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STUDYING FOOD AND EATERS

A cocktail of perspectives and methods

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Chapter 2

Measuring individual and household food security: potential and challenges in nutritional and social science collaboration

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Two main types of indicators are implemented to measure the extent of individual and household food security—those that focus on food eaters' experience and their personal assessment of their situation, and those that rely on a food consumption measurement such as the dietary diversity score. The latter takes stock of the nutritional quality of people's diets and the relevance of its findings may be enhanced if supplemented by more comprehensive approaches to food practices and food eaters' viewpoints.

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." This definition emerged from the 1996 World Food Summit and is now widely acknowledged by development actors (NGOs, government departments, international institutions) and researchers (nutritionists, epidemiologists, economists, sociologists, anthropologists, etc.). However, it poses considerable problems of observability and measurement. The concept spans multiple dimensions (health, economic, social and cultural), and may be applied at different scales (individual, household, country). The challenge for food security indicators—as for any composite indicator of a complex real situation—is to be able to measure a not directly observable variable using approximations (or so-called 'proxies') that meet minimum criteria in terms of reliability, relevance and usefulness for action and research.

This chapter provides a selective overview of the main indicators of individual and household food security from a non-nutritionist perspective[5]. The first section reviews the history of the development of two major families of indicators—one focused on food insecurity experience and the other on food consumption. The second section

5. The authors of this chapter conduct social science research focused on development issues, while having extensive experience in collaborating with nutritionists.

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outlines their application scope. The third section considers the practical and relational aspects of producing these indicators in the field. The fourth section discusses the contribution of indicators to the between-discipline dialogue. Finally, the fifth section presents feedback on the implementation of an indicator of dietary nutritional quality as part of a research project on the links between agriculture and food in Burkina Faso, i.e. the Women's Dietary Diversity Score (WDDS-10), based on the counting of 10 groups of consumed food.

⏩ Origin of food security indicators

The main food security indicators were originally developed by multilateral agencies (FAO, WFP[6]) and international aid organizations (USAID and the NGO Care), with the methodological support of university academics[7]. The history of these indicators reflects changes in the food security concept. (Mal)nutrition has long been the domain of epidemiologists and nutritionists focusing on individuals' nutritional status resulting from food-health interactions. The food security concept is more global in scope—its different pillars (availability, access, use and stability) place individuals' nutritional status in a broader socioeconomic context (the household scale is highly relevant here), while encompassing knowledge areas other than nutrition and epidemiology (FAO and WHO, 1992).

The food security concept has also advanced alongside the malnutrition concept. Nutritionists long focused on calorie and protein deficiencies, which were directly linked to staple food shortages (estimated in terms of cereal supplies and budget-consumption surveys). Since the late 2000s, attention has been increasingly focused on micronutrient deficiencies, which are more related to food and diet quality. The emergence of dietary diversity indicators is evidence of this shifting interest, with the expression 'food and nutrition security' (FNS) now preferred over 'food security'. The more recent trend towards malnutrition due to excess nutrient intake (fat, sugar, salt) has been taking hold in populations that are otherwise food-insecure, thereby adding to the complexity of the FNS concept.

There are two main families of indicators depending on the FNS vantage point (Box 2.1 and Table 2.1).

The first family (HFIAS, HHS, FIES, CSI[8]) is focused on food insecurity experiences and household strategies to prevent or cope with this issue. It is mainly used by social aid[9] and humanitarian emergency relief (WFP) actors.

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6. FAO (Food and Agriculture Organization of the United Nations) and the WFP (World Food Programme) are two United Nations agencies.

7. The Food and Nutrition Assistance Project (FANTA), https://www.fantaproject.org/ [queried 27/08/2021]) is a good example of collaboration between international agencies (USAID, FAO) and universities (Cornell, Tufts) for the development and validation of indicators. Tufts University has posted a very comprehensive survey of food security indicators: https://inddex.nutrition.tufts.edu/data4diets/indicators (queried 27/08/2021).

