**Meeting to Reach Consensus**
**on a Global Dietary Diversity Indicator for Women**

**Washington DC, USA, July 15th-16th, 2014**

# SUMMARY REPORT

**Prepared by FAO in October 2014**

Food and Agriculture Organization of the United Nations

USAID FROM THE AMERICAN PEOPLE

FANTA III FOOD AND NUTRITION TECHNICAL ASSISTANCE

EUROPEAN UNION

fhi360 THE SCIENCE OF IMPROVING LIVES

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# ACKNOWLEDGEMENTS

We express sincere appreciation those who contributed to and participated in this meeting, all of whom contributed to its great success.

The WDDP-II research was conducted at the Institute de Recherche pour le Développement (IRD) through funding provided by the European Union/FAO Improved Global Governance for Hunger Reduction Programme to the FAO Nutrition Division.

The workshop was hosted on location by the Food and Nutrition Technical Assistance III project (FANTA-III). Technical and financial assistance for the workshop were provided by both by FAO through support from the European Union and by FANTA through support from USAID.

We express appreciation to all the individuals who have provided intellectual, technical and logistic support to make this meeting possible. In particular we thank Yves Martin-Prével and Pauline Allemand who headed the research for WDDP-II at IRD, along with Doris Wiesmann, Mary Arimond, Terri Ballard, Megan Deitchler, Marie-Claude Dop, Gina Kennedy, Warren T K Lee and Mourad Moursi who rounded out the WDDP-II team and assisted in many ways including technical, intellectual and editorial aspects of the analysis. Many thanks go to Megan Deitchler and those who assisted her in making detailed and expert arrangements for the meeting. Especial thanks also to Nadra Franklin for her highly-skilled and excellent work as moderator.

The text for this document was written by Melissa Daniels and Terri Ballard, who are grateful for the meeting notes and audio recordings provided by Zeina Maalouf-Manasseh and the communications department of FANTA-III.

# ACRONYMS

| | |
|---|---|
| AUC | Area Under the Curve |
| CGIAR | Consultative Group on International Agricultural Research |
| DfID | Department for International Development (UK) |
| DHS | Demographic and Health Survey |
| EAR | Estimated Average Requirement |
| FANTA | Food and Nutrition Technical Assistance |
| FAO | Food and Agriculture Organization |
| FGI | Food Group Indicator |
| FGI-9R | 9-Food Group Indicator – Restricted (15 g) |
| FGI-10R | 10-Food Group Indicator – Restricted (15 g) |
| IRD | L'Institut de Recherche pour le Développement |
| MDD-W | Minimum Dietary Diversity - Women |
| MPA | mean probability of adequacy |
| NCD | Non-communicable disease |
| NPNL | non-pregnant/non-lactating |
| PA | probability of adequacy |
| RDA | Recommended Daily Allowance |
| ROC | Receiver-Operating Characteristic |
| USAID | United States Agency for International Development |
| WDD | Women's Dietary Diversity |
| WDDP | Women's Dietary Diversity Project |

# BACKGROUND AND KEY RESULTS

## BACKGROUND

The Food and Agriculture Organization of the United Nations (FAO) and the Food and Nutrition Technical Assistance III Project (FANTA) convened a consensus meeting in Washington DC on July 15-16, 2014, to select a simple proxy indicator for global use in assessing the micronutrient adequacy of women's diets. Meeting participants from academia, international research institutes, UN and donor agencies unanimously endorsed and agreed to support the use of a new indicator, called **Minimum Dietary Diversity – Women (MDD-W)**.[1] The new indicator reflects consumption of at least five of ten food groups (see the table on the next page), and can be generated from surveys. It provides a new tool for assessment, target-setting, and advocacy.

The Women's Dietary Diversity Project (WDDP) was designed to respond to the need for simple yet valid indicators of women's diet quality, with a specific focus on micronutrient adequacy. In the decades preceding the Project, there were many calls for attention to women's diet quality and nutrition but little programmatic action. A lack of platforms for reaching adolescent girls and women of reproductive age outside of prenatal care was—and remains—a major impediment. Lack of indicators to allow for assessment, advocacy, and accountability has been another constraint. The WDDP responded with a collaborative research project analyzing simple proxy indicators derived from high-quality dietary data sets from a range of settings in Africa and Asia. The WDDP used a common analytic protocol and harmonized definitions for a wide range of "candidate" indicators.

The first phase of the Project (WDDP-I, 2005–2010) ended with a partial solution to the "indicators gap" and the proposal of several dietary diversity scores for possible use.[2] The second phase (WDDP-II, 2012–present) used more data and conducted additional analyses with the objective of identifying and proposing a dichotomous indicator for global use.[3] The WDDP-II aimed to stimulate progress both through new analytic work and through engaging a broader range of experts for consideration of results and next steps.

Recent developments—including dramatically increased attention and funding for nutrition-sensitive interventions, notably in agriculture—have increased demand for indicators of food consumption and diet quality. Several organizations (e.g., FAO and US Agency for International Development (USAID)) currently use a 9-point food group score, which was among the indicators identified by WDDP-I. This WDD score is also identified as one of six outcome level indicators in

[1] This indicator complements the "Minimum Dietary Diversity" (MDD) indicator previously defined for infants and young children; see: WHO. 2008. *Indicators for assessing infant and young child feeding practices: Part 1 Definitions.* Available at: http://whqlibdoc.who.int/publications/2008/9789241596664_eng.pdf

[2] Arimond et al. 2010. "Simple food group diversity indicators predict micronutrient adequacy of women's diets in 5 diverse, resource-poor settings." *Journal of Nutrition*, 140(11):2059S–69S.

[3] FAO and IRD (Institut de Recherche pour le Développement). 2014. *Defining a Standard Operational Indicator of Women's Dietary Diversity: The Women's Dietary Diversity Follow-up Project.* Contributors: Y. Martin-Prével, P. Allemand, D. Wiesmann, M. Arimond, T.J. Ballard, M. Deitchler, M.C. Dop, G. Kennedy, W.T.K. Lee, and M. Moursi. Rome and Montpellier: FAO and IRD.

the USAID 10-year multi-sectoral nutrition strategy.[4] Several organizations have also proposed use of WDD indicators in the "Post-2015 Framework,"[5] and one noted the need for a validated dichotomous indicator.[6]

## PRIOR TO THE CONSENSUS MEETING

- "Candidate" indicators with more food groups were more strongly associated with micronutrient adequacy for women.[7]
- Indicators were strongest when consumption of trivial amounts (<15 g) of a food group did not count in dietary diversity scores.
- Researchers identified two candidate indicators for consideration during the consensus meeting: a dichotomous indicator based on the 9-point food group score currently in use by FAO and USAID and a dichotomous indicator based on a 10-point food group score.

## KEY RESULTS

WDDP-II researchers asked meeting participants first to assess whether the evidence was strong enough to support recommendation of a dichotomous indicator, and if so to select one of the two candidate indicators. Meeting participants reached a unanimous decision to recommend adoption of a dichotomous indicator with a threshold of at least **five food groups out of ten**. Women consuming foods from five or more food groups have a greater likelihood of meeting their micronutrient needs than women consuming foods from fewer food groups.

**MDD-W food groups**

| | |
|---|---|
| 1. All starchy staple foods | 6. Eggs |
| 2. Beans and peas | 7. Vitamin A-rich dark green leafy vegetables |
| 3. Nuts and seeds | 8. Other vitamin A-rich vegetables and fruits |
| 4. Dairy | 9. Other vegetables |
| 5. Flesh foods | 10. Other fruits |

Meeting participants agreed to disseminate and promote use of the new indicator through communicating to relevant communities of practice, developing user manuals, and seeking opportunities to collect the data, in particular in large-scale surveys. Where it is relevant and

[4] USAID. 2014. *Multi-Sectoral Nutrition Strategy: 2014–2025*.

[5] Road to Rio Global Nutrition Advocacy Working Group. "Proposed Nutrition Goals, Targets & Indicators for the Post-2015 Development Agenda." Available at: http://thousanddays.org/wp-content/uploads/2013/09/Nutrition-in-the-Post-2015-Agenda-Technical-Brief.pdf

[6] The Bill & Melinda Gates Foundation. 2014. "Sustainable Agriculture, Food Security and Nutrition in the Post-2015 Framework: Discussion Paper." p. 8.

[7] The 7-group indicator used for infants and young children (WHO, op. cit.) was tested but was not sufficient for use as a proxy for micronutrient adequacy for women of reproductive age.

would add value, participants will advocate for inclusion of the indicator in global monitoring frameworks.

Meeting participants were also asked to identify knowledge gaps and areas of need for future research. One key area of need was to optimize field administration of the FGI-10R: i.e. comparing of methods for capturing food groups, minimum amounts of food, foods in mixed dishes, and adapting food groups to location; evaluating data quality from these various collection methods; and determining recommended practices. Another major need was for research to validate the FGI-10R for tracking purposes.

# INTRODUCTION

This report contains the proceedings of a two-day meeting attended by a wide group of nutrition experts with the purpose of reaching consensus on a proxy indicator of micronutrient adequacy of the diets of women of reproductive age, based on evidence presented from the analysis carried out by the Women's Dietary Diversity Project (WDDP), phase II. The meeting was structured to conduct a series of votes by the participant group that would lead to a consensus decision on a final indicator for women's dietary diversity. The proceedings are organized in chronological order because major discussion sessions included consensus votes from the participants which in turn determined the focus of subsequent sessions. The discussion was rich, informative, challenging and reinforcing, which led to the successful accomplishment of unanimity in recommending the **Minimum Dietary Diversity – Women (MDD-W)** for global use.

In the opening presentations, speakers spoke of the need for an indicator for global use in assessment and in tracking change. However, very early in the meeting it was noted that the analytical work under the WDDP-II only validated the use of the indicator for assessment. Data were not available to allow evaluation of the indicator's ability to track change over time. The expert group and the core team members of the WDDP-II agreed to this clarification. This change was made to the meeting objectives, on the agenda annexed to this report and in several of the presentation slides that had originally mentioned global tracking. Details of this discussion and the rationale for changing the term from global tracking to global assessment are provided in the summary that follows.

# WDDP CONSENSUS MEETING- DAY 1

## MEETING OBJECTIVES

**Nadra Franklin**

Objectives for the two-day meeting include:

- Assess the core WDDP-II group's view that a dichotomous indicator can be recommended for global assessment
- Select one of two candidate indicators recommended by the core WDDP-II group for global assessment
- Discuss appropriate uses and limitations of a global indicator for other purposes (e.g., in programmes)
- Discuss issues around operationalization
- Discuss plans to move forward and communicate the indicator

A series of votes will be taken on critical issues, leading to the selection of a globally recommended food group indicator. A vote that exceeds 75% agreement will be considered decisive.

# OPENING SPEECHES

**Sandra Remancus**

*Sandra Remancus is the project director for USAID's Food and Nutrition Technical Assistance Project III (FANTA).*

Thank you, Nadra. I would like to welcome everyone to the Family Health International 360 (FHI 360) offices for this meeting to reach a global consensus on the women's dietary diversity indicator. It's good to see how many participants we have here today who were part of the original group that started this work in 2005. It's exciting to see so many of the same faces. I know the participants today here understand and have championed the importance of a global women's dietary diversity indicator.

We were very pleased to see all of the support for the recommendation back in April that a women's dietary diversity indicator be included in Demographic Health Surveys (DHS). As a US Agency for International Development (USAID) funded project, the Food and Nutrition Technical Assistance Project (FANTA) is also keenly aware of the importance of this indicator for the USAID as it launches its Multi-Sectoral Nutrition Strategy, and also as the Feed the Future programming expands.

The core members of the 2nd phase of the WDDP have put a lot of thought into the agenda for this meeting. The agenda covers a lot of ground and is going to lead us towards reaching consensus. There is a lot of work to do so I'm going to hand it over to our co-host from the Food and Agriculture Organization (FAO), Anna Lartey.

**Dr. Anna Lartey**

*Dr. Anna Lartey currently serves as Director of the Nutrition Division at FAO*

Thank you all very much. It's a pleasure to be here. On behalf of FAO I thank you all for taking time out of your busy schedules to attend this 2-day meeting. The fact that almost everybody we invited showed up is an indication of the level of interest and the urgency attached to this issue. I would like to thank USAID, FANTA and FHI360 for funding and technical support to make this work possible. On the side of FAO, we are very grateful to our long-term partner, the European Union, for their support over the years. I also thank the Women's Dietary Diversity Project Group for faithfully holding onto the vision that a global indicator for assessing dietary diversity for women is possible, and have faithfully over the years worked towards this goal. A special thank you also goes to L'Institut de Recherche pour le Développement (IRD), Montpellier, France for doing the analysis.

Dear colleagues, FAO recognizes that unhealthy diet is one of the main drivers of the current nutritional situation, where countries, especially developing countries, are faced with a triple, not double, burden of malnutrition - of undernourishment, micronutrient deficiencies, and obesity - the latter, also being the risk factor pushing the NCD (non-communicable disease) epidemic. We have 2 billion people globally who suffer from micronutrient deficiencies. At the same time NCDs are responsible for about two-thirds of the global mortality. And it is worth noting that about 80% of the NCD deaths occur in low and middle-income countries.

FAO believes that to sustainably address malnutrition in all its forms we need to examine our current food systems and make them healthy. How can we tap the abundant food resources at our disposal to ensure that populations have access to healthy diets? We know that heavy reliance on staple foods that provide little variety is contributing to micronutrient deficiency and also to obesity, because people are concentrating on filling the stomach with cheap, energy-dense foods without paying attention to quality.

This meeting is very important. We want to refocus the world's attention to the importance of diet quality. What better way to do this than to find a simple, valid and practical indicator to assess diet quality? To get all these three characteristics in one indicator is a perfect situation not easily achievable. I want to caution that we not let the quest for perfection stand in the way of progress. It is my hope that we can agree on a global indicator based on the analyses that have been done so far. I understand that about 100 years ago the world added 30 years to the human lifespan. And this was made possible with the discovery of sanitation. The question I ask all of us is what will be the equivalent of sanitation today that will add life to the quality of life that we currently enjoy? Thank you very much.

**Anne Peniston**

*Anne Peniston is Chief of the Nutrition Division, Office of Health, Infectious Disease and Nutrition at the USAID Bureau for Global Health.*

Thank you so much and, good morning. Thank you all for the opportunity to be here today to welcome you to this conference to reach consensus on a Global Dietary Diversity Indicator for Women. I'm delighted to be offering a few remarks along with Dr. Anna Lartey and Ms Sandy Remancus.

