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**MEASURING FOOD INSECURITY:  
THE FREQUENCY AND SEVERITY OF "COPING STRATEGIES"**

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## **ABSTRACT**

Defining and interpreting food security, and measuring it in reliable, valid and cost-effective ways, have proven to be stubborn problems facing researchers and programs intended to monitor food security risks. This paper briefly reviews the conceptual and methodological literature on food insecurity measurement, describes a particular method for distinguishing and measuring short-term food insecurity at the household level, and discusses ways of generalizing the method. The method developed enumerates the frequency and severity of strategies relied on by urban households when faced with a short-term insufficiency of food. This method goes beyond more commonly-used measures of caloric consumption to incorporate vulnerability elements of food insecurity as well as the deliberate actions of household decisionmakers when faced with food insufficiency.

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# **MEASURING FOOD INSECURITY: THE FREQUENCY AND SEVERITY OF "COPING STRATEGIES"\***

Daniel G. Maxwell

## **1. DEFINING FOOD SECURITY**

Food security historically referred to the overall regional, national, or even global food supply and shortfalls in supply compared to requirements, but, with increased observation of disparities in the sufficiency of food intake by certain groups, despite overall adequacy of supply, the term has been applied more recently mostly at a local, household, or individual level (Foster 1992) and has been broadened beyond notions of food supply to include elements of access (Sen 1981), vulnerability (Watts and Bohle 1993), and sustainability (Chambers 1989). Most definitions of food security vary around that proposed by the World Bank (1986); major components of the most common definitions are summed up by Maxwell and Frankenberger as "secure access at all times to sufficient food for a healthy life" (1992, p.8). In their exhaustive review of the literature on household food security, however, they note

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several caveats. First, the household is the logical social unit through which to view the question of access to food, in spite of intrahousehold inequities in the distribution of food (Bentley and Pelto 1991). This demands not only a knowledge of overall household needs and consumption, but also an understanding of intrahousehold dynamics affecting procurement and distribution of food. Second, household food security should be considered a necessary but not sufficient condition for adequate nutrition. Stated differently, food security at the household or even individual level is an "input," not an "outcome"—hence the distinction between food security and nutrition security (Babu and Pinstrip-Andersen 1994; Haddad, Kennedy, and Sullivan 1994). Third, food security must be understood in terms of the rationality and logic of the persons or social units involved. Acquiring food and the provision of adequate nutrition are among the most basic of human pursuits. Human beings are not simply passive victims of either adequate or inadequate nutrition (de Garine 1972). Summarizing the conceptual literature on food security, Maxwell and Frankenberger conclude:

First, "enough" food is mostly defined ... with emphasis on calories, and on requirements ... for an active, healthy life rather than simple survival—although this assessment may in the end be subjective. Second, access to food is determined by food entitlements [Sen 1981], which are derived from human and physical capital, assets and stores, access to

common property resources and a variety of social contracts at household, community and state levels. Third, the risk of entitlement failure determines the level of vulnerability and hence the level of food insecurity, with risk being greater, the higher the share of resources ... devoted to food acquisition. And finally, food insecurity can exist on a permanent basis (chronic) or on a temporary basis (transitory) or in cycles (1992, p. 48).

A full definition of food security thus includes the related concepts of access, sufficiency, security (or vulnerability), and sustainability.

## **2. MEASURING FOOD SECURITY**

Collecting data for a complete analysis of food security can be a virtually impossible task in a situation where household composition is variable and the "household" itself is subject to varying interpretations; where there may be multiple income sources among adult members of a household who have strong incentives not to reveal to each other the full extent of their individual earning power or assets; where responsibility for the production and/or purchase of food may be shared among these adults; and where subsistence production is harvested piecemeal and is neither measured nor recorded. Semiproletarian households in both urban and rural areas

may fulfill each of these criteria for making collection of valid and reliable food security data a difficult undertaking.

