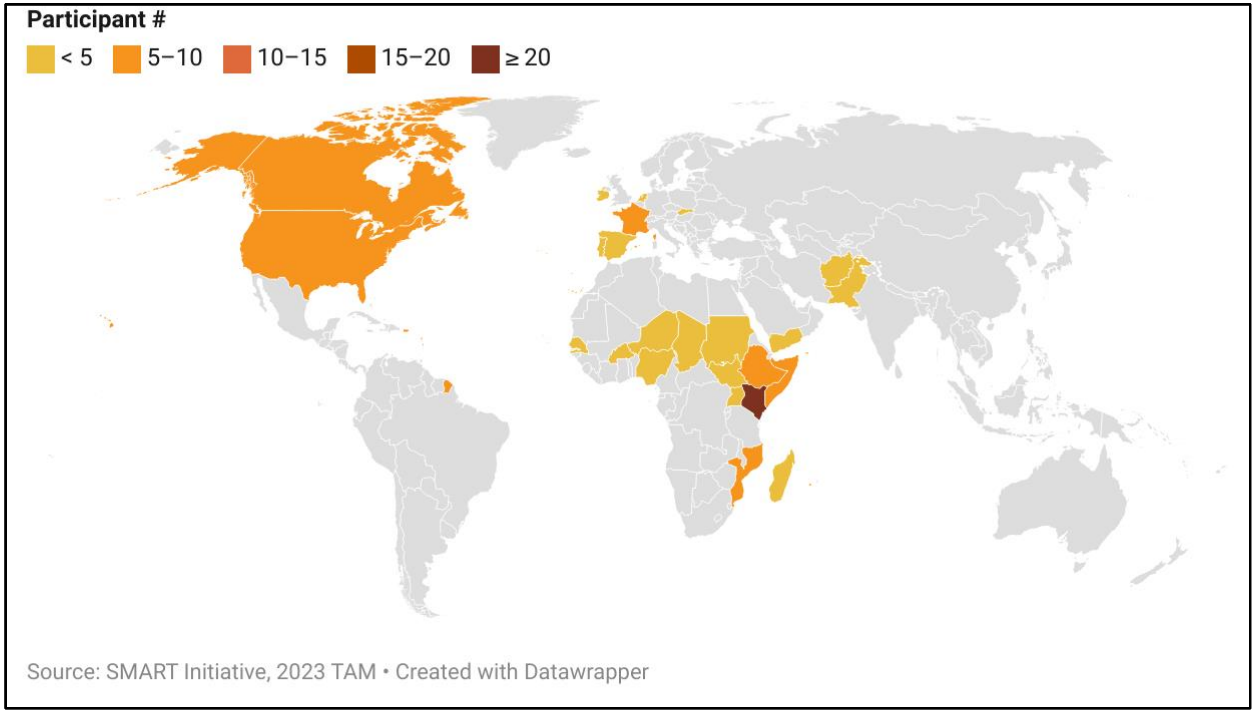
## ANNEX 3: PARTICIPANT CHARACTERISTICS



**Countries Represented**

There were 24 countries represented in total. All but 1 country had 1–8 representatives in attendance at TAM, with a mean attendance of 4.1 persons per country (mean attendance of 3 persons per country excluding Kenya). As the convening country, Kenya had a total of 29 representatives in attendance at the 2023 TAM workshop.




| Country List (N=24) | | | |
|---|---|---|---|
| Afghanistan | Kenya | Pakistan | Spain |
| Burkina Faso | Madagascar | Portugal | Sudan |
| Canada | Mozambique | Senegal | Tchad |
| Ethiopia | Netherlands | Slovakia | Uganda |
| France | Niger | Somalia | USA |
| Ireland | Nigeria | South Sudan | Yemen |

## ANNEX 4: PRESENTATION CITATIONS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