8. Note that the following indicator acronyms are used in this chapter. HFIAS (Household Food Insecurity Access Scale), HHS (Household Hunger Scale, from HFIAS), FIES (Food Insecurity Experience Scale) and CSI (Coping Strategies Index).

9. HFIAS was originally developed to assess food aid programmes for poor households in the United States. The indicator was later adapted and extended for application to situations in Global South countries. It is currently being replaced by FIES.

The second family (HDDS, WDDS, MDD-W, WDDS, FCS[10]) concerns food consumption based on dietary diversity scores and is mainly associated with nutrition or food security actors (FANTA project).

These indicators can—depending on the case—be applied at the individual or household (generally defined as a unit of residence and consumption) level. At this latter more aggregated level, decisions concerning food and care practices are made, which will ultimately contribute to the nutritional status of each household member. We will further discuss this important distinction in the following sections.

Box 2.1. Differences in approach by indicator family

■ **Family 1: Experience and feelings of food insecurity (HFIAS case)**

Area	Sample questions
Anxiety	Did you worry that your household would not have enough food?
Quality	Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?
Quantity	Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?
Hunger	Did you or any household member go a whole day and night without eating anything because there was not enough food?

Source: Coates et al. 2007, p. 5

■ **Family 2: Food consumption—qualitative 24 h recall assessment for dietary diversity scores (WDDS/MDD-W case)**

> "Please describe the foods (meals and snacks) that you ate or drank yesterday during the day and night, whether at home or outside the home. Start with the first food or drink of the morning […]".

Source: Kennedy et al., 2011, p. 7

These indicators have been developed from a set of common criteria related to methodological and operational considerations:
– relevance: the indicator should assess different dimensions of reality relevant to individual and household FNS. For epidemiologists who focus on diagnosis and prevalence, as well as for quantitative economists, the relevance may be validated by estimating levels of correlation with other proven measures of malnutrition and food insecurity (Hoddinott and Yohannes, 2002; Leroy et al., 2015). The validation process may be more qualitative for economists and socioeconomists who focus more on livelihoods and strategies, but the approach is the same;
– sensitivity to variation, to ensure that it can be used for diagnosis, comparison and, more generally, statistical analysis;
– comparability in time, space or between sub-populations, which requires substantial work to standardize questions, answers and analyses;

10. HDDS (Household Dietary Diversity Score), WDDS (Women's Dietary Diversity Score), MDD-W (Minimum Dietary Diversity Score for Women), and FCS (Food Consumption Score).

– (relative) simplicity of implementation. FNS indicators generally opt for information that is less precise, but easier and quicker to collect than other methods. For nutritionists and epidemiologists, the ideal is to carry out quantitative food consumption assessments, supplemented by anthropometric evaluations or blood tests, but these studies are very expensive and intrusive for people. For economists, the simplification is done with reference to budget-consumption surveys carried out by national statistical institutes, which are also very cumbersome and hampered by the extent of measurement errors;
– simplicity of handling. Indicators are presented as scores that pool different information; they can be used for descriptive statistics (e.g. for charts) or be included in more sophisticated statistical or econometric models;
– this simplification of indicator collection and processing methods is not just methodological, it is designed to facilitate data production delegation and multiplication. Detailed guidelines manuals (FAO, s.d.; Coates et al., 2007; Maxwell and Caldwell, 2008; World Food Programme, 2008; Ballard et al., 2011; Kennedy et al., 2012; FAO, 2021) have been produced to facilitate adoption of the methods by field actors or researchers from different disciplines.

⏩ Use of indicators

Scores to qualify individual and household FNS

The indicators are represented as scores that pool feelings, experience and strategies in the case of HFIAS, HHS, FIES and CSI, food groups in the case of diversity scores (HDDS, WDDS, IDDS and FCS), with a common coding system in terms of occurrences (sometimes combined with frequencies) over a given recall period.

CSI incorporates a weighting system that is adjusted on a case-by-case basis according to prior knowledge of the setting (potentially in collaboration with stakeholders). This system has the advantage of better reflecting the challenges of local situations, but it is limiting when the objective is to compare different contexts.