To get around this difficulty, most analyses rely on measuring food consumption. Two major methods have been widely used, and both are subject to measurement problems (Bouis 1993). The first, notwithstanding the problems just discussed, is to estimate gross household production and purchases over a period of time, estimate the growth or depletion of food stocks held over that period of time, and presume that the food that has come into the household's possession and "disappeared" has been consumed. The second method is to undertake 24-hour recalls of food consumption for individual members of a household, and analyze each type of food mentioned for caloric content (and sometimes a more complete nutrient analysis). While this method results in more reliable consumption data and captures intrahousehold distributional differences that the first method overlooks completely, it is also subject to a number of drawbacks: memory lapses, observer bias, respondent fatigue, a short and possibly unrepresentative recall period, and such high data collection costs that resources often constrain analysis to relatively small samples. The former method is most often utilized by economists; that latter, by nutritionists. Both of these methods result in consumption figures but neither provides a full

assessment of food security, because neither measures vulnerability or sustainability.<sup>1</sup> "Disappearance" methods take no account of intrahousehold distribution, but 24-hour recalls often are carried out only for certain individuals within a household, and therefore may not adequately reflect food access at the household level (Haddad, Kennedy, and Sullivan 1994). Both methods mostly only capture the sufficiency element mentioned above, and in the end, neither method has been accepted as a "gold standard" for an analysis of household food security.

### 3. ALTERNATIVE MEASURES

Other indicators have been used to monitor food security, including food balance sheets, rainfall and marketing data, and even anthropometric measurement (Maxwell and Frankenberger, 1992). Haddad, Kennedy, and Sullivan (1994) note a variety of indirect indicators that can be used as predictors for food insecurity at the household level, including asset ownership, household size, and dependency ratio. While they mostly discuss the use of single indicators, they suggest that indicators could be combined for greater specificity.

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<sup>1</sup> For both methods, conversion of gross household food consumption into calories, and dividing the calories figure by the number of adult equivalents in the household and the number of days in the recall period results in a concise figure for average calories consumed per adult equivalent per day, which is then compared with an estimate of caloric requirements. A frequently used cutoff point for analytical purposes is to consider a household that provides less than 80 percent of the caloric requirements for its total number of adult equivalents as food-insecure for the recall period. See, for example, Haddad, Kennedy, and Sullivan (1994), Tshirley and Weber (1992), or Reardon and Matlon (1989).

Another approach has been to analyze the use of, and reliance upon, strategies for dealing with insufficiency of food at the household level as direct indicators. The range of such strategies has been noted. Examples of these strategies include short-term dietary changes; reducing or rationing consumption; altering household composition; altering intrahousehold distribution of food; depletion of stores; increased use of credit for consumption purposes; increased reliance on wild food; short-term labor migration; short-term alterations in crop and livestock production patterns, pledging; mortgaging and sales of assets; and distress migration (Watts 1983; de Garine and Harrison 1988; Corbett 1988; Reardon, Matlon, and Delgado 1988; de Waal 1989; Drèze and Sen 1989; Moris 1989; Frankenberger and Goldstein 1990; Leonard 1991; Rahmato 1991; Frankenberger 1992; Teklu 1992; de Garine 1993; Davies 1993; Frankenberger and Coyle 1993; Devereux and Naeraa 1993; Watts and Bohle 1993; Eele 1994).

Numerous authors (Chambers 1989; Maxwell and Smith 1992; Davies 1993; Frankenberger and Coyle 1993) note that food security is but one element of livelihood security, and argue that indicators of the former should not be interpreted independently of a good understanding of the latter. Frankenberger and Coyle have observed that "poor people balance competing needs for asset preservation, income generation, and present and future food supplies in complex ways ... [and] may go hungry up to a point to meet other objectives" (1993, p. 36). For this reason alone, inferring food security purely from consumption data can be a tricky undertaking.

