

## Comparing Household Food Consumption Indicators to Inform Acute Food Insecurity Phase Classification

### Study Background

The Integrated Food Security Phase Classification (IPC) is a set of tools and procedures for classifying the severity of chronic and acute food insecurity across geographic areas and time using a convergence of available data and information. One important component of the acute IPC is the Acute Food Insecurity Reference Table for Household Group Classification (household reference table). This table provides qualitative, graduated descriptions of five acute food insecurity phases, along with thresholds for key household-level outcome indicators that can be used to classify the severity of acute food insecurity (see Table A for an abbreviated version of the acute IPC household reference table). Thresholds in the current version of this table in the *Integrated Food Security Phase Classification: Technical Manual Version 2.0* (p. 33), were devised after consultation with the developers of the indicators, including the Food and Agriculture Organization of the United Nations (FAO), the Food and Nutrition Technical Assistance III Project (FANTA), and the World Food Programme (WFP).

To date, little analysis has explored how well the food consumption indicators and their thresholds in the acute IPC household reference table align with one another or with the phase descriptions provided in that table. For example, there is little information on how well each of the indicators the

table employs captures the acute IPC's five severity phases, how well each indicator's thresholds align with the table's phase descriptions, or how well each indicator's threshold for a given phase relates to another indicator's threshold for the same phase. To analyze the relationships among select household food consumption indicators,<sup>1</sup> FANTA and the Famine Early Warning Systems Network (FEWS NET) initiated a household food consumption indicators study (HFCIS) based on available secondary data. The study was carried out by a team of consultants affiliated with Tufts University, with technical management support and guidance provided by FANTA and FEWS NET, and with technical input from WFP and the IPC Global Support Unit. The study's primary objective was to identify ways in which an improved understanding of these indicator relationships can enhance acute IPC indicator threshold alignment, thus helping to improve the convergence of evidence approach and overall quality of acute IPC analyses.

### Summary of the Study Process

The HFCIS made use of 65,089 household-level observations from 21 representative, population-level datasets spanning 10 countries: Ethiopia, Haiti, Kenya, Mongolia, Pakistan, Somalia, South Sudan, Sudan, Uganda, and Zimbabwe. Data used in the analysis were collected between 2008 and 2013 and contained at least two of the following indicators: the Coping Strategies Index (CSI),

<sup>1</sup> Though the indicators examined in this study may be more typically understood as indicators of food security, this study refers to them as "household food consumption indicators" because they are presented as food consumption outcome indicators in the acute IPC household reference table.

the Reduced Coping Strategies Index (rCSI), the Food Consumption Score (FCS), the Household Dietary Diversity Score (HDDS), and the Household Hunger Score (HHS).<sup>2</sup> These indicators represent two broad indicator groups: experiential indicators and diet diversity indicators.<sup>3</sup> Datasets employed in the analysis included at least 200 observations per indicator and collected/tabulated indicator data according to the standard methodology for each indicator.<sup>4</sup>

The HFCIS analysis included three main steps:

1. An exploration of the relationships between household food consumption indicators used in the acute IPC household reference table through correlations and cross-tabulations
2. An analysis of two major factors hypothesized to influence the relationships between pairs of these indicators: potential differences in the dimensions of food security measured by the indicators<sup>5</sup> and potential differences in the ranges of severity measured by the indicators
3. A comparison of how these different indicators aligned categorically (i.e., across study-constructed food secure, moderately food insecure, and severely food insecure categories) and an

examination of potential alternative indicator category alignments

The results of the first three steps led to a series of proposed changes to the indicators and thresholds used in the acute IPC household reference table.<sup>6</sup>

### Summary of the Study Findings

- The HFCIS correlation and cross-tabulation analyses identified strong relationships between two pairs of study indicators—rCSI/HHS ( $p = 0.495$ ) and FCS/HDDS ( $p = 0.592$ ). However, the remaining study indicator pairs were less strongly correlated and the consistency of indicator relationships varied among datasets.<sup>7</sup> This suggests that context (when and where data are collected) influences the strength of the relationships between these household food consumption indicators.
- The dimensionality analyses suggested that the indicators studied reflect different aspects of food security (and, for the purposes of the acute IPC specifically, food consumption outcomes). The results of these analyses were interpreted to indicate that the experiential indicators studied (HHS and rCSI) are likely to be stronger proxies of diet quantity while the diet diversity indicators