Methods for developing dietary diversity scores are differently adjusted to the evolutions of the FNS concept. WDDS/MDD-W, i.e. the only validated indicator for assessing individual dietary nutritional quality, includes 10 food groups of nutritional interest, without weighting. HDDS, developed from 12 unweighted groups, has been validated as an indicator of improved household economic access to food. However, three of these groups (sweets, oils/fats and beverages) are now associated with excess malnutrition, and their inclusion may thus be deemed inconsistent. FCS uses weights ranging from 0 to 4 to account for the nutritional quality level assigned to each group, but this indicator has yet to be statistically validated.

Interpretation and comparison

The indicator values are hard to separately interpret as they are aggregated. Thresholds are proposed for HFIAS and CSI (food insecurity severity levels), MDD-W (women —with an average score of 5 or more groups—are more likely to meet their micronutrient needs), and FCS (dietary quality levels). In all cases, the guidelines manuals stress the need for caution in handling and interpreting these thresholds and the

Table 2.1. Comparison of indicator features.

	Family 1: Experience and feelings			Family 2: Food consumption (dietary diversity)		
	HFIAS (HHS)	**FIES**	**CSI**	**HDDS**	**WDDS/MDD-W**	**FCS**
FNS proxy via…	Feelings and experience	Feelings and experience	Adaptation strategies	Economic access to food	Dietary nutritional quality	Food access[a]
Areas	Access Anxiety, quality, quantity Hunger experience	Access Anxiety, quality, quantity Hunger experience	Strategies for managing food scarcity/hunger season	Access, dietary diversity	Dietary diversity	Dietary diversity and frequency
Analysis unit	Household	Household	Household	Household	Individual	Household
Person interviewed	Person in charge of meals	Person in charge of meals	Person in charge of meals	Person in charge of meals	Woman of childbearing age	Not specified
Recall period	4 weeks	12 months	4 weeks or/1 week	24 hours	24 hours	7 days
Indicator construction	Frequency weighted score Classification (severity)	Unweighted score Classification (severity)	Frequency and type weighted score Classification (severity)	Unweighted score of 12 food groups	Unweighted score of 10 food groups[b] (WDDS-10) Classification: dichotomous indicator equal to 1 if the score is ≥ 5 (MDD-W)	Frequency-weighted score and nutritional value (9 food groups) Classification (quality)

[a] The WFP guidelines manual (World Food Programme, 2008) considers that FCS also measures the dietary quality, but subsequent research has questioned the validity of this aspect (Leroy et al., 2015).

[b] 1: starch-based foods; 2: peas and beans; 3: nuts and seeds; 4: dairy products; 5: meat foods; 6: eggs; 7: vitamin A-rich leafy vegetables; 8: vitamin A-rich fruits and vegetables; 9: other fruits; 10: other vegetables.

resulting classifications. Moreover, for any indicator, it is always possible to get back to the source data in order to hone the analyses, i.e. feelings and practices for HFIAS, strategies for CSI, and food groups that contribute to the diversity scores.

It is easier to interpret changes in a given indicator over time in terms of improvement or deterioration, subject to the assumption that the recall period is representative of a 'typical' situation. Special attention should be paid to seasonal variations, which are very marked in rural and agricultural areas. For instance, an increase in the dietary diversity score, due to the seasonal availability of fruit and vegetables, may occur simultaneously with a deterioration in the FNS indicators of feelings due to a reduction in cereal stocks (Hoddinott and Yohannes, 2002; Savy et al., 2006; Lourme-Ruiz et al., 2021). Measurements thus must be repeated in the same season in order to monitor structural changes.

Specific difficulties arise when comparing populations, particularly for indicators related to food insecurity experience and strategies. Even if the questions are standardized, answers will depend on the sociocultural context, which may invalidate the comparison. For example, populations regularly exposed to food insecurity may show a form of resignation and therefore express less anxiety than other less exposed populations. This observation prompted the development of the HHS indicator, which focuses on a subset of questions related to hunger experience and is considered to be more universal while having a greater comparability potential than HFIAS and FIES. Yet this gain in comparability comes at the cost of a loss in specificity regarding the degrees and differences in the expression of food insecurity.