I also want to recognize Megan Deitchler and her colleagues who have done an amazing job to prepare us for these two days. It's evident that you have been working very hard and I congratulate all of you who have contributed to the analysis, to the discussions, and to the Phase 1 findings upon which all of you will deliberate and reach final conclusions by tomorrow. Looking at the volume of materials I can see it's not going to be an easy task. I don't want to take much time now because I know you want to get moving on the work.

I don't need to reiterate the importance of reaching consensus on a dietary diversity indicator for women of reproductive age, just as was done for infants and young children in the adoption of the minimum dietary diversity indicator several years ago. These tools are extremely important for our programs in global health, in Feed the Future, for our Title II Development Assistance programs, and in the Demographic and Health Surveys that USAID funds in order to measure progress toward our overarching nutrition goals. This is especially important for USAID at this beginning point in our Multi-sectoral Nutrition Strategy to inform our programs, to monitor them and to tell our story to our stakeholders in the U.S. and in the countries where we work. The workshop is timely and the results are going to contribute significantly to the advancement of public health nutrition.

I commend all of you for your efforts and know that by the end of this meeting, direct and easy to understand recommendations will be produced to strengthen the monitoring and evaluation of our nutrition programs worldwide. Thank you and let's get to work!

## INDICATOR QUALITIES, BROAD CRITERIA, AND USES

**Mary Arimond**

Mary Arimond opened her presentation by explaining that dietary diversity indicators measured by a simple count of foods or more commonly food groups consumed over a limited time period (usually the last 24 hours) are meant to be proxies for micronutrient adequacy. She then gave a general overview on the larger context for indicators, such as use of indicators for different situations including for advocacy and raising awareness, global, national and sub-national assessment relative to targets, and monitoring and evaluation. A wide range of criteria were presented for evaluating the technical and substantive characteristics of indicators as well as their usefulness in policy dialogue and for meeting information, communication, and decision-making needs of stakeholders. She noted that importance and relative weighting of different criteria varies depend on the proposed use. She briefly reviewed the rationale for and proposed uses and limitations of dietary diversity indicators. She noted they are not appropriate for all uses (e.g., should not be used for screening of individuals), and that they do not reflect all dimensions of dietary quality (e.g. they cannot reflect appropriate quantity, nor balance and moderation in consumption).

## OBJECTIVES OF THE WDDP I AND WDDP II

**WDDP-I Megan Deitchler**

Megan Deitchler summarized the first phase of the WDDP-I, which began in 2005 and ran until 2010. This was a FANTA/USAID supported initiative to identify a set of simple food group indicators of dietary diversity to reflect the micronutrient adequacy of women's diets. Existing 24 h recalls from surveys of women of reproductive age in resource-poor countries formed the basis of the analyses and served as the "gold standard" of micronutrient adequacy. The WDDP-I project was motivated by an existing data gap of information on the adequacy of women's diets in developing countries, in particular women of reproductive age (15-49) who are more vulnerable to deficiencies because of their greater micronutrient needs. Improving women's diets not only improves their health and ability to work and care for their families, but also has a positive effect on pregnancy outcomes and the health and nutrition of infants and young children, falling within the 1000 day framework. It was believed that having available data from valid indicators on dietary diversity would assist in identifying populations and subpopulations at increased risk and generate greater programmatic attention to women's diets.

The research carried out in WDDP-I was coordinated by IFPRI (Marie Ruel and Mary Arimond) and the research group included investigators who provided datasets on food intake of women. Altogether the study used 5 data sets from Africa and Asia, covering both urban and rural populations.

The WDDP-I produced many important outputs, including a standard data analysis protocol and syntax that have been used by other researchers, 5 site-specific reports corresponding to each

dataset in the project[8,9,10,11,12] and a summary comparative report[13] written by the WDDP-I researchers and published by FANTA. FANTA also oversaw preparation of a Journal of Nutrition Supplement in 2010 which included several additional articles. While the project produced a number of candidate food-group indicators, it did not identify a single indicator for wide use. Nor did it recommend a validated dichotomous indicator based on a standard number of food groups that could be used for estimating the prevalence of achieving a certain probability of micronutrient adequacy within population groups. A quasi-continuous indicator based on the mean of the score has been used for reporting. Both USAID, through the Feed-the-Future and Title II programs, and FAO have promoted the 9 food group indicator tested in the WDDP-I study. However, no dichotomous indicator of women's dietary diversity has thus far been included in large-scale surveys such as the DHS that would provide national level data for global assessment. This fact along with a growing demand for data on the quality of women's diets provided the impetus for WDDP-II.

**WDDP-II Terri Ballard**

Terri Ballard described FAO's work since 2006 on measurement of dietary diversity at household level, using the FANTA Household Dietary Diversity Score tool, and for women using the 9 food group indicator developed through the WDDP-I which could be created using the FANTA expanded Dietary Diversity module. In the absence of a dichotomous indicator, the FAO Guidelines on assessing household and individual dietary diversity for women recommended reporting results by the mean population score. However, work in several different countries and consultation with organizations wishing to assess individual dietary diversity has highlighted the need for a nutritionally meaningful dichotomous indicator. The ability to estimate the prevalence of women with a greater likelihood of meeting their micronutrient needs, through a simple and meaningful proxy indicator, will greatly improve our ability to view and communicate the nutritional needs of women.

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[8] Arimond M, Torheim LE, Wiesmann D, Joseph M, Carriquiry A. *Dietary diversity as a measure of the micronutrient adequacy of women's diets: results from rural Bangladesh Site*. Washington, DC: Food and Nutrition Technical Assistance II Project, Academy for Educational Development; 2009. Available from: http://www.fantaproject.org/sites/default/files/resources/WDDP_Bangladesh_Dec09.pdf

[9] Becquey E, Capon G, Martin-Pre´vel Y. *Dietary diversity as a measure of the micronutrient adequacy of women's diets: results from Ouagadou-gou, Burkina Faso Site*.Washington, DC: Food and Nutrition Technical Assistance II Project, Academy for Educational Development; 2009. Available from: http://www.fantaproject.org/sites/default/files/resources/WDDP_BurkinaFaso_Dec09.pdf

[10] Kennedy G, Fanou N, Seghieri C, Brouwer ID. Dietary diversity as a measure of the micronutrient adequacy of women's diets: results from Bamako, Mali Site [Internet]. Washington, DC: Food and Nutrition Technical Assistance II Project, Academy for Educational Development; 2009 [cited 2009 Dec 29]. Available from: http://www.fantaproject.org/sites/default/files/resources/WDDP_Mali_Dec09.pdf.

[11] Wiesmann D, Arimond M, Loechl C. Dietary diversity as a measure of the micronutrient adequacy of women's diets: results from rural Mozambique Site [Internet]. Washington, DC: Food and Nutrition Technical Assistance II Project, Academy for Educational Development; 2009 [cited 2009 Dec 29]. Available from: http://www.fantaproject.org/sites/default/files/resources/WDDP_Mozambique_Dec09.pdf

[12] Daniels MC. *Dietary diversity as a measure of the micronutrient adequacy of women's diets: results from metropolitan Cebu, Philippines Site*. Washington, DC: Food and Nutrition Technical Assistance II Project, Academy for Educational Development; 2009. Available from: http://www.fantaproject.org/sites/default/files/resources/WDDP_Philippines_Dec09.pdf

[13] Arimond, M., Wiesmann, D., Becquey, E., Carriquiry, A., Daniels, M.C., Deitchler, M., Fanou, N., Ferguson, E., Joseph, M., Kennedy, G., Martin-Prével, Y., Torheim. L.E. *Dietary diversity as a measure of the micronutrient adequacy of women's diets in resource-poor areas: Summary of results from five sites.* Washington, DC:Food and Nutrition Technical Assistance II Project Bridge, FHI360, July 2011. Available from: http://www.fantaproject.org/sites/default/files/resources/WDDP_Summary_Report_Jul2011.pdf

At the 8th International Conference on Diet and Activity Methods held in Rome in 2012, FAO convened a number of the original WDDP-I researchers to discuss the feasibility of collecting additional datasets and attempting to identify a standard dichotomous food group indicator to assess the micronutrient adequacy of women's diets. Based on a positive assessment, the FAO Nutrition Division, with funds from the EU-funded Programme on Improved Global Governance for Hunger Reduction, issued a letter of agreement to the Institut de Recherche pour le Développement in Montpellier, where Yves Martin-Prével led the analytic component of the newly-formed WDDP-II. FANTA and FAO have co-sponsored this meeting to present our results and recommendations to you on identifying a valid dichotomous indicator to be used for diet assessment at global, national and sub-national levels in the interest of improving women's health and nutrition.

# THE WDDP-I METHODOLOGY

**Doris Wiesmann**

Doris Wiesmann described the methodology overview for WDDP-I. Her presentation included criteria for dataset selection and sample exclusions, methods of indicator construction, and an explanation of how micronutrients were selected along with their estimated average requirements. She explained the computation of the main outcome indicator, the mean probability of adequacy, as well as the statistical tests performed and the criteria for indicator performance.

***Criteria for data sets***

Respondents in the datasets used for validation were women of reproductive age (15-49yrs) from resource poor (developing country) settings. Because these women lived more or less in poverty, micronutrient adequacy was low overall and very few women reached high levels of adequacy. This limited our ability to analyze whether the food group indicators had predictive power for higher levels of micronutrient adequacy. Too few women reached these levels for us to conduct meaningful statistical analyses.

Datasets were required to include 24-hour dietary recalls, direct observation or weighing of food, so dietary data represented good standard practices. This was important to verify since data quality can be quite variable, depending on how well the interviewers are trained and how well the data collection instruments are developed. The recipes needed to be broken down into their ingredients. In most cases this had already been done, but if not, it was done for inclusion in WDDP. The food composition tables were specific to the study area. An alternative would have been to develop a large food composition table for all datasets, but site- or region-specific food composition tables were preferred because nutrient values of foods can vary across geographic areas. Sample sizes of the selected datasets had to be at least 100 women with at least 40 repeat-recalls (i.e. women were interviewed on a second non consecutive day) to assist in calculation of usual intake estimates. The analyses of physiologic subgroups - non-pregnant/non lactating women (NPNL), pregnant, and lactating women - allowed a slightly lower number of repeats (30 or more), mainly because usual intake estimates were done for the sample as a whole. Also, datasets contained information on women's age, height, weight, pregnancy and lactation status. Pregnancy and lactation status were a requirement for all datasets, but we were able to handle some missing values for height, weight and age.

Five datasets were used in the analysis representing resource-poor regions in Asia (Philippines (peri-urban) and Bangladesh (rural)) and Africa (Mali (urban), Burkina Faso (urban), Mozambique (rural)).

***Exclusions from the samples***

Women who had implausibly low or high energy intakes were excluded from the analyses, in order to avoid bias by over- or under-reporting. We used the Goldberg Method[14] for determining plausible energy intakes which uses the ratio of Estimated Energy Intake/Basal Metabolic Rate (BMR).

Individuals with a ratio <0.9 were classified as under-reporters and those with a ratio >3.0 were considered to be over-reporters. The equations are based on the energy requirements by Schofield and others. In addition to these criteria, the principal investigators of the studies included in the analysis used personal judgment in evaluating exclusions, and exceptions were allowed. For example, in some cases low energy intakes were considered plausible based on knowledge of the food insecurity situation in the study area. Women were also excluded if they had an incomplete or implausible food record (as judged by the principal investigator), and if their age was below 15 or above 49 years.

***Food group indicators (FGIs)***

The indicators we used had four levels of disaggregation: 6, 9, 13 or 21 food groups and we had two quantity restrictions as well. The first was minimal: intake for the food group had to be at least 1 gram per day to count. The higher quantity cutoff required 15 grams per day to count. We referred to this as FGI-R with the 15 gram restriction and to FGI (not restricted) for the 1 gram restriction. The 15 gram restriction was selected as potentially feasible to communicate and operationalize, as it corresponds to ~1 tablespoon of many foods. It was recognized from the outset as imperfect, but more feasible than, for example, defining and operationalizing a globally relevant serving size for each food group. So combining this with the number of food groups the labels were FGI-6, FGI-6R, FGI-9, FGI-9R etc. Vitamin A-rich foods were defined as having > 60 RAE/100g, and for Vitamin C-rich > 9 mg/100g. This was based on the definition of a source in the Codex Alimentarius. We did not consider some food groups for constructing the indicators because we assumed they made a very limited contribution to micronutrient adequacy. These included fats and oils, sweets and added sugars, Alcohol and other beverages except for 100% juice. One exception was red palm oil which was rich in vitamin A and classified with the Vitamin A-rich fruits and vegetables. The colorful table below shows the food groups and how the groups were broken down for WDDP-I. In the WDDP-II the focus was first on the FGI-9R and from there other indicators were developed, but the FGI-6, FGI-13 and FGI-21 were not used.

[14] Goldberg, G. et al. "Critical Evaluation of Energy Intake Data Using Fundamental Principles of Energy Physiology: 1. Derivation of Cutoff Limits to Identify Under-Recording." European Journal of Clinical Nutrition 45 (1991): 569-81.

***WDDP-I Food Groups***

| FGI-6 | FGI-9 | FGI-13 | FGI-21 |
|---|---|---|---|
| All starchy staples | All starchy staples | All starchy staples | Grains and grain products |
| | | | All other starchy staples |
| All legumes and nuts | All legumes and nuts | All legumes and nuts | Cooked dry beans and peas |
| | | | Soybeans and soy products |
| | | | Nuts and seeds |
| All dairy | All dairy | All dairy | Milk/yoghurt |
| | | | Cheese |
| Other animal source foods | Organ meat | Organ meat | Organ meat |
| | Eggs | Eggs | Eggs |
| | Flesh foods and other miscellaneous small animal protein | Small fish eaten whole with bones | Small fish eaten whole with bones |
| | | All other flesh foods and miscellaneous small animal protein | Large whole fish/dried fish/shellfish and other seafood |
| | | | Beef, pork, veal, lamb, goat, game meat |
| | | | Chicken, duck, turkey, pigeon, guinea hen, game birds |
| | | | Insects, grubs, snakes, rodents and other small animals |
| Vitamin A-rich fruits and vegetables | Vitamin A-rich dark green leafy | Vitamin A-rich dark green leafy vegetables | Vitamin A-rich dark green leafy vegetables |
| | Other vitamin A-rich vegetables and fruits | Vitamin A-rich deep yellow/orange/red vegetables | Vitamin A-rich deep yellow/orange/red vegetables |
| | | Vitamin A-rich fruits | Vitamin A-rich fruits |
| Other fruits and vegetables | Other fruits and vegetables | Vitamin C-rich vegetables | Vitamin C-rich vegetables |
| | | Vitamin C-rich fruits | Vitamin C-rich fruits |
| | | All other fruits and vegetables | All other vegetables |
| | | | All other fruits |

***Selected nutrients***

The selected micronutrients were B vitamins (thiamin, riboflavin, vitamin B6, folate, vitamin B12) vitamins A and C, and the minerals calcium, iron and zinc. Iodine was not included because iodine content in foods varies markedly by geographic region and there are no reliable food composition data available. We could not include vitamin D because there was no estimated average requirement available at the time.