Davies (1993) makes the distinction between "coping strategies" (fallback mechanisms to deal with a short-term insufficiency of food) and "adaptive strategies" (long-term or permanent changes in the way in which households and individuals acquire sufficient food or income). She notes a number of drawbacks about the use of "coping strategies" in food security research: first, they are something of a catchall, although some of the clarifications just mentioned help to reduce this problem; second, they imply that people somehow "get by," when, in fact, coping strategies are an indication that things are getting worse; and, third, they are almost by definition nutritionally unsustainable, and are likely to be economically and environmentally unsustainable as well. Nevertheless, even though coping strategies are an indication of food insecurity, the distinction between "coping" and "failure to cope" is an important distinction to note in the famine literature (for example, Drèze and Sen 1989).

While this literature has offered a qualitative explanation of coping strategies in some depth, it offers relatively few concrete examples of their utilization in an actual method of measuring food insecurity. Haddad, Kennedy, and Sullivan (1994) offer some comparison between the use of alternative indicators and more commonly-accepted consumption figures, but the indicators they explore are mostly not based on coping strategies per se. In studies of food insecurity in the United States, approaches have included construction of a "hunger index" in the Community Childhood Hunger

Identification Project (Wehler 1994) and the Radimer "food insecurity scales" (Campbell 1991; Radimer, Olson, and Campbell 1992).

#### **4. MEASURING COPING STRATEGIES AS A FOOD SECURITY INDICATOR**

Given the difficulties of acquiring valid and reliable figures for income, expenditures, and production, and the high data collection costs of 24-hour recalls, an indicator was developed to capture the short-term food sufficiency element of food security at the household level for use in a survey intended to quantify the determinants and impacts of a long-term, adaptive strategy: semi-subsistence farming in a major African urban center.<sup>2</sup> To do this, a range of short-term coping mechanisms was identified that are used when there is not sufficient food in the household, according to the person primarily responsible for the preparation and provision of food. Strategies identified relate specifically to food practices in the short term. Information about these individual strategies was collected through in-depth interviews with such persons. Strategies described included relatively small changes in eating practices (such as eating a less expensive and less preferred food) to relatively severe changes (such as going for an entire day without eating).

Subsequently, the various strategies identified were discussed in focus groups, and respondents assigned an ordinal rank to each strategy according to its perceived

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<sup>2</sup> The full study is the author's Ph.D. dissertation (Maxwell 1995).

severity. Finally, a relative frequency scale was developed and pretested, and calibrated so that the higher the number on the scale, the less frequently a strategy had to be used (presumably, therefore, indicating a higher level of food security). While the full survey questionnaire for that study was lengthy, the amount of time devoted to questions related to food security was only a matter of 2-to-3 minutes. Some of the methods discussed by Campbell (1991) were followed in conceptualizing initial questions for in-depth interviewing. However, the detailed descriptions of individual coping strategies grew out of qualitative interviews. For the severity weighting, frequency-scaling and the development of a cumulative food security index, no methodological antecedent was found in the literature.

Six main short-term, food-based coping strategies were mentioned by respondents. They are listed here according to how they were ranked by focus groups, from least severe to most severe.

1. Eating foods that are less preferred. Although respondents in all income groups reported long-term trends toward eating foods that were less preferred as a means of adapting to lower real incomes, in a squeeze, there is almost always an even less preferred and less expensive food to eat that is roughly comparable, at least in terms of energy. All but the wealthiest respondents stated that they occasionally must eat less preferred foods. Focus group respondents generally agreed that this was the least drastic measure to which they could resort.