Because food group classification remains quite relevant between contexts, dietary diversity indicators are more suitable for between-region comparisons. However, two identical scores can mask major nutritional quality disparities.

Special attention should be paid to differences between MDD-W/WDDS and HDDS, which cannot be equated with a change of analysis scale from individual to household. The two indicators measure different food security dimensions: dietary nutritional quality for the former, economic access to food for the latter. Moreover, unlike the individual indicators, HDDS does not measure out-of-home food consumption (school canteen, market, etc.), which can generate consumption disparities between household members. Finally, although focused on the individual level for data collection, MDD-W is only a valid indicator of nutritional quality at the population level.

Operational and research questions

As FNS indicators have been developed by food aid and development agencies, they primarily meet operational needs: estimating food insecurity prevalence levels and degrees of severity; triggering, targeting and parameterizing food or nutrition assistance interventions, sometimes in emergency situations; and carrying out monitoring/assessment and impact studies. These indicators are also used in broader or longer-term development projects (e.g. agriculture and educational projects), adopting a 'nutrition-sensitive' approach (Ruel and Alderman, 2013). Dietary diversity scores are promoted by donors such as the European Union, who encourage project operators to use them in assessing their outcomes.

These indicators can also help answer research questions and the guidelines manuals are useful for researchers of all disciplines. Indeed, they outline protocols and provide

practical fieldwork advice, while including epistemological and methodological considerations regarding the indicators (analysis units, statistical validation, measurement quality), and meta-analysis for comparative studies. Research using these indicators can be part of nutritional studies or broader studies on household socio-economic functioning, on links between agriculture and food, etc. (see the 'Case study: farm household dietary diversity in Burkina Faso' section later in this chapter).

Collecting data: ethical and practical issues

Conducting questionnaire surveys for the purpose of developing indicators raises ethical and practical issues. From an ethical (and sometimes regulatory) standpoint and due to the personal nature of the survey data, protection mechanisms are crucial, e.g. ethics committee approval, informed consent of participants and database anonymization. The questionnaire implementation time, which represents an opportunity cost for respondents, is another parameter to be considered. From a practical viewpoint, the collected data quality depends on the biases inherent to declarative data collection, i.e. cognitive, respondent fatigue and social desirability bias. These general considerations are of special importance because of the sensitive nature of food insecurity. Interviewers must balance the methodological rigour required to obtain standardized data with the empathy needed to create a climate of trust with respondents, sometimes in tense and even distressing situations.

HFIAS and CSI questionnaires are quick to implement and not very vulnerable to cognitive bias: they do not cause comprehension or memory problems over the survey recall period, although frequency questions may be harder to answer than occurrence questions. Yet some questions are sensitive, such as those concerning hunger experience or avoidance strategies. The risk of social desirability bias is high, often in two ways: food insecurity over-reporting if respondents are looking forward to benefiting from a future programme; under-reporting if certain practices are socially stigmatized.

Regarding diversity scores, there is also a risk of social desirability bias, as normative representations, which could vary according to the context, may be associated with certain foods. For HDDS and WDDS/MDD-W, implementation of the 24 h recall approach (Chapter 1) will not substantially tax the respondents' memory, but the process involves recording details of the ingredients of food dishes consumed, thereby increasing the risk of fatigue, memory and cognitive bias when the dishes have been prepared by a third party. The FCS recall period is longer (7 days), but the added memory effort is offset by the fact that food groups are taken into account, which is more global than focusing on dishes and ingredients.

Finally, it is essential to pay special attention to the questionnaire respondents who may—depending on the context and their status—be unaccustomed to speaking out, or, on the contrary, become 'professional respondents' in extensive intervention conditions. Moreover, the risk of cognitive and social desirability bias is even greater for household indicator sampling as the respondent, i.e. generally the woman in charge of meals, may be asked to speak on behalf of her entire household, i.e. a group of varied size (the boundaries of which must be specified), with diverse degrees of variation between members.