***Estimated Average Requirements (EARs)***

We used separate Estimated Average Requirements for adolescent girls and adult women by physiological status (NPNL, pregnant, and lactating women) because pregnant and lactating women have higher requirements. The main source of EARs was WHO/FAO[15] because it makes recommendations for developing countries and we wanted EARs adapted for developing countries and resource-poor sites. We made several exceptions: 1) because of the skewed distribution of iron requirements for NPNL women, we could not use an EAR-based approach but used the tabulations adapted from Institute of Medicine[16] that assigned a probability of adequacy to ranges of iron intakes; 2) for zinc we used the newest requirements, which had recently been issued by IZiNCG[17]; and 3) for calcium we used the method of Foote et al.[18] using the Adequate Intake since the group considered the WHO/FAO recommendation to be too high.

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[15] WHO/FAO. Vitamin and mineral requirements in human nutrition. 2nd ed. Geneva: WHO; 2004. Available at: http://www.who.int/nutrition/publications/micronutrients/9241546123/en/

[16] Institute of Medicine (IOM). Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc [Book]. - Washington, D.C. : National Academies Press, 2000.

[17] International Zinc Nutrition Consultative Group (IZiNCG). Assessment of the risk of zinc deficiency in populations and options for its control. Hotz C and Brown KH, eds. Food and Nutrition Bulletin 25: S91-S204, 2004.

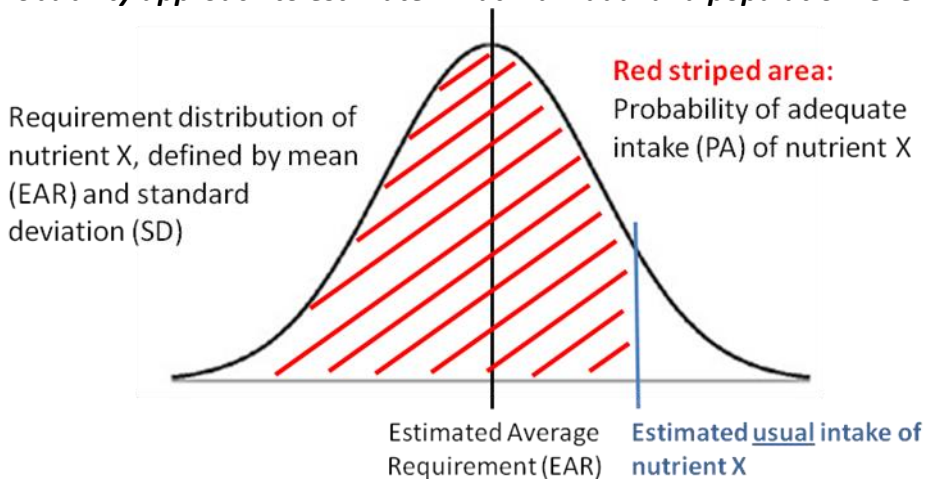
[18] Foote, JA, Murphy SP, Wilkens LR, Basiotis PP, Carlson A. (2004). "Dietary variety increases the probability of nutrient adequacy among adults." J Nutr 134(7): 1779-1785.

It was higher than EU, UK, or Australian recommendations and equivalent to the U.S. "adequate intake" at the time.

***Mean Probability of Adequacy***

We used the probability approach to assess micronutrient adequacy[19]. This approach considers the intra-individual variation of nutrient intakes to compute usual intakes. Usual intakes can be estimated when two or more 24-hour recalls are available for at least a subset of subjects. This approach also accounts for the distribution of micronutrient requirements in estimates of micronutrient adequacy. This is important because even women in the same group (for example: pregnant women 15 to 49 years) differ in their requirements because there is a distribution of requirements. Our statistical expertise for this analysis was provided by Maria Joseph and Alicia Carriquiry from Iowa State University who developed the Stata syntax adapted and used in both WDDP-I and II. First we calculated the women's probability of adequacy (PA) for each micronutrient. Mean probabilities of adequacy (MPA) were then averaged across the 11 selected micronutrients to give an individual estimate of adequacy for each woman. These individual MPA values were used to construct three dichotomous indicators – one for women with MPA >50%, one for women with MPA >60% and one for women with MPA >70%. Given the overall low MPAs in the datasets, MPA>70% was the highest level of MPA which could be used in our analysis. The probability approach to assess nutrient adequacy is illustrated by the diagram below. Note that at population level, the average of all individual PAs is equivalent to the prevalence of adequacy in the population (for example, if the average probability of thiamin adequacy among a group is 0.7 (or 70%), then the estimated prevalence of thiamin adequacy for the group is also 70%).

***Probability approach to estimate PA at individual and population level***




This shows the estimated average requirement and the requirement distribution around it, which is defined by the mean (that is, the EAR) and the standard deviation. For most nutrients, it is just a simple normal distribution, as shown in the diagram. The blue line is an example of estimated usual intake, corrected for inter-individual variation. The probability of adequacy is the red-striped area. If a woman's estimated usual intake was located on the far left below the lowest value on the requirement distribution, then her PA would be zero because there would be no chance that her micronutrient intake is adequate according to the distribution of

[19] Barr SI, Murphy SP, and Poos MI. Interpreting and using the dietary references intakes in dietary assessment of individuals and groups. Journal of the American Dietetic Association, 2002. - Vol. 102. - pp. 780-88.

requirements. A woman's estimated usual intake might also be at or above the highest value, in which case her PA would be one. The area under the curve which is below the estimated usual intake defines the probability of adequacy.

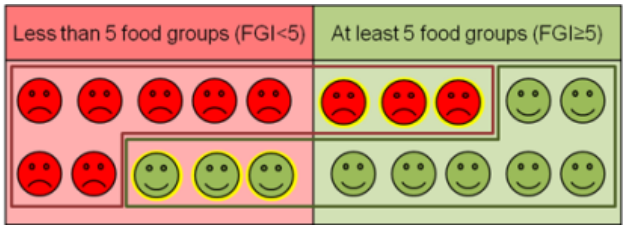
***Statistical analysis***

We used Stata software for the statistical analysis except for some data preparation work done with other packages. WDDP-I carried out descriptive analyses for dietary patterns (percent of women consuming a certain food group, for example) and mean and medians of the FGIs. We also looked at energy, macro- and micronutrient intakes, PA of each micronutrient and MPA. To examine the relation between the FGIs and the MPA, we carried out correlation and regression analyses and generated graphs to visualize the relationships. Performance of the different FGIs in predicting MPA was evaluated with Receiver-Operating Characteristic (ROC) analysis. Sensitivity-specificity analysis was used for evaluation and selection of potential FGI cutoffs.

***Statistical analysis: sensitivity + specificity***

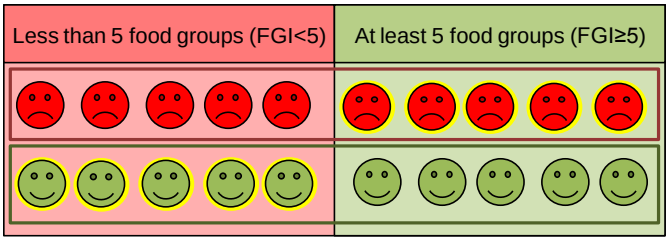
A simple illustration of sensitivity and specificity analysis is presented. The face color represent individuals true micronutrient status - red faces for low micronutrient adequacy (in this illustration, an MPA cut-off of ≤60%) and green faces for acceptable micronutrient adequacy (MPA>60%). The prevalence of each was 50%. The red and green fields represented the FGI test result - whether people consumed less than 5 food groups, or at least 5 or more food groups.

In the first example, the FGI cut-off is 5 and the prevalence of women at/above and below is 50% (10 women are in each field). Misclassification is 30%.




In the case of perfect classification, all the green faces would be in the green field, and all the reds in the red field. The FGI would perfectly identify which women have low MPA (≤60%) and which women have acceptable MPA (>60%). Sensitivity would be 100% (green faces in the green field/all green faces), and specificity would also be 100% (red faces in the red field/all red faces). Misclassification would be 0%.

If the FGIs were not associated with MPA, it would still be possible to classify 50% of the individuals at/above and below the cutoff, but they would be randomly assigned to the red and green fields. If prevalence of adequacy remained at 50%, each field would have half green faces and half red faces in our example. Both sensitivity and specificity would be 50%, and misclassification would also be 50%. So even though the prevalence of 50% at/above the cutoff matches with the prevalence of 50% adequacy, it does not indicate whether the classification is good or not.




Using the same scenario (one row of red, one of green faces), if we moved the cutoff to the right we would have fewer misclassified above the cutoff, and more below it, but no association would be seen. If we had only 6 individuals with a diversity score ≥6 and 14 with a score <6, sensitivity would be 30% and specificity would be 70%. Total misclassification would still be

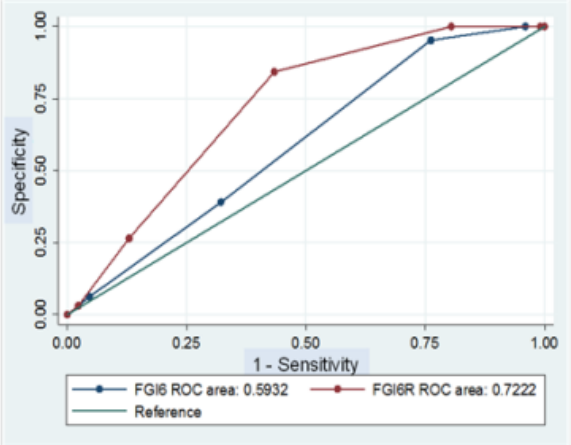
50%. What would change is the prevalence. Prevalence above the MPA cutoff is still 50% but the prevalence at/above FGI cutoff is 30%. So we can adjust the prevalence by moving the FGI cutoff but that does not mean we get a better classification if there is no association between the FGI.

The first example depicted is a bit more realistic. Sensitivity is 70% (green faces in green field/all green faces) and specificity is 70% also (red faces in red field/all red faces). This combination of sensitivity and specificity is quite good. Misclassification is 30% (faces outlined in yellow/all faces). We aimed for <30% misclassified. The prevalence above the MPA cutoff still equals our 50% prevalence at/above our FGI cutoff.

***Statistical analysis: ROC analysis***

The key statistic in ROC analysis is the area under the curve. The dark green diagonal line in the graph represents no association between the FGI and the dichotomous MPA indicator. The combination of 50% sensitivity and 50% specificity falls on this line. If we change the FGI cutoff we simply move along the same line and change the prevalence at/above the FGI cutoff without achieving better combinations of sensitivity and specificity (the sum of sensitivity and specificity will always be 100% and will not exceed this threshold). The area below the line is 50% but we want something more than that. In the graph presented, the first curved line (blue) is a slight improvement which allows for a combination of 50% sensitivity with 60% specificity. The second curved line (purple) is much more promising with better combinations of sensitivity and specificity and more potential for the indicator to predict acceptable adequacy. The area under the curve for the first indicator (FGI-6, blue curve) is about 0.60 and for the second indicator (FGI-6R, purple curve) about 0.70. We can also evaluate whether this is significantly different, that is, if one indicator really performs better than the other.

**FGI-6 and FGI-6R vs. MPA > 50%, Bangladesh site, WDDP-I**




***Criteria for indicator performance***

ROC curves provided the basis for our assessment of indicator performance. For ROC analyses, the Area Under the Curve (AUC) should be significantly ($p < 0.05$) greater than 0.50. For an indicator to have "reasonable potential" we wanted an AUC of at least 0.70. We evaluated for statistically significant differences ($p < 0.05$) between AUC of FGIs. To find a suitable cutoff for an indicator that met the criteria for AUC, we used sensitivity-specificity analysis: we wanted an indicator that had sensitivity >60%, specificity >60% and total misclassification <30%.

## METHODOLOGY OVERVIEW: ADAPTATION AND ADDITION TO WDDP-II

**Pauline Allemand**

Pauline's presentation described the adapted methodology used in the WDDP-II to further refine indicators and test their performance. This built on the work from WDDP-I and used the 5 original datasets (Philippine, Bangladesh, Mali, Burkina Faso, Mozambique), along with four

additional datasets (Bangladesh 2, Burkina Faso 2, Uganda 1 and 2) for a total of 9 (6 in Africa and 3 in Asia). Datasets will be described in greater detail by Yves Martin-Prével. Other changes included updates to EAR recommendations, a more consistent approach to handling over and under reporters and exclusions, and three additional analyses beyond WDDP-I.