2. Limiting portion size. Limiting the quantity of food served to an individual was practiced in the majority of households in the survey, although results indicate significant seasonal variation. Nevertheless, cutting back the amount of food that each person in the household gets was the second most common coping strategy, and in terms of severity, is roughly equivalent to eating foods that are less preferred. If more than a modest reduction of food is involved, most respondents said they would skip meals, so that when they did eat, they would be satisfied. The manner in which limiting portion size is done varies widely, and a sophisticated analysis would require distinguishing between uniform reductions and redistribution that favors some household members to the detriment of others.
3. Borrowing food or money to buy food. Borrowing either food or money was a commonly-mentioned practice. Borrowing food from a relative or friend is the most common. Local merchants may extend short-term credit as well. However, borrowing money for food can lead to permanent indebtedness, and is an example of how a short-term coping strategy can put a household in a more vulnerable position with regard to longer-term livelihood options.
4. Maternal buffering. Maternal buffering is the practice of a mother deliberately limiting her own intake in order to ensure that

children—usually recently-weaned toddlers—get enough to eat. There is, of course, no reason why someone besides the mother could not do the same thing, but no empirical evidence emerged in this study to suggest anyone other than mothers did this.

5. Skipping meals. Eating only one or two meals per day was commonly practiced, particularly by lower-income groups. As noted above, most respondents stated a preference for eating fewer meals, but "feeling satisfied" after these meals, if food is not sufficient for three meals per day.
6. Skipping eating for whole days. Clearly a more severe means of dealing with food insufficiency, going whole days without eating anything was found to be practiced mainly by the lowest income group, and mostly at certain times of the year.

Of course, these various strategies are also often used together, but individually, they have been presented in the order of increased severity, with the first two (less preferred food and limiting portion size) roughly equivalent in terms of severity; the next three (borrowing, buffering, and skipping meals) roughly the same in terms of severity; and the last one (skipping whole days) the most severe. Other coping strategies were alluded to, including drastic measures such as stealing food or abandoning children. Longer-term strategies such as migration back to rural areas were mentioned as well. However, the list presented above covers commonly

practiced measures for dealing with short-term food insufficiency. Because these strategies were identified in urban or peri-urban areas, some of the possibilities mentioned in the introduction were not noted in this particular study—particularly reliance on wild foods and drawing down food stores (in fact, urban gardens functioned as food stores in this study).

## **5. USING THE INDICATOR**

A simple scale of 1-4 was developed for the frequency of each individual strategy, and multiplied by the weighting factor based on ordinal ranking assigned by focus groups, as depicted in Table 1. Thus a discrete score for each strategy was obtained, which added together made up a cumulative food security score or index. This score was then used both for bivariate comparison of groups in the study, and as an independent variable in multivariate analysis of nutritional status. Table 1 breaks down the results of this indicator by individual coping strategy

Table 1—Individual coping strategies and the cumulative food security index by income group

Income Group	Round <sup>a</sup>	Eating Less Preferred Foods (1-4)*1 <sup>b</sup>	Limiting Portion Size (1-4)*1 <sup>b</sup>	Borrowing Food or Money (1-4)*2 <sup>b</sup>	Maternal Buffering (1-4)*2 <sup>b</sup>	Skipping Meals (1-4)*2 <sup>b</sup>	Skipping Days (1-4)*3 <sup>b</sup>	Cumulative Index (11-44) <sup>c</sup>
Very low income	1	1.6	2.4	5.1	5.2	4.9	9.8	29.8
	2	2.4	3.0	6.2	6.6	5.6	11.2	35.6
Low income	1	2.5	3.1	6.4	6.3	6.5	11.4	36.3
	2	2.8	3.5	6.7	7.0	6.6	11.8	39.1
Lower-middle income	1	2.6	3.3	6.7	7.0	7.3	11.8	38.7
	2	2.9	3.7	7.4	7.6	7.3	11.8	41.1
Upper-middle/high income	1	3.3	3.6	7.3	6.9	7.9	12.0	41.1
	2	3.3	3.6	7.4	7.3	7.5	12.0	41.4
All groups	1	2.5	3.1	6.2	6.3	6.5	11.3	35.9
	2	2.8	3.4	6.8	7.1	6.6	11.7	39.0

Source: Author's survey, 1993.