⏩ Methodological contributions to related disciplines

In this section, we focus on potential synergies between nutrition and social sciences to gain insight into the mechanisms that characterize or determine food insecurity situations at the household and individual levels.

From both development and research standpoints, FNS indicators can be applied in a broader range of fields: poverty, vulnerability, livelihoods, intra-household inequality, gender perspectives, etc. The fact that FNS indicators are standardized should normally facilitate dialogue between operators and researchers, or between researchers from different disciplines.

A growing number of research studies now combine dietary diversity indicators with different agricultural variables (Jones, 2017; Sibathu and Qaim, 2018), yet the conditions needed for a worthwhile interdisciplinary dialogue are not always met. Debates have emerged between agricultural economists and nutritionists that have highlighted selective borrowing, and even methodological or conceptual confusion (on analysis units, groups, etc.). This questions the validity of certain interpretations, while underlining that indicators should not be presented as validated when the survey and analysis methods deviate from those outlined in standardized guidelines manuals (Verger et al., 2019). Conversely, social science researchers may criticise nutritionists for having too narrow a view of food (reduced to its nutritional components), individuals (reduced to their health status) and even more so of their family, social, cultural and material environment.

The synergy potential also depends on linkages between analysis units. The household is a key level, but scaling up from an individual to a household FNS is not clearcut. The contours of the household may be fluid, depending on whether it is considered as a unit of residence, income, consumption, or more specifically of food consumption. The question of contours is all the more critical in extended, polygamous and intergenerational family situations. What is more, farm households are both producers and consumers of food, thereby further adding to the complexity. By characterizing the contours and interactions within the household, social sciences (economics, socioanthropology) can help gain insight into how strategies are defined, how tradeoffs are made to generate, control and allocate resources, and the place food occupies in these strategies and tradeoffs.

Finally, between-discipline dialogue could be enhanced through an analysis of processes based on qualitative approaches (ethnography). Indicators used at the household level (HFIAS, HDDS, FCS, CSI) reveal nothing about the decision-making and allocation processes involving individuals or subgroups within the household (spouses, parents/children, etc.), about the nature of the relationships underlying these processes (cooperation, subordination, negotiation, compromise, conflict), or about possible resulting inequalities (gender, generational). Individual scores (WDDS/MDD-W and its adaptations for other individuals) can identify inter-individual differences within a household, but they are not meant to describe the underlying mechanisms.

⏩ Case study: farm household dietary diversity in Burkina Faso

This section draws on the multidisciplinary (nutrition, economics, agronomy, socio-anthropology, geography, political science and modelling) RELAX project[11], which is

11. https://relax.cirad.fr/en (queried 27/08/2021).

geared towards studying the agriculture/nature/market/food nexus in a province of western Burkina Faso. An individual dietary diversity score (WDDS-10 and MDD-W) was incorporated in an economic survey of 300 farming households. This example illustrates the discrepancy between the apparent simplicity of guidelines manuals and the actual implementation conditions—computing a diversity score is more complex than it seems.

Methodological choices

The RELAX project is focused on farm households, but we decided not to use the household HDDS indicator and instead opted for individual dietary diversity scores that enable interpretations in terms of the nutritional dietary quality. We also contemplated the conditions needed to conduct the analysis at the household level. WDDS/MDD-W measures the dietary diversity of women of childbearing age, who for biological reasons (pregnancy and breastfeeding) are more vulnerable to the risk of malnutrition. Moreover, women's dietary diversity can be interpreted as a baseline for what happens at the household level, as gender inequalities in access to food resources disadvantage women in many settings. To assess possible intra-household food consumption disparities, we also split the household into several consumption subunits, and randomly selected a representative from each one: a woman of childbearing age (15-49 years old), a man (15 years and older) and a child (8-14 years old).

We assessed seasonal variations in women's dietary diversity by conducting 12 monthly measurements between October 2017 and September 2018; for men and children (due to budgetary constraints), we limited ourselves to three measurements based on the cereal crop calendar, i.e. February (postharvest), May (onset of the hunger season, with possible pressures on stocks) and August (first harvest). As the agriculture/nature/market/food nexus is pivotal to the RELAX project, questions concerning the food supply mode were incorporated on the basis of four different modalities: self-consumed production, purchased, collected and donated supplies[12].