***EAR choices***

| | Females 15-18Y | | Females 19-49y | | Pregnant women | | Lactating women | |
|---|---|---|---|---|---|---|---|---|
| | EAR | SD | EAR | SD | EAR | SD | EAR | SD |
| **Vitamin A (RE/d)** | 365 | 73 | 270 | 54 | 370 | 74 | 450 | 90 |
| **Vitamin C (mg/d)** | 33 | 3.3 | 38 | 3.8 | 46 | 4.6 | 58 | 5.8 |
| **Thiamin (mg/d)** | 0.9 | 0.09 | 0.9 | 0.09 | 1.2 | 0.12 | 1.2 | 0.12 |
| **Riboflavin (mg/d)** | 0.8 | 0.08 | 0.9 | 0.09 | 1.2 | 0.12 | 1.3 | 0.13 |
| **Niacin (mg/d)** | 12 | 1.8 | 11 | 1.6 | 14 | 2.1 | 13 | 2.0 |
| **Vitamin B6 (mg/d)** | 1.0 | 0.10 | 1.1 | 0.11 | 1.6 | 0.16 | 1.7 | 0.17 |
| **Folate (µg/d)** | 330 | 33 | 320 | 32 | 520 | 52 | 450 | 45 |
| **Vitamin B12 (µg/d)** | 2.0 | 0.20 | 2.0 | 0.20 | 2.2 | 0.22 | 2.4 | 0.24 |
| **Calcium (mg/d)** | 1100 | 100 | 800 | 100 | 800 | 100 | 800 | 100 |
| **Iron (mg/d)** | IOM table adapt. | IOM table adapt. | IOM table adapt. | IOM table adapt. | 10%: 24.9<br>5%: 49.9 | 2.34<br>4.69 | 10%: 11.7<br>5%: 23.40 | 3.51<br>7.02 |
| **Zinc (mg/d)** | 34%: 7<br>25%: 9 | 0.88<br>1.13 | 34%: 6<br>25%: 7 | 0.75<br>0.88 | 34%: 8<br>25%: 10 | 1.00<br>1.25 | 34%: 7<br>25%: 8 | 0.88<br>1.00 |

The table above gives an overview of the EARs used for WDDP-I and WDDP-II. Most of the EAR's were taken from WHO/FAO (2004)[20] recommendations and were similar for both WDDP-I and WDDP-II. EARs for iron (pregnant and lactating women) came from IOM in both rounds. While no reliable EAR for calcium existed at the time of WDDP-I, IOM released an EAR and RDAs for calcium in 2011 which were used for WDDP-II. All SDs were calculated based on EAR and CV (SD=CV*EAR/100). CVs were provided by FAO/WHO except niacin, vitamin A, and iron (for pregnant and lactating women) were provided by IOM, and calcium was back-calculated from IOM using the equation CV=(RDA-EAR/2). The EAR and CV for zinc were taken from IZiNCG (2004)[21].

Methods for estimating iron adequacy and bioavailability varied according to women's physiologic status. Iron requirements for NPNL women are strongly skewed, so IOM tables 22 provided probabilities of adequacy (PA) for ranges of iron intake, as in WDDP-I. Since these tables assumed an iron bioavailability of 18% which is more appropriate for developed countries, for both WDDP-I and II, we adjusted these estimates to reflect an iron bioavailability of 5% to 10%, depending on local dietary patterns according to WHO/FAO (2004) recommendations. Estimates of iron adequacy for lactating women were also adjusted to reflect and iron bioavailability of 5 to 10%, rather than the 18% assumed by IOM.

[20] WHO/FAO 2004, op. cit.
[21] IZiNCG 2004, op. cit.
[22] IOM 2000, op. cit.

Iron absorption increases throughout pregnancy. IOM estimates bioavailability is 18% in the first trimester, and 25% in the 2nd and 3rd trimesters. WDDP-I assumed absorption levels of 23%, which is a weighted average of these estimates. However, for WDDP-II we felt that estimates should reflect the lower bioavailability associated with the poorer diets of the women in our studies. FAO/WHO (2004) estimates highlight that iron bioavailability increases by 50% in the second trimester and by up to 400% in the third trimester. We used a factor of 1.5 for the second trimester and 2.5 for the third to arrive at average estimates of 10 and 20% absorption for pregnant women.

| 1st trimester bioavailability | 2nd trimester factor | 2nd trimester bioavailability | 3rd trimester factor | 3rd trimester bioavailability | Mean bioavailability |
|---|---|---|---|---|---|
| **5%** | 1.5 | **7.5%** | 2.5 | **12.5%** | **10.0%** |
| **10%** | 1.5 | **15.0%** | 2.5 | **25.0%** | **20.0%** |

***Goldberg exclusions***

Exclusions for under- and over-reporters were identified using the Goldberg method[23], the same as in WDDP-I. In the WDDP-I individual investigators were allowed some flexibility in exclusions. For WDDP-II the criteria were applied uniformly to all datasets. That is, women with Energy/BMR < 0.9 or >3.0 were excluded.

We used an adaptation to the Goldberg method to minimize exclusions where datasets had some missing weights. This used the BMR equation to back-calculate what the women's weight range would be based on her caloric intake, and the applied BMR cutoffs of 0.9 and 3.0. A weight was deemed to be acceptable if it was within the range of known weight values of the dataset.

BMR factor = Energy / (X + Y * **weight**)
**<-> weight** = (Energy - BMR factor * X) / (BMR factor * Y)

The Uganda2 dataset was the single exception to this. Even using the adapted method it could not be evaluated for under- or over-reporters, because no anthropometry were available.

***Contributions of food groups to MPA***

Our first objective in WDDP-II was to identify alternate food groupings that would maximize the odds of a good correlation, at the individual level, between the FGI and the MPA. Each of the 21 food groups from WDDP-I were evaluated from each dataset to determine their individual contributions to probabilities of adequacy (PA) for individual nutrients and MPA. This allowed us to identify some food groups that contributed the most to MPA.

Our second objective was to compare how various aggregations might improve the relationship between FGI and MPA. We evaluated those aggregated food groups already existing in the 9-group indicator (shown below) and assessed the percent and mean MPA of women having consumed one or the other, both, or none of the sub-groups. This was to enable us to propose a new food grouping or new indicator that could perform better than the FGI-9R from WDDP-I.

[23] Goldberg 1991, op. cit.

| FGI-9R | Disaggregated Groups |
|---|---|
| All starchy staples | Grains & grain products |
| | All other starchy staples |
| All legumes & nuts | Cooked dry beans & peas (including soy and soy products) |
| | Nuts & seeds |
| All dairy | |
| Organ meat | |
| Eggs | |
| Flesh foods | Meat |
| | Fish |
| Vitamin A-rich dark green leafy vegetables | |
| Other Vitamin A-rich vegetables & fruits | |
| Other fruits & vegetables | Other fruits |
| | Other vegetables |

***Comparison of prevalence rates given by various MPA and FGI cutoffs***

The indicator we are looking for from this analytic work is not going to be used at the individual level, but for evaluation of populations and prevalence. Therefore, in addition to performing a sensitivity and specificity analysis similar to WDDP-I, we wanted to assess to what extent the prevalence rate at or above a certain FGI cutoff matches the prevalence above a certain MPA cutoff (i.e. whether the two methods predicted similar percentages of individuals with low adequacy). We expected that at very best, prevalence rate at or above FGI cutoff would equal the prevalence rate at or above the MPA cutoff. The worst case situation would be no relationship between the two. However, in practice, we would be satisfied to find that sites with higher FGI prevalence also had higher MPA prevalence, and sites with lower FGI prevalence would also had lower MPA prevalence.

Our last objective was to explore how the quality of women's diet was reflected by the FGI prevalence at or above the FGI cutoffs chosen through sensitivity and specificity analysis. The mean MPA among women reaching or not reaching the chosen FGI cutoffs were explored, along with the % of women having consumed various nutrient-dense food groups. The three groups we investigated were animal source food groups, at least two of the fruits and vegetables food groups, and at least one of the legumes, nuts, and seeds food groups. These analyses were performed for all sites and weighted according to sample size.

## WDDP-II RESULTS: DATASETS DESCRIPTION & PERFORMANCE OF 2 CANDIDATE INDICATORS

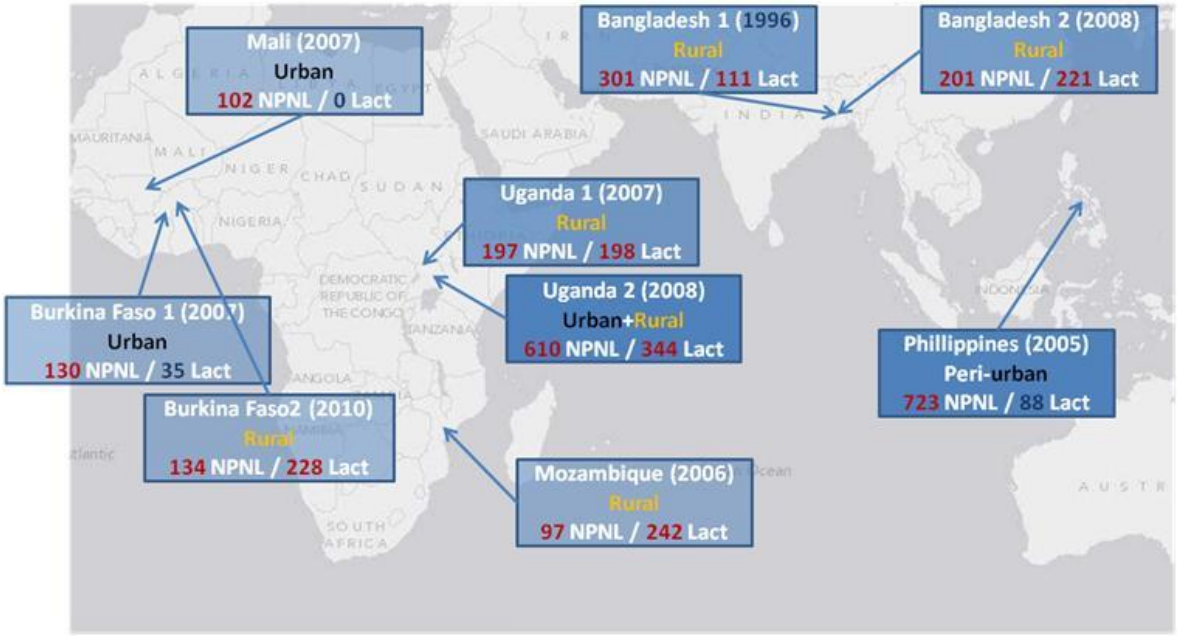
**Yves Martin-Prével**

Yves Martin-Prével presented the results of the analyses carried out on two candidate food group indicators – FGI-9R and FGI-10R. He started his talk by acknowledging the extraordinary work carried out by Pauline Allemand over the course of the study.

***Data set descriptions***

The presentation began with a brief overview of the 9 datasets included in the analysis. The datasets came from Burkina Faso (1 urban and 1 rural), Mali (urban), Bangladesh (2 rural), Mozambique (rural), Uganda (1 rural and 1 urban and rural), and the Philippines (peri-urban).

***Mean MPA and percentage of women having consumed various food groups of interest at or above and below FGI cutoffs***




Six of the nine datasets had sufficient numbers of lactating women to include in the analysis. In eight datasets, intake was collected as a quantitative 24-hour recall. The ninth study (Bangladesh 2) obtained 24 hr diet intake through a combination of 12 hr direct observations using weighed food records, plus recall of any foods consumed during the subsequent 12 hr period. All datasets included repeat dietary intake measurement for at least a subsample. As described by Pauline, Goldberg criteria were used for excluding outliers, except for the Ugandan dataset for which women's weight was not available. The figure above lists sample sizes after these exclusions. This procedure excluded 61% of women from the Philippines study, while in the remaining datasets, the percent of exclusions ranged from 0 to 18%. Despite the high exclusion rate in the Philippines, the dataset was retained because the distribution of intakes looked coherent in the remaining sample and its size was still quite large.

The datasets varied on the average energy consumption with an 800 kcal gap between the Philippines (the lowest) to Uganda (the highest). In four datasets (Ban1, Ban2, Moz and Ug1), mean percent of energy from carbohydrates exceeded WHO recommendations while only one country exceeded recommendations for percent of energy from fats (Mali).

The PA of individual micronutrients and the MPA across all micronutrients varied across the nine datasets (slide 8). Some of the micronutrients had a very low PA (<0.25) in most datasets, in particular iron, calcium, and Vitamin B12. The highest PAs were for zinc, Vitamin B6 and Vitamin A. MPAs ranged from a low of 0.34 in one of the datasets from Bangladesh to a high of

0.60 in the rural Uganda study. This is compared with an MPA of 0.83 calculated from a German dataset, used as a yardstick.[24]

***Performance of two candidate food group indicators at the individual level***

Two FGIs were presented as the best candidates for a recommended indicator of women's dietary diversity: FGI-9R was one of the set of three best indicators from WDDP-I and is the most widely used at present. FGI-10R was the best performing of all the different combinations tested. Both of these indicators are "restricted" in the sense that only food groups where consumption was at least 15 g were counted in the score.

The following table from the presentation (slide 11) shows how the food group compositions differ between the two FGIs. In FGI-9R, all legumes and nuts as well as all non-Vitamin A-rich fruits and vegetables are aggregated while organ meat is a separate food group from flesh foods and miscellaneous small animal protein. In FGI-10R, beans and peas comprise a separate food group from nuts and seeds, non-Vitamin A-rich fruits are separated from non-Vitamin-A vegetables, while organ meat was aggregated with flesh foods.

***The two candidate FGIs***

| FGI-9R | | FGI-10 | |
|---|---|---|---|
| **1** | All starchy staples | **1** | All starchy staples |
| **2** | All legumes and nuts | **2** | Beans and peas |
| | | **3** | Nuts and seeds |
| **3** | All dairy | **4** | All dairy |
| **4** | Organ meat | **5** | Flesh foods (including organ meat and miscellaneous small animal protein) |
| **5** | Flesh foods and miscellaneous small animal protein | | |
| **6** | Eggs | **6** | Eggs |
| **7** | Vitamin A-rich dark green leafy vegetables | **7** | Vitamin A-rich dark green leafy vegetables |
| **8** | Other vitamin A-rich vegetables and fruits | **8** | Other vitamin A-rich vegetables and fruits |
| **9** | Other fruits and vegetables | **9** | Other vegetables |
| | | **10** | Other fruits |

A detailed overview was shown of the frequencies of women having consumed foods the prior day from the different FGI-9R and FGI-10R food groups across the datasets (slides 10-11). Except in the Philippines, no women consumed organ meats. Similarly, egg consumption was highest in the Philippines compared to other datasets, but overall consumption of eggs was quite low. With the exception of starchy staples which were consumed by almost all women, there was great variability in frequency of consumption of the other food groups across the datasets. The mean number of food groups consumed ranged from 2.9 to 4.4. The prevalence of women having consumed 5 or more food groups out of 9 ranged from 1% in the rural Burkina Faso study to 43% in the urban study of the same country.