<sup>2</sup> HHS data used in this study were either collected directly or calculated from available Household Food Insecurity Access Scale data. As CSI is so rarely implemented as designed, limited data were available for its analysis in the context of acute IPC thresholds. In addition, rCSI has replaced CSI as WFP's commonly collected indicator of coping and is available in many datasets. Therefore, though rCSI is not included in Version 2.0 of the acute IPC household reference table, it was considered in the HFCIS.

<sup>3</sup> Experiential indicators ask respondents to rate the depth and/or frequency of their food insecurity. These indicators may contain questions about experiences related to anxiety about household food access; satisfaction regarding food preferences, food availability, and diversity; and signs of food shortages in daily life (IFPRI, 2012, *Improving the Measurement of Food Security*, Discussion Paper O1225). Diet diversity indicators ask respondents about the number of different food groups consumed over a reference period. Of the indicators studied here, the CSI, rCSI, and HHS indicators are considered experiential indicators, while the FCS and HDDS indicators are considered diet diversity indicators.

<sup>4</sup> While examination of the relationships among the indicators that proxy for food consumption outcomes in the acute IPC household reference table is most effectively undertaken by comparing the performance of these indicators against caloric intake data, such analysis was outside the scope of this study given the time and resources available and concerns regarding the accuracy and methodological consistency of available caloric data.

<sup>5</sup> Food security dimensions include stability, quantity, quality, acceptability, and safety (Coates 2013).

<sup>6</sup> These proposed changes are made with the understanding that quantity deficits are the primary characteristic of the poor food consumption the acute IPC aims to classify. The proposed changes to better measure quantity deficits are provided with the limitation that there was no gold standard indicator of caloric adequacy against which to verify them.

<sup>7</sup> Correlation coefficients for the remaining four study indicator pairs (rCSI/FCS, rCSI/HDDS, HHS/FCS, and HHS/HDDS) had an absolute value of  $p \leq 0.3$ . Even correlations among the indicator pairs that were strongly correlated across the study data (rCSI/HHS and FCS/HDDS) varied among specific datasets (e.g., the rCSI/HHS relationship ranged from  $p = 0.597$  in Ethiopia to  $p = 0.323$  in South Sudan).

(HDDS and FCS) are likely to be stronger measures of diet quality. This split warns against using these two groups of indicators interchangeably as indicators of acute food consumption outcomes and suggests relying on at least one indicator from each group for more accurate classification.

- The HFCIS alignment analysis suggested four primary conclusions related to indicator alignment:
  - None of the indicators performed well across the full range of food insecurity severity reflected in the acute IPC's five phases.
    - HHS appeared not to be sensitive in discriminating among relatively food secure households. As HDDS and FCS scores increased (implying a more food secure situation), HHS scores did not vary greatly.
    - HDDS and FCS, meanwhile, did not align well with HHS and rCSI when food insecurity was severe, although it is unclear whether this was because the former are less sensitive at the more severe end of the acute food insecurity spectrum or because the association between quantity and quality of food consumption is attenuated in these situations.
  - In the absence of caloric intake data, alignment analysis requires establishing an “anchor” against which indicator relationships can be assessed. Two possible anchors were considered as indicators of “catastrophe” (acute IPC Phase 5):  $HHS > 4$  and  $FCS \leq 10$ . Because FCS and HHS were not well correlated at their extremes, alignment analysis suggested that only the indicator chosen as the anchor would distinguish between Phases 4 and 5. HHS was ultimately selected as the study's anchor for the following reasons:
    - The clear conceptual link between the severe caloric deficits described at acute IPC Phase