Field implementation

Considerable attention has been paid to the preliminary survey stage. It is generally recommended to allow for at least several weeks, which may vary depending on the extent of knowledge of the context and the available documentation.

As a first step, we conducted extensive research in collaboration with the project geographers to identify all foods available on farms, in markets and wild-gathered food. These foods were classified in a glossary along with the scientific names and translations into French and several local languages for the purpose of facilitating interviewers' subsequent work.

Once identified, the foods were assigned to one of the 10 food groups defined in the method (listed in note b, table 2.1). This classification is not always clearcut, e.g. maize should be classified in group 1 if consumed in the form of flour (for making *tô*, a dough that serves as a daily meal) or in the 'other vegetables' group if consumed fresh. A distinction should also be made between ripe mangoes or papayas ('vitamin A-rich

12. For children, a fifth modality « school canteen » was added.

fruits and vegetables') and green ones ('other fruits'). In situations in which there is very little dietary diversity, as was the case in the project, these classification differences could have a marked impact on the final score.

Finally, interviewer training is essential for mastering the technical features of the indicator, the context and also the relational aspects of the survey. A key challenge is to obtain accurate information while not biasing the responses. For instance, dish ingredients must be recorded without drawing assumptions on the recipes. The individual scope of the indicator must not be overlooked—the ingredients of a dish (meat, vegetables) may be unevenly shared amongst eaters, so it is important to make sure that they have actually been consumed by the respondent.

The interviewer training sessions took place over 6 days: an initial phase to explain the method, discuss local specific features and refine the questionnaires; a role-playing phase during which the participants played the role of both interviewer and respondent; and a test phase under real conditions in a nearby village (not included in the final sample).

The interview respondents were enthusiastic and curious during the first visit. The women were pleased by the attention paid to their food practices, which otherwise are generally not given much consideration. However, this interest waned along with the response accuracy as the survey progressed and the enumerators kept coming every month. We decided to interview women when they were alone in their homes so that they would feel free to express themselves on certain depreciated practices (e.g. eating a food without sharing it with the family, or diluting sauces because of a lack of means). It was sometimes hard to get reliable answers from certain respondents due to problems of comprehension or shyness, particularly when the questionnaire was administered to out-of-school children or to women living with their in-laws and who did not speak the local dialect. On several occasions the interviewers had to call upon an interpreter from the village, while taking care to ensure that he/she did not bias the answers. Another difficulty arose when the respondent had not actually prepared the food (in the case of children, men, and sometimes women when the meal had been prepared by another woman in the household).

Interviewers used a tablet for data input, but we also asked them to take notes so as to have meal cards corresponding to each surveyed household, and to be able to compare them with the food tables. This enhanced data quality control.

Data analysis

In the RELAX project, we computed the WDDS-10 and MDD-W indicators. MDD-W has been validated as a nutritional adequacy indicator, yet it is not as easy to handle as WDDS due to its dichotomous nature, especially when there is little variation and the sample size is small. In the RELAX project, during 6 of the 12 months of the survey, less than 20% of the women participants reached the 5-group threshold, which is problematic for intergroup comparison in the analysis. WDDS-10 is more sensitive to variation and more suitable for use with predictive models.

To answer our research questions, we also considered intermediate data so as to identify food groups and foods consumed. An analysis of the provenance of food enabled us to link the nutritional information to a broader analysis of practices and mechanisms within the agriculture/nature/market/food nexus.