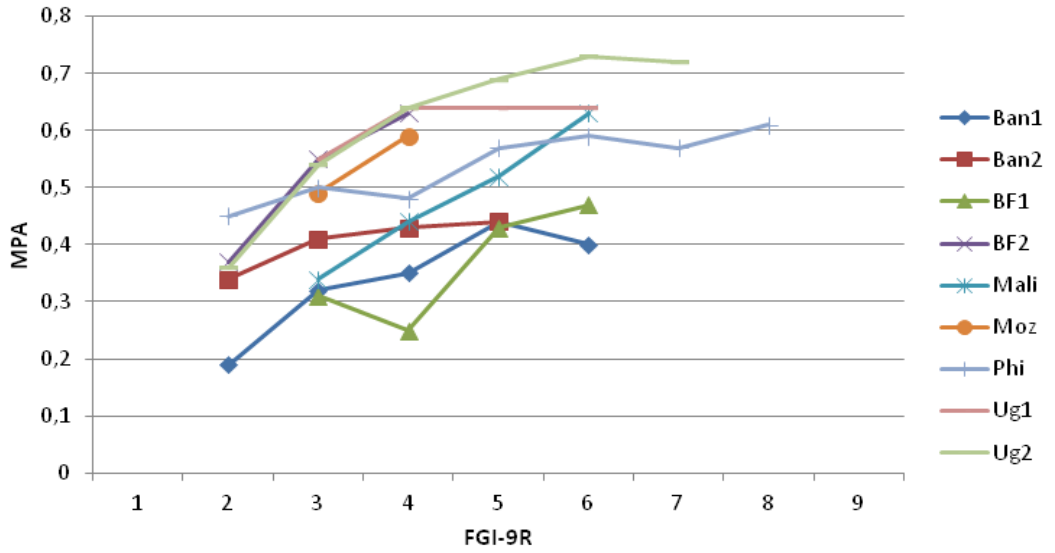
[24] We chose to estimate MPA for developed country with relatively high income, but without widespread consumption of fortified foods/products. Representative data were available for Germany, one such country.

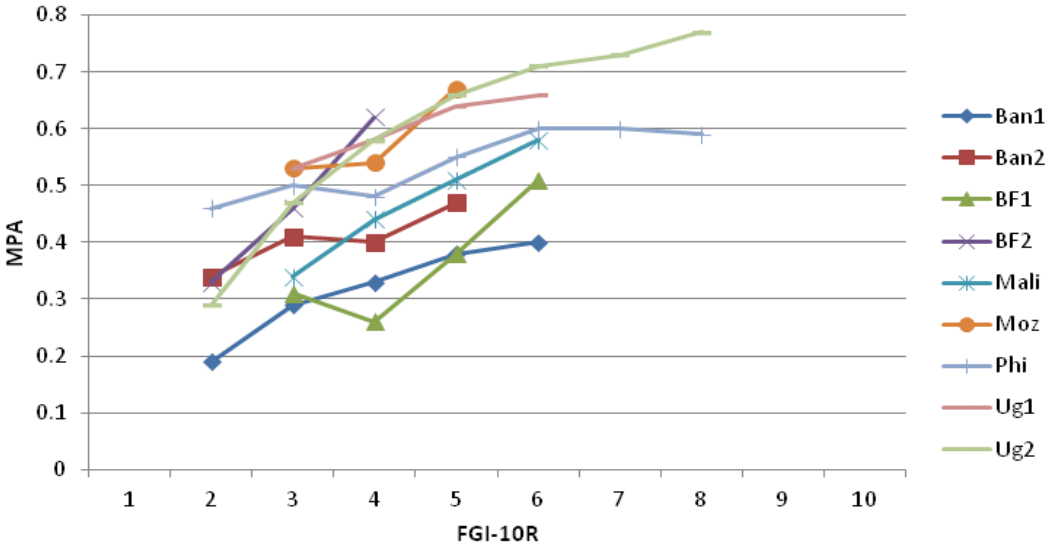
A series of analyses, as described by Doris and Pauline, were carried out on the two FGIs to test each against the following criteria:

- Correlation between FGIs and MPA
- ROC analysis
- Sensitivity/Specificity, total misclassification (selection of best FGI and MPA cutoffs)
- Relationships between dichotomous FGI and dietary characteristics at the population level (including prevalence matching exercise)

***The Relationship between FGI and MPA***

For both FGIs, MPA increases were clearly visible with increasing diversity as depicted below. The correlations between number of food groups and MPA overall were promising (ranging from 0.25 to 0.56) and all statistically significant, although these varied across the individual datasets. This shows that there is a definite relationship between greater dietary diversity and greater probability of micronutrient adequacy for both FGIs. This was reduced somewhat when energy was controlled for, but it still remained strong.



***ROC Analysis: Area Under the Curve***

The desired benchmark of 70% AUC in ROC Analysis was not met in all countries even for the FGI-9R and FGI-10R, the two best-performing indicators. However, both indicators met the 70% criteria in 5 of 10 countries, and for the remaining datasets AUC was >60%, as depicted in the figure below. Comparing the differences in AUC for the two indicators across countries indicates better performance for FGI-10R. When the difference is in favor of FGI-9R, it is very small (1% or less) and when the difference is in favor of FGI-10R, it is more substantial (2-5%).

***AUC values for the 2 candidate FGI-Rs***

| MPA > 0.60 | | | | |
|---|---|---|---|---|
| | **FGI-9R** | **FGI-10R** | **Difference (FGI-10R - FGI-9R)** | **P-value** |
| **Ban1** | 0.818 | 0.811 | **-0.007** | 0.701 |
| **Ban2** | *0.673* | *0.695* | **0.022** | 0.673 |
| **BF1** | 0.709 | 0.702 | **-0.007** | 0.730 |
| **BF2** | 0.743 | 0.794 | **0.051** | 0.588 |
| **Mali** | 0.710 | 0.700 | **-0.010** | 0.012 |
| **Moz** | 0.636 | 0.680 | **0.044** | 0.028 |
| **Phi** | 0.624 | 0.617 | **-0.007** | 0.048 |
| **Ug1** | 0.620 | 0.669 | **0.049** | 0.261 |
| **Ug2** | 0.729 | 0.768 | **0.039** | 0.000 |

**Color code:** AUC<0.650 | 0.650≤AUC<0.700 | 0.700≤AUC<0.750 | 0.750<AUC≤0.800 | 0.800≤AUC | P<0.05

Results from all of the analyses comparing each candidate indicator showed small differences, but that the FGI-10R indicator performed slightly better on average. For FGI-10R, five datasets (one of the Bangladesh studies, both Uganda studies, Mali and the Philippines) had acceptable performance towards the criteria (greater than 0.70) but only the Bangladesh-1 study met all criteria established a priori.

***Sensitivity and Specificity analyses***

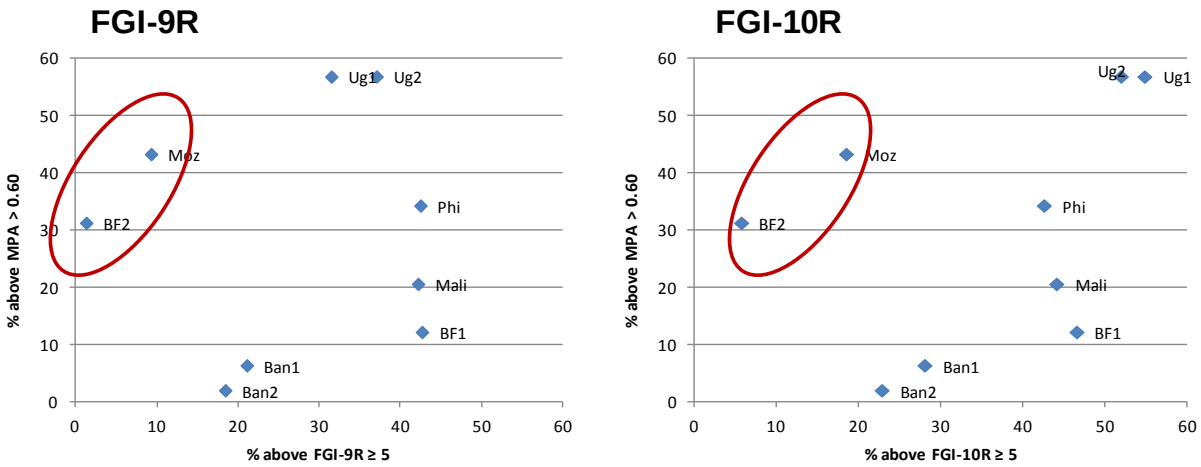
These analyses were performed for each potential FGI at three levels of MPA (0.50, 0.60 and 0.70) for each dataset in the search of a "best cut-off". Slide 20-24 shows these analyses for FGIs 9R and 10R. For both FGIs, it was possible to identify an acceptable cut-off of 5 in five countries and only one country met all criteria determined ahead of time (Bangladesh 1). The main obstacle to a better matching was the overall low sensitivity across the datasets. These analyses identified that setting the MPA at 0.60 with a cut-point of five or more food groups worked best for both candidate indicators.

***Relationships between characteristics of diet and dichotomous FGIs at the population level***

One way of comparing the two FGIs at population level is to calculate the prevalence of women at or above the cut-point compared to the mean MPA. A desirable feature would be to have the prevalence of women at or above the designated cut-point associated with the prevalence of women with an MPA > 0.60. We drew scatter-plots of these associations (slides 26-28) with

and without two datasets that were considered as outliers (Mozambique and Burkina Faso 2), and found a satisfactory association when those countries, considered true outliers and not data-flawed, were removed. In both cases, the coefficients were higher for FGI-10R and were statistically significant for FGI-10R when outlier datasets removed.

***Prevalence matching exercise for NPNL women***
***(% women with FGI-R ≥5 vs % women with MPA > 0.60)***



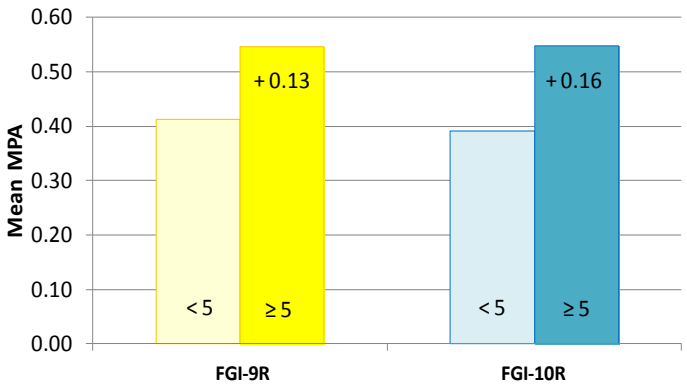

| Spearmann rank correlation | | | | |
|---|---|---|---|---|
| **Coeff.** | **p-value** | | **Coeff.** | **p-value** |
| **0,03** | **0,93** | **All datasets (n=9)** | **0,36** | **0,43** |
| **0,4** | **0,29** | **Without ouliers (n=7)** | **0,82** | **0,02** |

The two outlier datasets were already recognized as outliers in other parts of the analysis. This is because they exhibit relatively high MPA prevalence and, in contrast, relatively low FGI prevalence. For Mozambique, the survey was performed at the peak of the mango season when large amounts of mangoes were consumed. For rural Burkina Faso, the rather high MPA is partly explained by the consumption of large quantities of grains, mainly sorghum, quite rich in minerals (iron and zinc), and of some condiments made out of sorrel seeds. Therefore, in both cases, the MPA was driven by quantities rather than by diversity.

Across all datasets, 27% of women reached or exceeded the cut-point of 5 for FGI-9R, while this figure was 35% for FGI-10R. We also calculated mean MPA separately among women reaching or exceeding 5 food groups compared to those consuming fewer.

The following figure shows the mean MPA across studies (weighted by dataset sample size) by having reached or exceeded the cut point of 5. The FGI-10R showed a wider spread

***Mean MPA at or above vs. below the FGI cutoff of 5***
***(all women across all sites)***



in MPA between the group of women at or above the cut-point of 5 compared to women below 5 food groups (16 percentage-point difference, vs. 13).

Another way of looking at population characteristics captured by the two FGIs was through consumption of specific food groups of interest. Both indicators showed higher percents of women consuming animal sources foods, fruits and vegetables and legumes at or above the cut-point of 5. Here again, the FGI-10R performed somewhat better than FGI-9R.

***Conclusion***

The conclusions of these detailed analyses are the following:

- Diets were very poor in calcium, iron, vitamin B12; poor also in folate and riboflavin **(MPA range: 0.34 to 0.60)**
- Restricted indicators (**FGI-Rs**) performed better in almost all analyses
- **At the individual level**, the FGI-10R tended to perform better than the FGI-9R
- **At the population level**, the FGI-10R tends to have a better alignment between the MPA level and the number of food groups
- **Both dichotomous indicators are nutritionally meaningful with respect to the quality of the diet they reflect**

# SUMMARY OF RECOMMENDATIONS FROM THE CORE WDDP II GROUP

**Nadra Franklin**

- We recommend a dichotomous indicator for global diet assessment
- We recommend a positive (as opposed to a negative) indicator based on whether or not women meet a MPA > 60%
- We recommend a cut-off of 5 or more food groups for minimum dietary diversity in women (note: this was the best performing cut-off for both candidate indicators)
- We suggest requiring a minimum consumption of 15 g for a food group to "count" toward the indictor score
- We recommend 2 candidate indicators for consideration: FGI-9R and FGI-10R

A reminder to the group was made that the main tasks of the meeting are 1) to assess the core group's views that a dichotomous indicator can be recommended for assessment, setting targets and for advocacy, and 2) recommend one of the 2 indicators identified by the core group taking into consideration both technical performance and other factors.

# DISCUSSION

The discussion centered around questions and clarifications on the WDDP-II analysis and on issues concerning implementation in the field.

The WDDP-II core team was questioned whether they had considered pooling the data, in particular for the countries that had two datasets (Burkina Faso and Uganda) and also all datasets together. They responded that pooling was not possible, even within the same country across urban and rural populations, because of differences in the food composition tables. Also,

analysis within individual datasets was desirable so that variability within the relationship between FGI and MPA was clearly visible. In response to a follow up question on potential inclusion of other large 24 h intake datasets such as the most recent Mexican Nutrition and Health Survey and the US National Health and Nutrition Examination Survey (NHANES), it was explained that when the WDDP-II got started, the datasets from Mexico were not yet available, and that the decision was taken not to include datasets from countries with high levels of fortified foods as the relationship between dietary diversity and nutrient adequacy would be different.

There were a number of questions on the quality of the datasets and the analysis process. Several questioned the decision to consider only FGIs with the 15g restriction, and how much better the restricted indicators performed given the implications for implementation. The reply was that in most cases the AUCs for restricted indicators were higher and that the performance predicting MPA was systematically better when food groups consumed in amounts <15 g/d were excluded. Some concern was expressed that the set of country datasets studied may not have provided enough variability across sites and that so few datasets might reduce confidence in recommending a global indicator. Alicia Carriquiry, a member of the WDDP-I statistical team, stated that actually the results of the 9 datasets in WDDP-II were quite good, given the difficulties in getting accurate estimates of MPA at individual level no matter the number of datasets, because intra-individual variability is notoriously high in all cases.