5 and the experiences that households with an HHS of 5 or 6 face

- The results of the study's dimensionality analysis, which were interpreted to indicate that HHS is a proxy of diet quantity
- The longer recall period used to collect HHS data
- On average, using current acute IPC thresholds for HHS, FCS, and HDDS and a set of study-constructed thresholds for rCSI, a randomly selected pair of these four indicators classifies households at the same level of food insecurity severity 42.7 percent of the time. This statistic is referred to as average pairwise concordance.
- By adjusting some thresholds and removing others (i.e., deciding that certain indicators are unable to distinguish a given phase), the final step in the HFCIS analysis suggested that there are a range of options to achieve an average pairwise concordance of more than 50 percent while maintaining the indicator thresholds' logical consistency. Using the full study dataset, the best-performing indicator threshold schemes achieve an average pairwise concordance of more than 60 percent. Increased concordance of indicator thresholds is expected to improve acute IPC analyses by increasing the likelihood that indicators classify households in the same way, thus facilitating the convergence of evidence approach.

### Key Implications for the Acute IPC Household Reference Table

- Previous studies have suggested that the relationship between caloric consumption and some of the indicators under study here varies across contexts.<sup>8</sup> The results of the HFCIS analysis further indicate that the relationships among the indicators themselves vary in different contexts.

<sup>8</sup> Lovon, M. and Mathiassen, A. 2014. “Are the World Food Programme's Food Consumption Groups a Good Proxy for Energy Deficiency?” *Food Security*. Vol. 6, Issue 4, pp. 461–470; Wiesmann, D.; Bassett, L.; Benson, T.; and Hoddinott, J. 2009. “Validating the World Food Programme's Food Consumption Score and Alternative Indicators of Household Food Security.” IFPRI Discussion Paper 00870. Washington, DC.

This underscores the importance of employing a convergence of evidence approach and suggests that acute IPC analyses that rely heavily on one quantitative indicator are likely prone to misclassification.

- When using a convergence of evidence approach in acute IPC analyses, the HFCIS findings strongly suggest the use of at least one indicator from each of the two identified indicator groups (experiential and diet diversity), that is, either HHS or rCSI and either FCS or HDDS.
- The results of the alignment analysis suggest a range of opportunities to improve the average pairwise concordance of the food consumption indicators under study. Determining which changes were most appropriate was not simply a matter of selecting the threshold combinations with the highest concordance. Rather, the range of possible options suggested by the empirical analysis was considered in light of how the acute IPC is used and the need for conceptually valid thresholds. Consultations among the study team suggested a series of specific changes to the number and ranges of food consumption indicator thresholds in the acute IPC household reference table. Together, these changes increased average pairwise concordance to 61.4 percent, an improvement of nearly 20 percentage points over the current acute IPC household reference table thresholds. The specific changes are listed below and included in Table A:
  - Small adjustments to HHS thresholds (HHS = 2 moves to Phase 2, HHS = 5 to 6 remains only in Phase 5)
  - The addition of rCSI to the reference table, with the following thresholds: 0 to 4 = Phase 1, 5 to 20 = Phase 2,  $\geq 21$  = Phase 3 or higher
  - Reduction in the number of HDDS thresholds from four to two and an adjustment of these thresholds such that HDDS 5 to 12 = Phase 1 or 2, HDDS 3 to 4 = Phase 3, and HDDS 0 to 2 = Phase 4 or higher
- A shift from WFP's food consumption categories (poor, borderline, and adequate) to raw FCS scores to enhance classification precision and transparency, a reduction in the number of FCS thresholds from four to two, and an adjustment of these thresholds such that FCS 35 to 112 = Phase 1 or 2 (with an FCS 42 to 112 = Phase 1 among populations consuming oil and sugar daily), FCS 13 to 34.5 = Phase 3 (with an FCS of 13 to 41.5 among populations consuming oil and sugar daily), and FCS 0 to 12.5 = Phase 4 or higher
- Although average pairwise concordance is improved by the changes proposed above, the study results also highlight the limitations of these quantitative indicators. Given the importance of contextual factors that was apparent in the study results, the IPC should re-emphasize the importance of reinforcing quantitative indicators with a robust analysis of other food security information when undertaking any classification.