Women's dietary diversity was very low, with an average annual score of 3.6 food groups consumed (Lourme-Ruiz et al., 2021). The daily dish was *tô* (group 1, see note b, table 2.1), served with a sauce made with leafy vegetables (often baobab leaves, group 7), sometimes with vegetables (onion, cabbage, tomato, group 9), groundnuts (group 3) or fish (group 5). The score improved between February and June because of the occasional availability of mangoes (group 8), market garden produce (group 9), and wild-gathered fruits (group 10). As already highlighted in other studies (Hoddinott and Yohannes, 2002; Savy et al., 2006), the score variation could not be automatically interpreted as an FNS variation. It was highest in June, when many households faced shortages of staple cereals, i.e. stockpiles from the previous harvest were not sufficient to bridge the gap to the next harvest, and people were limited in their market purchases due to a lack of available cash, especially as prices generally rise seasonally over the preharvest period.

A look at the supply sources revealed complementarities between food production, purchases and gathered produce, with complex seasonal patterns that depended on crop and livestock farming and non-agricultural systems, and on the status of women in these systems. For example, vegetable production could involve competition for land use and family labour (particularly with cotton or cereals, which underpinned local production systems); the vegetable production periods throughout the year depended on the extent of access to irrigation infrastructure (generally low); and perishable foods (fruit and vegetables) were only consumed at harvest or gathering times, due to the lack of means to preserve these foods. For instance, mangoes, which represented almost the entire group of vitamin A-rich fruits and vegetables, were only available in March-April.

Questions arise regarding the fact that some food groups were scarce in women's diets despite their nutritional value and local availability. Milk produced locally by Peul people and readily available on the markets was hardly ever consumed. Eggs were totally absent from the diet, whereas almost all farms had poultry livestock. Legumes were consumed very little, even though they were grown on many farms in rainfed conditions, and they stand up well during storage. Everything cannot be simply explained by financial and availability bottlenecks. It is essential to gain insight into the mechanisms underlying this under-consumption in order to find ways to remedy the situation. This should take into account multidisciplinary views on knowledge, perceptions and food preferences, on economic tradeoffs (opting to sell rather than self-consume a food product, prioritizing purchases of a given food), on possible intra-household tensions over the control and use of budgets and food stocks, etc.

Home consumption patterns were similar when the three sample sub-populations (men, women and children) were compared, whereas out-of-home consumption patterns differed. Unlike women, children ate more legumes, i.e. cowpeas served in school canteens, and more wild-gathered fruits. Men had more activities outside the family household and thus access to more fish and vegetables such as cabbage served in small informal restaurants. Note that HDDS, which excludes out-of-home consumption, would not have identified these nutritionally important differences.

The RELAX project example highlights the advantages of looking at the data prior to the scores, and assessing the range of causes leading to the consumption (or not) of a given food group or item. The interviews conducted by the project sociologists also

revealed that households did not seek to diversify their diet in the nutritional sense. The priority was to ensure cereal intake. Once satiety was achieved, households sought to vary their dishes by alternating sauces or replacing maize *tô* with rice. These choices did not necessarily result in a higher diversity score. The diversity score is generally meaningless for populations that do not consume food groups, but rather food items and dishes. This research on bottlenecks, rationales and representations provides food for thought on more suitable interventions and messages.

In conclusion, discussions on indicators often highlight the tension between standardization of the method (to produce spatiotemporally comparable validated results within a relatively short time period) and adaptation to the local context (for greater finesse). In this chapter, we show that FNS indicators also have considerable potential by offering the possibility of separately analysing data collected upstream for the purpose of indicator computation, and linking them to more meaningful explanatory schemes. While not overlooking the difficulties that may arise, the chapter showcases the interest of closer collaboration between nutrition and social sciences to produce relevant knowledge while designing or piloting appropriate food and nutrition security interventions.

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List of the main symbols and abbreviations

CSI: Coping Strategies Index

FANTA: Food and Nutrition Assistance Project

FAO: Food and Agriculture Organization of the United Nations

FCS: Food Consumption Score

FIES: Food Insecurity Experience Scale

FNS: Food and Nutrition Security

HDDS: Household Dietary Diversity Score

HFIAS: Household Food Insecurity Access Scale

HHS: Household Hunger Scale, from HFIAS

IDDS: Individual Dietary Diversity Score

MDD-W: Minimum Dietary Diversity Score for Women

WDDS: Women's Dietary Diversity Score

WHO: World Health Organization

WFP: World Food Programme

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