One question was whether an algorithm-based approach for defining minimally adequate dietary diversity was considered rather than simply establishing a cut-point on the score (e.g.: at least one source of high quality protein and one starchy food and one fruit or vegetable). The participant felt that results from such analyses might be easier to communicate. Mary Arimond added that in the process of developing the Infant and Young Child Feeding (IYCF) indicators, some algorithms were investigated. She reported that within some individual countries this approach performed well but did not do so globally. This may be due to the wide diversity of dietary patterns across geographic settings, making it difficult to identify a common set of sentinel food groups.

There were several questions about why organ meats had been separated out from flesh foods in the FGI-9R. This is actually a historical artifact from the WDDP-I. Food groupings were agreed among the initial participants in WDDP-I, based on consideration of nutrient-density. The original group discussed that a more empirical approach to identifying and aggregating food groups would be ideal, but considered the number of data sets too few to provide a basis for this, and resources were not available for a more extended approach to this. Once WDDP-I was completed, the indicator was used in some surveys and programs, and so WDDP-II conducted further analysis with the existing food group aggregation scheme as well as with new ones. The different sets of food groups investigated in WDDP-I were based on current nutritional knowledge at the time. Separating out Vitamin A-rich foods may also be a historical artifact, following from a strong focus on vitamin A in many public health nutrition programs. It was noted that in the current study, vitamin A intakes were less problematic than intakes of many other micronutrients.

There was a discussion on how to handle the classification of certain “borderline” foods, for example difficulties in designating foods into fruits or vegetables. Enumerator training should include a substantial component on how to classify foods that are reported, and provide

examples. Other measures may also be employed to ensure consistency, such as only hiring female enumerators who are more familiar with local foods and know how meals are cooked.

It was noted that both the FAO Dietary Diversity Guidelines and in the manuals for the IYCF indicators include a comprehensive annex of illustrative foods in each group. Such a tool could be updated globally and adapted locally to provide consistency in the way foods are categorized into appropriate food group. The benefits of expanding data collection to include food groups of interest beyond those required by the FGI were also mentioned.

The issue of data collection was discussed at length in order to identify the differences in using a qualitative free recall method vs. a pre-set list of food groups. With the recall method, the respondent is asked to recall all foods consumed the prior day, including mixed dishes, and the enumerator ticks or marks each food into the appropriate food group listed on the dietary diversity questionnaire module. The list-based approach involves asking the respondent about each of the food groups listed on the dietary diversity questionnaire module, one by one, giving examples of typical foods corresponding to the food group. Yves Martin-Prével talked of his long experience in collecting recall data for assessing dietary diversity in his research projects, acknowledging that the recall approach takes time and lengthy enumerator training, and may not be practical for large-scale surveys. One problem with the list-based approach is that with a long list or a larger number of disaggregated food groups, errors in reporting are more likely since the burden is on the respondent to categorize what she ate into the correct food group. To date, we do not have empirical data on advantage and accuracy of list-based vs. qualitative free recall collection of data.

Several participants stated their opinions that the evidence presented by the WDDP-II is thorough and that we have what we need to move forward on identifying an indicator for global dietary assessment. As one person pointed out, the indicator for stunting, -2 SD, was not based on extensive validation yet is widely used and accepted as valid. Thus, the validation work carried out under WDDP-II is an improvement in the field of indicator development.

## OVERVIEW OF OPERATIONAL AND PRACTICAL CONSIDERATIONS RELATED TO A WOMEN'S DIETARY DIVERSITY INDICATOR FOR GLOBAL ASSESSMENT

**Megan Deitchler**

In this presentation, issues on practical use of the dietary diversity indicator were covered, several of which were already brought up and discussed in the previous session.

The first issue concerns the method used to collect data: list-based or open recall. Both methods collect data on the previous 24 hours using the phrase "yesterday, during the day or at night". The list-based method is when the enumerator goes through each of the food groups on the questionnaire, giving examples and asking the woman to indicate whether or not she ate any of those types of food. The open-recall involves asking the respondent to recall all foods and beverages consumed. Enumerators lead the respondents through the day and then tick on the questionnaire the foods or food groups corresponding to the reported foods and beverages. After completing the recall, the enumerator will then identify the food groups not ticked and ask the woman explicitly if she had anything from those groups.

There are several advantages and disadvantages to each method, as summarized below.

| *LIST-BASED METHOD* | *OPEN RECALL-BASED METHOD* |
|---|---|
| **Advantages** | |
| • Faster to administer | • Puts the burden on the enumerator to match foods consumed with foods and/or food groups listed in the questionnaire<br>• May be more likely to lead to better recall of foods consumed |
| **Disadvantages** | |
| • Puts the burden on the respondent to match foods consumed with food groups listed in questionnaire<br>• May be more likely to lead to omission of foods consumed | • More time required to administer |

The open recall method may well have some advantages in terms of obtaining more complete information on consumption; however the enumerators must be well trained to categorize foods correctly, implying familiarity with local foods, diets and recipes.

A second related issue is how to handle consumption of mixed dishes for identifying the food groups. Two different approaches which are not mutually exclusive can be used. The first identifies main ingredients of commonly consumed mixed dishes prior to carrying out the survey, and the second one relies on respondents to report ingredients of mixed dishes, both for dishes prepared by the respondent and those prepared by others such as street or restaurant foods. Alternatively, names of mixed dishes are noted and most common ingredients are identified and coded later.

The third issue that survey designers may face is how many food groups to include on the data collection tool. It is common to have more food groups than the minimum necessary to create the FGI. Some disaggregation may facilitate recall (for example, having two groups on the questionnaire for starchy staples: grain-based foods and white roots and tubers, even though these two will be aggregated into "starchy staples"). Disaggregation can be helpful if specific component foods or smaller food groups are of interest. The researchers may also wish to study consumption of foods not included in the dietary diversity indicator, such as fats/oils or sugary foods, so these food groups could also be included. It is important that all food groups included in the questionnaire be mutually exclusive and adapted to include local foods (with their local names) that are commonly consumed by the target population.

The fourth issue that survey teams will face is how to meet the requirement that only food groups where at least 15 g be consumed are counted as being consumed (the "restricted" food group indicator). Because all research carried out thus far has demonstrated that restricted

indicators perform better, efforts should be made to exclude food groups that were consumed in very small amounts. The 15 g restriction applies to the entire food group for the full day, and not to individual foods within a group (15 g of a specific food/serving ≠ 15 g of food group/day).

The last issue is related to seasonality with respect to data collection and interpretation. One-time assessments within a country should collect data within one agricultural season or spread out across all agricultural seasons, as is done with national household budget surveys. Repeated surveys that do not aim to identify seasonal differences in dietary diversity should be conducted in the same time period. Cross-national comparisons should also consider seasonality.

## DISCUSSION: IDENTIFICATION OF THE BEST INDICATOR FOR ASSESSMENT – CRITICAL VOTES

At the beginning of this session, a vote was taken to see if the group agreed that the evidence was sufficient to recommend a dichotomous indicator of women's dietary diversity assessment. A dichotomous indicator would enable estimates of the prevalence of women meeting dietary diversity criteria, which is much easier to compare and communicate than mean values of a semi-continuous indicator.

### All participants were in favor of a dichotomous indicator.

There was a discussion before the next vote was taken whether the group recommended a positive indicator as opposed to a negative indicator. A positive indicator would require a threshold sufficiently high that those at or above threshold could be labeled as more likely to have an "acceptable" MPA. A negative indicator would require a lower threshold, characterizing those below it as being more likely to have "low" adequacy. Some participants were concerned about the risk that users would consider any score above the threshold of a negative indicator as a good or acceptable diet, or would use the threshold as a recommendation.

One key argument in favor of a positive indicator, provided by several participants, was that it would be in line with the IYCF indicator of Minimum Dietary Diversity and would avoid confusion on the part of policy makers if the indicators for the two target groups had the same format and interpretation.

There were a number of comments in favor of negative indicator. One person observed that a negative indicator would be more likely to grab the attention of policy makers. Another expressed the concern that with the positive indicator set for an MPA of >60%, considered quite low, the indicator was not really inspirational. It was noted that there are a number of existing indicators that are set as negative, such as extreme poverty which are inspiring (i.e. attract attention, such as percent of persons living at <$1.25/day, for example). An example message from a negative dietary diversity indicator could be "if you don't eat at least 5 groups a day, it is unlikely you are meeting your requirements".

The core group members acknowledged that there was a risk of miscommunication also with a positive indicator, and the message must be very clear that eating from 5 or more food groups in a day is not necessarily adequate, but that the further a person falls short of the threshold, the worse the situation is likely to be in terms of micronutrient adequacy.

The vote was taken on which type of indicator to recommend.

**There were no votes in favor of a negative indicator. There were several abstentions for a positive indicator but the vote exceeded the decision point of 75%.**

Further discussion followed the vote with respect to where the FGI cutoff should be set for a positive indicator and to how such information could be interpreted and used. The first point was whether an MPA>60%, the value used to determine the threshold, was sufficient in terms of micronutrient adequacy. It was clarified by the core group that for a positive indicator, the highest assessable MPA should be used. In the WDDP-II analyses, the AUC's were best at 60% MPA; at the 70% MPA, things became unstable and there were very few women even reaching that level. Also the prevalence of women at or above the 5 food group cutoffs and the prevalence of women above 60% MPA seem to match well.

Another concern raised was that there is a potential for misclassification with the >60% MPA and the 5 food groups cutoffs. The response to this was that in fact, MPA is very hard to measure accurately and we are trying to validate the dietary diversity indicator against a gold standard that may itself be measured poorly. Given this, the indicators being proposed here seem to work quite well, and the degree of misclassification identified at the different cut points may not actually be so high. A more certain type of validation would be to gather four to five 24 h recalls on women across a variety of sites but for now, these types of data do not exist.

Participants also questioned whether the misclassification in the indicator would be a limitation when making comparisons across countries and/or across time. One commenter had a strong opinion that tracking change in dietary diversity across time with this indicator requires analysis of how the indicator responds to actual change in the MPA, which we don't have the data for. Additionally, comparison across countries requires that the indicator has been validated for cross-cultural equivalency, which has been done for very few indicators. However, others highlighted that, in practice, the indicator will be used for tracking. Given this reality, we must be clear on explaining the limitation that the indicator has not actually been validated for this purpose, similar to many other indicators. Several persons endorsed recommending it for assessment only, but we must acknowledge that it will indeed be used for tracking. We may have the data in time to see how well it might capture real change in micronutrient adequacy.

Participants also emphasized that in the future this indicator may need to be updated with new nutritional knowledge or in a way that reflects evolving dietary guidelines for overall diet quality.

The group acknowledged these possible caveats, but nevertheless felt the indicator was sufficient and the best possible one given current knowledge. There was a strong endorsement to move ahead with defining the indicator and to pave the way for its use, as this will be very helpful for all institutions working on diet issues.

**When the vote was taken on selecting an indicator set at the MPA of >60%, more than 75% of participants were in favor, exceeding the decision rule.**

The next vote concerned the recommendation of a cut point of 5 or more food groups. Yves Martin-Prével affirmed that the threshold of 5 worked across all MPAs for both candidate FGIs – 9 or 10. The group agreed to name the selected indicator "minimum dietary diversity" to avoid implying that 5 or more can be considered adequate in all cases, and for harmonizing the name with the IYCF "minimum dietary diversity" indicator, which was so named for the same reason.

**When the vote was taken on recommending a cut off of 5 or more food groups for minimum dietary diversity in women, all but one voted in favor of the recommendation, exceeding the decision rule.**

**To summarize, today we have reached consensus to recommend a dichotomous indicator for dietary diversity assessment with a cut point of 5 or more to indicate minimum dietary diversity.**

Discussion began on the selection between the FGI-9R and the FGI-10R. Participants were curious about how food groups for the various indicators were selected, defined and aggregated. One of the earliest questions was about whether, in the analysis, there was any attempt at consolidating the fruits & vegetables groups or looking at them differently than how they are categorized in the FGI-9R and FGI-10R. The core group answered that they were looked at the data in different ways but the other combinations did not do better (or did not make more sense nutritionally) than the proposed FGI-9R and -10R groupings. A number of disaggregations were tested for grains and other starchy foods, fish and meat, and different fruit and vegetable combinations but some of these were not meaningful nutritionally and did not contribute to improving performance.

Several persons clarified that the discussion on which indicator to choose should not be based on the number of food groups that appear on the data collection tool. It might be useful to keep the food groups on the data collection tools more disaggregated so that if the indicator gets updated in the future, the data will already be available. Separating seeds and nuts from beans and legumes and the different fruit and vegetable food group disaggregation does make sense for improving recall when using the list-based approach. Several people affirmed that asking for more disaggregated data on the questionnaire does not compromise indicator creation because groups can be collapsed for analysis. Adding additional food groups that are not part of the indicator (such as organ meat if FGI-10R is selected) can be considered if there is particular interest on the part of the researchers in certain foods.

One consideration in selecting between the two indicators is which one better promotes what we want women to eat. While in the datasets used for the analysis organ meats were consumed very little, the DHS evidence shows that organ meat consumption is considerable in a number of countries. However, it may be unlikely that both organ meats and other flesh foods are consumed the same day, and this would not necessarily be recommended. Overall, it was felt that FGI-10R aligns better with nutritional messages, such as promoting consumption of a variety of fruits and vegetables and plant-source proteins. Several participants also felt that FGI-10R had a more appropriate balance between plant and animal foods. These are strong points in its favor despite the possible disruption required to existing questionnaires if this one is chosen.

The following table summarized some of the discussion points on the two indicators

| In favor of FGI-9R: | In favor of FGI-10R: |
| --- | --- |
| • Has been in use for a while (referred to in the FAO guidance documents)<br>• Simple<br>• Will give a lower prevalence of women meeting the minimum dietary diversity (avoiding overestimation)<br>• Separating the eggs, meats and organ meats can help to emphasize the groups that we want women to eat<br>• Organ meats are actually consumed in many DHS surveys | • If nuts & seeds are truly different nutritionally than legumes, then they should be separated<br>• This one mirrors the dietary guides: it's not easy to encourage low income populations to eat organ meats; it's easier to recommend consuming plant sources of protein<br>• This indicator has a better relationship with micronutrient adequacy both at the individual and the population level and is more reflective of nutritional messages to consume a wide range of fruits and vegetables. |

The discussion for the day ended here and picked up on Day 2.