### Implications for Future Research and the IPC Chronic Reference Table

- This analysis includes useful insights into the behavior and application of the study indicators, as well as recommendations for related future research priorities. Suggested priority areas of future research include:
  - Primary data collection that includes all of the following in the same survey:
    - Detailed information on caloric intake
    - All four analyzed food consumption indicators (HHS, rCSI, FSC, and HDDS), collected according to the standard methodology for each
    - The recently developed Food Insecurity Experience Scale

- Quantitative indicator sampling in areas that have Household Economy Approach baselines so that comparative analysis can be undertaken (see Appendix G in the full report for findings from an initial exploration of such an analysis)
- Development of additional household-level indicators capable of distinguishing acute IPC Phases 4 and 5
- Acute IPC classification of household groups is based on two groups of outcome indicators: food consumption and livelihood change. This study focused on the former group of outcome indicators, but more work is needed on the latter. This work should include further exploration of a CSI constructed from context-specific changes to livelihood strategies (e.g., atypical migration, asset sales, removal of children from school) due at least in part to food consumption challenges.
- Although this study was initially developed to inform the acute IPC's household reference table, it also has implications for the chronic IPC's reference table, given that many of the same indicators are used in both classifications. The IPC working group responsible for harmonizing the IPC classification tables should consider this study as they initiate and implement this effort.

**Table A. Current and Recommended Indicator Thresholds for the Food Consumption Component of the Acute IPC Household Reference Table**

Abbreviated IPC Acute Food Insecurity Reference Table for Household Group Classification					
	1 – None	2 – Stressed	3 – Crisis	4 – Emergency	5 – Catastrophe
<b>Phase description</b>	Household group is able to meet essential food and non-food needs without engaging in atypical, unsustainable strategies to access food and income.	Even with any humanitarian assistance, household group has minimally adequate food consumption but is unable to afford some essential nonfood expenditures without engaging in irreversible coping strategies.	Even with any humanitarian assistance, household group has food consumption gaps with high or above usual acute malnutrition  OR Household group is marginally able to meet minimum food needs only with accelerated depletion of livelihood assets that will lead to food consumption gaps.	Even with any humanitarian assistance, household group has large food consumption gaps resulting in very high acute malnutrition and excess mortality  OR Household group has extreme loss of livelihood assets that will lead to large food consumption gaps in the short term.	Even with any humanitarian assistance, household group has an extreme lack of food and/or other basic needs even with full employment of coping strategies. Starvation, death, and destitution are evident.

Source: Adapted from IPC Global Partners 2012

Current Indicator Ranges					
	1 – None	2 – Stressed	3 – Crisis	4 – Emergency	5 – Catastrophe
<b>HHS</b>		1	2 to 3	4 to 6	6
<b>CSI</b>	Reference, stable	Reference, but unstable	> Reference and increasing	Significantly > reference	Far > reference
<b>HDDS</b>	No recent deterioration and ≥ 4 food groups	Recent deterioration of HDDS (loss of 1 food group)	Severe recent deterioration of HDDS (loss of 2 food groups from usual)	< 4 food groups	1–2 food groups
<b>FCS*</b>	“Acceptable consumption” (stable)	“Acceptable consumption” (but deteriorating)	“Borderline consumption”	“Poor consumption”	Below “poor consumption”

Source: Adapted from IPC Global Partners 2012

Recommended Indicator Ranges					
	1 – None	2 – Stressed	3 – Crisis	4 – Emergency	5 – Catastrophe
<b>HHS</b>	0	1 to 2	3	4	5 to 6
<b>CSI</b>	Reference, stable	Reference, but unstable	> Reference and increasing	Significantly > reference	Far > reference
<b>rCSI</b>	0 to 4	5 to 20	≥ 21		
<b>HDDS</b>	5 to 12		3 to 4	0 to 2	
<b>FCS</b>	35 to 112 <sup>†</sup>		13 to 34.5 <sup>‡</sup>	0 to 12.5	

\* The standard FCS-based food consumption categories are: < 21 = “Poor,” 21–35 = “Borderline,” and > 35 = “Acceptable.” In areas where oil and sugar are regularly consumed, the thresholds are adjusted as follows: < 28 = “Poor;” 28–42 = “Borderline;” and > 42 = “Acceptable.”

<sup>†</sup> 42 to 112 for populations consuming oil and sugar daily.

<sup>‡</sup> 13 to 41.5 for populations consuming oil and sugar daily.



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