# WDDP CONSENSUS MEETING DAY 2

## REVIEW OF DAY 1

Nadra Franklin summarized the consensus reached the previous day on 3 recommendations:

- A dichotomous indicator for dietary diversity assessment
- A positive indicator based on whether or not women meet a MPA > 60%
- A threshold of 5 or more food groups for minimum dietary diversity in women

In the ensuing discussion leading to a final vote between FGI-9R and FGI-10R, issues were brought up that related primarily to performance and food group differences between the two indicators, as well as operational issues pertaining mostly to adaptation of existing dietary diversity data collection tools. The fact that the current indicators have not been validated for their ability to meaningfully track change was also widely discussed, which has implications for messages on intended use of the new indicator.

## CONTINUED DISCUSSION ON IDENTIFICATION OF THE BEST INDICATOR FOR GLOBAL ASSESSMENT AND CRITICAL VOTES

***Performance and food group differences***

Participants discussed at length the differences in food group composition of the two candidate indicators. It was mentioned that the separation of fruits and vegetables into Vitamin-A rich or not reflects a historical Vitamin A interest on the part of nutritionists, whereas results for WDDP-II data sets showed intakes of vitamin A were less problematic than intakes of a number of other micronutrients, at least in the areas studied. A reminder was made that this focus on vitamin A is also present in the IYFC indicator. The core group reminded participants that the performance of the tested FGIs was improved by disaggregation of fruits and vegetables into four different groups. Also, there is a benefit of having this degree of disaggregation, as it conforms to current thinking on chronic disease prevention recommendations to eat a variety of fruits and vegetables. Several participants affirmed that the FGI-10R reflects healthier dietary patterns, such as a variety of fruits and vegetables and seeds/nuts in addition to legumes and beans. A few participants were uncertain about aggregating organ meats into an overall group of flesh foods because of their high micronutrient content and that these foods are widely consumed in a number of countries, but not in the WDDP countries with the exception of the Philippines. For example, organ meat consumption is common in Latin American countries, but unfortunately Latin American or Caribbean countries were not included in the analysis. However, one core group member pointed out that women who ate meat might consume only an organ meat or a flesh food in a day, in which case, aggregating them into one food group would not be problematic.

***Data collection tools***

Participants discussed in depth the array of food groups to be collected. Many endorsed including more food groups than necessary to calculate the indicator. There were several reasons for this, such as interest in particular foods that may be the focus of a study or project; interest in also gathering information on food groups that should be consumed in moderation such as fats/oils and sugary foods and beverages, in order to broaden the scope of the assessment. The fact that organ meat would be folded into the FGI-10R group on flesh foods would not limit researchers from adding a specific food group on consumption of organ meats if this is of interest or there is need to reconstruct the FGI-9R for comparison with previous surveys using that indicator. A reminder was made that it will be necessary to change the data collection tool currently being used for FGI-9R in order to calculate FGI-10R. This is done by separating seeds and nuts from beans and legumes, and by separating "other fruits and vegetables" into "other fruits" and "other vegetables".

The question about the inconvenience of questionnaire change was addressed to Anne Swindale who oversees the Feed the Future (FtF) Monitoring and Evaluation framework, which currently collects data on Women's Dietary Diversity using the FGI-9R. She said that in reality the FtF questionnaires and indicators change all the time in the effort to get the best information possible. If FGI-10R were to be recommended, the required questionnaire changes would be made. The FtF dietary diversity module also is expanded beyond the indicator food groups to include fats & oils and sugary foods. With respect to analysis and comparability when switching mid-project to the FGI-10R, it would only be a matter of calculating both indicators the first year, and then only reporting the FGI-10R subsequently.

Monica Kothari from DHS raised the problem of using an expanded food group list for the woman's indicator of 9 or 10 food groups when asking dietary diversity information both on women and on infants. The DHS dietary diversity food group list currently combines legumes with nuts, and other fruits with other vegetables. Although women's diet questions are not currently administered, they were previously, with the same food group list used for women and children. Under this format, use of the FGI 10 would expand the list of questions for both women and children.

***Validated use of the indicator for diet assessment***

Validation of the indicator for assessment but not for tracking was a concern for several individuals in the discussion on final indicator selection. One concern was whether to change the questionnaires and guidance already existing for FGI-9R without evidence that FGI-10R excels in this area. However, it was pointed out that this type of evidence is not available on the FGI-9R either. Several core group members felt we should separate the issue of whether the FGI is responsive to MPA improvement (tracking) from selecting and recommending an indicator for assessment based on validated, comparable evidence. Participants expressed that many years have been invested in this validation research, and compared to many widely used indicators these FGIs have undergone a tremendous amount of validation against an accepted gold standard. We do not know yet how they respond to change but this is unknown for almost any other indicator in common use for monitoring trends. Are we setting a different standard for selecting this indicator? The suggestion was to embrace a research agenda considering its

responsiveness, while moving forward with a recommendation now. Moving forward was endorsed by a large majority of participants.

**A vote was taken on final selection of the recommended indicator, choosing between FGI-9R and FGI-10R. One person voted for FGI-9R, four abstained, and the remaining votes for FGI-10R.**

While the vote exceeded the decision rule of 75%, it was felt by many that further discussion was needed to understand why four persons abstained from indicating their choice. One person abstained because of concerns that the food groups might not reflect current dietary patterns or guidelines. She was convinced that having an established threshold is very important and will greatly improve our assessment of dietary diversity. But she would not want to change the questionnaire that her institution is using now if soon, we will be coming up with a "better" set of food groups. She asked whether the choice of FGI-10R as the best we have now means that we will use it for the foreseeable future, or should we stay with the FGI-9R and incrementally improve that one as new knowledge is obtained. Responding to the question on how many years it would take realistically to test and identify a better set of food groupings, one core group member speculated that it would take at least 5 years with new data to find the "best" group of foods. However, other core group members remarked that given the current set of data, additional rethinking of the food groups would not have produced a better indicator, since numerous combinations of food groups were already tested. The reply by the abstainer was that she would really like the indicator to reflect the foods we want people to eat and to reflect dietary guidance, rather than just be the best performing indicator. She was still not sure the current proposed food groups do that. A comment was made that with respect to carrying out more research to achieve this, we may need to improve the data first, because the available studies are often small and suffering from a number of limitations. For this reason, it might take several years to get the data needed to improve the food groupings.

A second abstainer was concerned that countries will not understand the meaning of the indicator, whether it is 9 or 10, because the food groups may not be relevant to the country context (e.g. organ meats or the different types of fruit and vegetable groups). Combined with the imperfect performance of the indicator to reflect MPA, she felt these food group combinations seem weak and may not be useful to countries.

Someone brought up that there are other datasets available to look at. However, this would require time and money for reviewing the data, and many of these datasets come from countries with a large number of fortified foods. The same participant also suggested that given the diversity of local diets, maybe we should consider locally-specific indicators that are still good proxies for the underlying construct of adequacy. They could be different but comparable in the sense that all would be grounded on the same underlying construct. However, another participant was emphatic that we need a single indicator to use globally and this should be the thrust of our decisions here - to select a simple proxy indicator that has been validated against MPA of diets that do not contain fortified foods. And this has to have a comparable interpretation across locations.

There was a follow-up comment that the ideal indicator should reflect dietary guidelines, which in some cases are quantified, such as WHO's guidelines for at least 400 g daily of fruits and vegetables. It would also provide recommended upper limits for salt and saturated fats. A plea was made to work more on developing dietary guidelines for all population groups. But participants speculated that it would be at least 10 years before we have truly global dietary guidelines, which is too long to wait.

The core group replied that probably neither FGI-9R nor FGI-10R is really intuitive. The efforts to look at a number of different indicators did include those with a much smaller number of food groups that might correspond to dietary guidelines, but these minimal indicators did not perform nearly as well as the ones we are considering today. We need to be clear in our communication efforts to describe what this indicator is meant to do and that it does **not** reflect dietary guidance – it is not prescriptive.

There were many questions and comments on the hope that the new indicator can be included in DHS, as this survey would be an important source of information on women's diets. It was felt that including a dichotomous indicator for women's DD, similar to the Infant and young child indicator, would make the information gathered more useful. The WDD indicator was promoted by FANTA with a number of supporting statements during a call in 2014 for suggestions for the next DHS cycle. One possible problem around including an FGI in DHS is that the FGI-9R was used for several years (although not very recently) in approximately 20 countries so changing to FGI-10R could affect comparability. Also, adding a number of new questions would bring a considerable cost. If the women's indicator is going to be asked alongside of the IYCF MDD, then the food groups will need to be changed. The question was raised whether this might affect the validity of the answers on the child indicator. Another participant reminded the group that there is a lot of momentum around nutrition and agriculture within the SUN movement, and an indicator of women's dietary adequacy would be very relevant to design of agriculture/nutrition programs. SUN countries rely on DHS for data, so having a women's dietary diversity indicator included would be very helpful. It is the responsibility of the nutrition community to express the need for including the women's indicator in the DHS. It was noted that DHS is flexible and based on the demands of the participating countries, thus it might be possible to add several women-focused nutrition questions if the demand is there.

Anne Peniston, USAID Nutrition Division Chief, took the floor and said this is great time to be finalizing an indicator for women's dietary diversity because DHS is starting a new phase. USAID will be convening with DHS and other stakeholders in the autumn to look at various survey methodologies in use and their added value, in light of a possible revision. They are thinking about how to make adjustments in the core DHS and are considering adding a separate nutrition module.

A participant mentioned the possibility of looking for other data collection opportunities such as household consumption and expenditure surveys. However, consumption/expenditure modules collect information about dietary consumption (usually acquisition) at the household level on a lot of different foods, but do not collect information at the individual level. They may collect information using a proxy household dietary diversity indicator or create an indicator

from the food reported as purchased; however this is not a proxy for dietary quality, but rather for calorie availability and income. These types of surveys are carried out in many fewer countries and less frequently than DHS. They might be made amenable to collecting individual level data for women's dietary diversity, as they collect anthropometry and have a women's module.

The outstanding issues that remained prior to a final vote included the risk of lack of continuity between prior assessments, and which of the two indicators would be the best choice for getting women's diversity measurement back in DHS, which is extremely important. Anna Lartey, Nutrition Division Director at FAO, made a plea for the group to move forward with conviction based on the science and what we believe is the right thing to do. Operational issues should be a secondary consideration.

A participant from one of the funding agencies reflected that the group attending this meeting is very powerful and this should not be underestimated. She suggested making a decision now and moving forward with it quickly but also encouraged developing a research agenda to re-evaluate the food group composition sometime in the future.

The Global Nutrition Report coming out in November, 2014, will address data gaps and we need to be forthright on how to fill this gap. Representative funding agencies can be better advocates for getting the nutrition information that is needed once an indicator is agreed upon. Representatives from the Gates Foundation and from the Department for International Development (DfId) endorsed this position, because the fact that an indicator has been chosen by consensus is very powerful and the new indicator will definitely contribute to reducing the data gap.

**The final binding vote was unanimous with a 100% vote in favor of the FGI-10R. The new indicator is named Minimum Dietary Diversity – Women (MDD-W).**

## DISCUSSION: OPERATIONAL FEASIBILITY ISSUES RELATED TO FGI-10R

The issues proposed for discussion after selection of the FGI-10R indicator included:

- Changes to existing questionnaires
- Advocacy needs
- Open recall vs. list-based method of data collection
- 15 g minimum consumption required
- How to collect data on foods included in mixed dishes
- Issues with adaptation of food groups
- Relatively high enumerator training needs

***Method of data collection***

The question was posed whether we need a standard data collection tool; this means placing a ceiling on the maximum number of food groups to be included, allowing for the collapse of

some of the groups in order to create the indicator. Different approaches for seeking affirmative replies to food groups when using the list-based approach may lead to differences in the completeness of the data across surveys. There was some concern that excessive probing could inflate the number of positive responses. It was suggested that additional questions on a specific food group of interest should be placed in a separate location on the questionnaire from the dietary diversity food groups. With respect to recommending a standardized approach, most large surveys will opt for the list-based approach even if the open recall method and checking off food groups by the enumerator obtains more complete information. It could be useful to produce and recommend a standard food group list, expanded with respect to the minimum number required to create the indicator but with a reasonable maximum number of food groups to avoid respondent fatigue or coercion for obtaining affirmative responses. Research to compare the data quality obtained from these two different methods has apparently not been published so this may be a topic for the research agenda.

Several participants shared their experiences with operationalizing the 15 g minimum/food group requirement. As part of the food list adaptation, foods likely to be taken in minimal amounts could be identified, such as fish powder, small amounts of hot pepper, or a small amount of milk in a hot beverage. Alternately, women could be shown a tablespoon to gauge if they consumed more of less than that amount. If there is pre-existing 24 h quantitative intake data available for the country, it might be possible to identify foods commonly consumed in minimum amounts. The question was raised whether there should be standard guidance on how to operationalize the 15 g minimum /food group effectively.

There was agreement that the different approaches to collecting the data are likely to compromise comparability across surveys. Efforts to standardize approaches on training, food list adaptation to include all important commonly consumed foods, and application of the survey tool, may help to reduce some of this inherent variability. It was mentioned that use of electronic devices for recording responses may complicate application of a standard approach designed for paper and pencil data collection.

## HOW THE MINIMUM DIETARY DIVERSITY INDICATOR FOR WOMEN CAN BE INTERPRETED AND COMMUNICATED

**Gina Kennedy**

The motivation for developing this indicator was to have a simple proxy for micronutrient adequacy of women's diets. Food-based indicators fill a niche in agriculture-nutrition advocacy because dietary improvement is in the direct impact pathway from agriculture to nutrition. Special areas of focus related to women's diets include adolescent nutrition and the Thousand Day framework.

The MDD-W has been validated for population-level assessment of women's diet:

- It provides the prevalence of women reaching the minimum dietary diversity
- Groups/populations with a higher proportion at or above the threshold are likely to have higher average micronutrient adequacy across the 11 micronutrients.

Because the indicator is based on the PROBABILITY of micronutrient adequacy, it does not mean that all women reaching or exceeding the minimum have adequate intake of all 11 micronutrient. This message must be communicated well.

The MDD-W is not a dietary guideline, it is not reflective of all aspects of diet quality (sugars, fats or oils, or other micronutrients not included in the original 11), and it is not reflective of the intake of fortified foods.

The MDD-W is measured at individual level but inferences are made about dietary adequacy of populations by generating point prevalences of women's minimum dietary diversity at national, regional, project/program levels. Although not yet validated for this purpose, it may be appropriate to use the MDD-W as a monitoring indicator for tracking change by projects with food-based interventions and a plausible impact pathway for dietary diversification. It should NOT be used for individual level assessment or screening. The indicator can also be useful to analyze individual food groups of interest, for example to calculate % consuming animal-source foods, or % consuming fruits & vegetables.

There are several cautionary messages to keep in mind. As discussed over the past two days, we do not know how sensitive the indicator is to change over time. In particular, we need evidence to evaluate if the relationship between FGI and MPA remains the same when diets change. When starting from a very low baseline of dietary diversity, the indicator may not be very responsive to changes that occur below the threshold level. While the indicator was based on the MPA as a gold standard, no dietary methodology is a true gold standard as all entail measurement error to one degree or another.

We will be using this indicator in the absence of international food-based dietary guidelines, which would include key dietary principles/guidelines for women of reproductive age as well as other population groups.

Open points for discussion this afternoon include: which messages/uses are the most important to promote; how to communicate the changes to current users of FGI-9R (USAID, CGIAR, UN) and with future users of the new indicator based on 10 food groups.

## DISCUSSION

There were a number of excellent suggestions made by the group, summarized below, that are related to communication about the new indicator to an audience comprised of decision makers, programme implementers, the nutrition community and governments.

Although we do not yet know how this indicator behaves for monitoring and tracking change, it was the opinion of several persons that use of the new indicator for this purpose should be accepted so we can generate evidence on its effectiveness. One suggestion is that for tracking, as the dichotomous indicator might not show change in the lower range of dietary diversity, calculating a mean number of foods groups consumed at different times would presumably be

more sensitive to changes observed below the threshold level and could be recommended in addition to estimating the proportion of women reaching established threshold at 5 or greater food groups.

***Immediate communication needs to be addressed after this meeting***

- Talking points for why FGI-10R is better than the FGI-9R currently in use would be very helpful for promoting the change in institutions and programmes currently using FGI-9R, in particular for Feed the Future, DHS and FAO. These points could include the argument that the FGI-10R might be more useful in the area of agriculture and nutrition since nutrient-dense plant foods are more disaggregated.
- A technical communication on why an indicator for women's dietary diversity in addition to that for infants and young children is needed.
- A technical brief on how the different indicators relate to each other and how they fit within the framework of nutrition-sensitive agricultural programming (IYCF indicators, women's indicator, poverty indicators, etc.) would be useful to allow for consistent messaging.
- A small concise slide set for promotional communication.
- A two page executive summary on the project and the new indicator could be posted on websites and accompany any slide presentation.
- Coming up with a clear way to describe what the indicator is a proxy of – micronutrient adequacy, micronutrient intake, dietary adequacy, etc. We may not wish to bring the MPA concept into communication messages.

***General suggestions towards a communication strategy:***

- We need to emphasize that this not a complete indicator of dietary quality, but one of diversity. Work is needed for measuring other components of a healthy diet for women.
- This indicator will greatly assist in promoting improvement in women's nutrition, an often neglected issue.
- We should be cautious against the use of this indicator for other population groups, since it has only been validated against MPA among women of reproductive age
- With respect to advocating this indicator for women's dietary diversity in general, the UNICEF framework has data gaps in the area of food access and consumption; this indicator can help fill these gaps. Specialized UN agencies will welcome this indicator as part of their programmatic work on improving agriculture to address nutrition.
- We need to emphasize what it does and does not reflect. While not a "perfect" indicator, it does reflect overall increases in dietary diversity over a number of food groups. However, it does not reflect increase in the diversity within a single food group (e.g. increased consumption of soy beans compared to other legumes), nor does it capture information about changes in quantity of nutrient dense foods consumed
- We should promote its inclusion as a nutrition monitoring indicator for the Post 2015 Sustainable Development Goals Initiative by creating a demand for this type of information.

***Golden Opportunities***

The UN's zero hunger challenge - the commitment to providing 100% access to food - includes no indicators on access to food other than the MDG Prevalence of Undernourishment indicator,

which is not a complete indicator of access to food. The MDD-W could be one such indicator for a specific population group, especially with the increased attention to nutrition-sensitive agriculture.

Anna Lartey mentioned that the Rome-based agencies have recommended indicators on dietary diversity and food security for consideration in the Post 2015 Sustainable Development Goals monitoring framework, but this does not guarantee that they will be included in the final selection. This is because there are many other "classical" indicators for nutrition such as anthropometrics and anemia. We need to push to bring nutrition to the forefront and create a demand by member states.

## NEXT STEPS - POINTS FOR DISCUSSION

**Terri Ballard**

There will be several immediate outputs from the WDDP-II group, which include the final project report on the analytical validation work, the summary report of this meeting, and a scientific publication of the validation research. To respond to requests made in the previous discussion, we will also write a short document to explain to institutions currently using the FGI-9R why we have recommended a change, and we will come up with a set of slides that can be used by anyone for promotional purposes.

A longer term commitment is to develop a users' manual along the lines of the FAO guidelines and the documentation for the Infant and Young Child Feeding Indicators. These guidelines for the MDD-W indicator will include, among other topics, use for assessment in large-scale surveys, use for programmatic purposes (i.e. monitoring & evaluation, sample size, seasonality issues), operational issues such as methods of data collection, the 15 g restriction requirement, and adaptation of local food lists. This work may result in a suggested standardized food group list for survey questionnaires, as discussed earlier. It would be good if we could also update the food group classification tables currently published in the FAO and IYCF guidelines.

An important next step involving all of us is communication with the broader stakeholder group, such as communities of practice like the Agriculture to Nutrition (Ag2Nut), the Food Security Information Network (FSIN), websites such as SecureNutrition of the World Bank, blogs and institutional tweets. A suggestion has already been made to write a blog for the website of the Global Nutrition Report (since it is too late to include anything on MDD-W in the report itself). We need to promote inclusion of the MDD-W in nationally representative surveys, including but not limited to DHS or MICS, and in broader initiatives such as the Post 2015 Sustainable Development Goals monitoring framework and the Integrated Food Security Phase Classification (IPC).

We will want to build a research agenda around the indicator including but not limited to carrying out operational research for field administration, such as the best methods for capturing minimum quantities of food groups, comparison of list-based vs. open recall data collection methods, and degree of country adaptation needed. A summary of the research needs identified by the participants is included in the Annex.

## FINAL DISCUSSION ON NEXT STEPS

The idea of developing a WDD coalition for collaboration and sharing information on the indicator was brought up. This might involve periodic Skype calls, email list servers, or subgroups following up on one of the needs. This coalition could include discussions on other indicators of diet quality that the MDD-W does not capture.

There were many other ideas brought forward on a future research agenda. One topic that was also debated on the first day is a possible need in the future to change the indicator to include food groups that better reflect what we now know about nutrition requirements and healthy dietary patterns. Another point of consideration in the future might be how easily the chosen food groups could be adapted to regional dietary patterns. One participant mentioned that it would be desirable to align food groups to dietary guidelines, which could mean using an algorithm approach rather than a score and threshold. It was pointed out that consolidated dietary guidelines across countries do not presently exist and the country-specific guidelines that have been produced change over time. Different countries will set guidelines based both on science and on locally available foods, so it may not be realistic to have a common set of recommended food groups. It was pointed out that recommended dietary allowances also change over time, with new advances in equipment and research techniques, and thus the MPAs based on these innovations may change as well.

Another much discussed topic throughout the meeting was that the MDD-W has not been validated for tracking change in dietary diversity over time. Thus, a future area of research could involve validation of the indicator for global, country and programme tracking, including its responsiveness to change. In light of this, it was proposed that we could look at MPAs from surveys that are carried out at different times (for example, across seasons or in different years) to see how robust the relationship with MPA is. If it were shown to be relatively stable, this would give us more confidence about the indicator both for assessment and for tracking purposes. One limitation to this approach is the lack of available datasets to carry out this research now and the inevitable time lag for generating new data that could be used for this area of investigation.

Jennifer Coates mentioned that Tufts is putting together a project to improve the collection and use of different types of food consumption data, which might present an opportunity that some of these operational questions can be folded into small randomized, experimental-type studies. The timeframe for the project is not clear yet, but they will know in a few months whether the project as a whole will move forward.

With respect to uptake of the indicator in surveys other than DHS or MICS, Linda Kiess from WFP said that WFP surveys are currently focused on household level data collection, but there are discussions underway on how to better measure nutrition and whether there is a need to collect individual-level data. In WFP's monitoring and evaluation framework, the IYCF Minimum Acceptable Diet indicator has been introduced, so there is the opportunity for collection of the MDD-W as well.

There may be another opportunity to include the MDD-W in nationally representative surveys as part of the implementation of the Global Strategy for Agricultural and Rural Statistics led by FAO in collaboration with USAID, USDA, WB, and the Gates Foundation. Within the strategy it has been proposed to carry out periodic surveys, a sort of agricultural DHS. This highlights the importance of having a manual for the MDD-W indicator if we want to promote including it in such or other efforts.

There was an exchange on the next steps towards designing a users' manual on the MDD-W which would serve to update the part of the FAO Guidelines that cover women's dietary diversity. FAO and partners will take responsibility for this update. The Part II of the IYCF indicators manuals may be revised taking into account all the field experience with UNICEF, DHS, and NGOs who have collected data for the IYCF indicator. For potential manuals coming out of the work on women's dietary diversity, we should make sure they are in harmony with the revised lists of the IYCF and operational guidelines.

## CLOSE OF THE MEETING

Megan Deitchler from FANTA thanked the participants, noting that nearly all invited participated in the meeting. She congratulated the participants on reaching a unanimous decision and thanked the WDDP core group for all their effort in planning and preparing for the meeting. She highlighted the support from FANTA for logistics, communication, and note-taking. She warmly thanked Nadra Franklin who as facilitator did an excellent job in helping the meeting accomplish its objectives.

Anna Lartey from FAO added her voice to Megan's in congratulating the participants in achieving the task they set out for themselves. She closed by saying that good nutrition is the way to achieve a good quality of life, and the participants in this meeting have helped achieve progress in that regard, so she thanked them for their time and effort.

# Annex 1: RESEARCH NEEDS NOTED BY PARTICIPANT

### FIELD ADMINISTRATION OF THE MDD-W

- Conduct research to compare the data quality obtained from different data collection methods, e.g. open recall vs. list-based approaches. Different ways for seeking affirmative replies to food groups when using the list-based approach may lead to differences in the completeness of the data across surveys.
- Investigate the best methods for capturing minimum quantities of food groups
- Assess the degree of country adaptation needed on the food group lists for questionnaire construction.
- Explore how to collect data on foods included in mixed dishes, including those purchased and eaten outside the home

### VALIDATION OF THE MDD-W FOR GLOBAL TRACKING

- Validate the indicator for tracking over time, to test whether the relationship between the FGI and MPA remain the same and move in the same direction at different assessment points over time (e.g. in different seasons or across years). One approach mentioned was to look at MPAs from surveys that have multiple recalls per woman as well as multiple waves of data collection to see how robust the relationship with MPA is.

  ***Limitations***
  This will require improvement in the quality and number of individual food consumption studies as available surveys in resource-poor countries are often small in size and not representative of the population, few in number and suffering from methodological problems.

### FOOD GROUPS

- Test food groupings reflecting common dietary guidelines to determine if indicator performance can be further improved.

  ***Limitations***
  There are no universal dietary guidelines and many countries do not have national guidelines. Coordination may be difficult even with existing guidelines as they are subject to change over time. Also, a wide variety of food group combinations has already been tested and it may be difficult to further improve indicator performance.

# Annex 2: MEETING AGENDA

**Reaching Consensus on a Global Dietary Diversity Indicator for Women**
Washington, DC, July 15–16, 2014

## Agenda for Day One

| Time | Session | Responsible Party |
|---|---|---|
| 8:30–9:00 | Registration and Breakfast | |
| 9:00–9:10 | Welcome from FANTA, FAO, and USAID | Sandra Remancus<br>Anna Lartey<br>Anne Peniston |
| 9:10–9:45 | Introductions | Nadra Franklin |
| 9:45–10:00 | Indicator qualities, broad criteria, and uses | Mary Arimond |
| 10:00–10:30 | Objectives of Women's Dietary Diversity Project (WDDP) I and WDDP II | Megan Deitchler<br>Terri Ballard |
| 10:30–10:45 | Break | |
| 10:45–11:30 | Overview of WDDP methodology | Doris Wiesmann<br>Pauline Allemand |
| 11:30–12:00 | Discussion | Nadra Franklin |
| 12:00–1:00 | Lunch | |
| 1:00–1:45 | Results for two candidate indicators | Yves Martin-Prével |
| 1:45–2:00 | Summary of recommendations from the core WDDP II group | Nadra Franklin |
| 2:00–2:45 | Discussion | Nadra Franklin |
| 2:45–3:15 | Break | |
| 3:15–3:30 | Overview of practical and operational issues for an indicator for global assessment | Megan Deitchler |
| 3:30–5:00 | Discussion: Identification of the best indicator for global assessment | Nadra Franklin |

## Agenda for Day Two

| Time | Session | Responsible Party |
|---|---|---|
| 8:00–8:30 | Breakfast | |
| 8:30–8:45 | Review of Day 1 | Nadra Franklin |
| 8:45–10:00 | Continued Discussion: Identification of the best indicator for global assessment | Nadra Franklin |
| 10:00–10:15 | Break | |
| 10:15–11:15 | Discussion: Uses of the selected food group measurement tool for purposes other than global assessment | Nadra Franklin |
| 11:15–12:30 | Discussion: Operational feasibility issues related to selected indicator for both global assessment and programmatic uses | Nadra Franklin |
| 12:30–1:30 | Lunch | |
| 1:30–1:45 | How the selected indicator for global assessment can be interpreted and communicated | Gina Kennedy |
| 1:45–2:15 | Discussion | Nadra Franklin |
| 2:15–3:00 | Discussion: Promoting the chosen indicator for global assessment | Nadra Franklin |
| 3:00–3:15 | Break | |
| 3:15–3:30 | Next steps | Terri Ballard |
| 3:30–4:00 | Discussion | Nadra Franklin |
| 4:00–4:15 | Closing remarks | Sandra Remancus<br>Anna Lartey |

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