<sup>a</sup> 1 = rainy season (N = 328); 2 = dry season (N = 304).

<sup>b</sup> 4 = Never (zero times per week); 3 = rarely (once or fewer times per week); 2 = sometimes (2-5 times per week); 1 = frequently (almost every day). Frequency scoring (in parentheses) times severity weighting based on ordinal ranking by focus group respondents gives range of possible means listed for each category.

<sup>c</sup> Cumulative Index is the sum of scores for the six individual coping strategies.

according to income group<sup>3</sup> and season of the year—the first round of the survey was carried out during the rainy season, when relatively less food was expected to be available from household production and market prices were relatively higher; the second round was during the dry season, when food availability was greater and prices were relatively lower.

The purpose for which the indicator was developed was to compare short-term food sufficiency between two different urban groups, those who have access to some land for semi-subsistence farming and those who do not. The results of that comparison are presented in simple, bivariate form in Table 2, controlling only for income level. The results presented in Table 2 are particularly relevant to this discussion for several reasons. First, the cumulative food security index was developed to measure short-term coping strategies, but individuals and households facing difficulties in gaining and maintaining access to sufficient food rely not only on short-term means of "coping," they also devise alternative means of increasing access and security of access in the longer term. Urban and peri-urban agriculture in Africa is one of those means (Maxwell 1995). But in developing an indicator of food security, it is necessary to distinguish between short-term coping strategies and

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<sup>3</sup> These income groups were constructed on the basis of both quantitative and qualitative data, and hence must be interpreted as categories, not as percentile divisions in continuous data. It was, in fact, the difficulty of obtaining valid and reliable data on household income that suggested the difficulties of using household food procurement data for food security.

longer-term adaptive strategies (Davies 1993). Urban and peri-urban agriculture is *not* a coping strategy—that is, it is not something that one does when

Table 2—Cumulative food security index by farming and income group

Income Group	Round <sup>a</sup>	Cumulative Index Score		Difference
		Farming	Nonfarming	
Very low income	1	33.0	27.6	5.4**
	2	37.4	34.1	3.7*
Low income	1	35.3	36.7	-1.3
	2	39.5	38.2	0.8
Lower-middle income	1	40.7	37.5	3.3
	2	40.5	41.5	-1.0
Upper-middle/high income	1	40.4	41.6	-1.2
	2	42.2	40.8	1.4
All groups	1	36.3	35.8	0.5
	2	39.6	38.6	1.0
Analysis by variance	1	F = 5.39**	F = 18.99**	
	2	F = 1.98	F = 7.22**	

Source: Author's survey, 1993.

\*  $p < 0.10$ .

\*\*  $p < 0.05$ .

there is not sufficient food in the household for the immediate future. A complete analysis of food security would necessarily take into account both coping and adaptive strategies, but counting both short-term and longer-term strategies in the same indicator would undermine its validity by confusing different kinds of activities.

Second, simply comparing households on the basis of short-term strategies is a rather simplistic analysis. While this kind of comparison may be all that is required in some circumstances, the results in Table 2 suggest that important information can be learned by comparing the frequency and severity of short-term strategies while controlling for longer-term strategies and income level. In this case, it suggests that the group most vulnerable to food shortage consists of very-low-income households who have no access to land for farming, particularly at certain times of the year—a finding supported by anthropometric analysis of nutritional status (Maxwell 1995).

## **6. COMPARING THE CUMULATIVE INDEX TO OTHER MEASURES**

Since this indicator was developed to avoid the problems of collecting household food procurement data and the high data collection costs of 24-hour recalls, it is not possible to compare results of this method with either of the two methods of measuring food consumption. Even if it were possible to compare the data, they are not measures of the same phenomenon. Although both consumption measures have been used as proxies of household food security, food consumption and food security are conceptually distinct (Figure 1). Relying on measures of caloric intake mostly

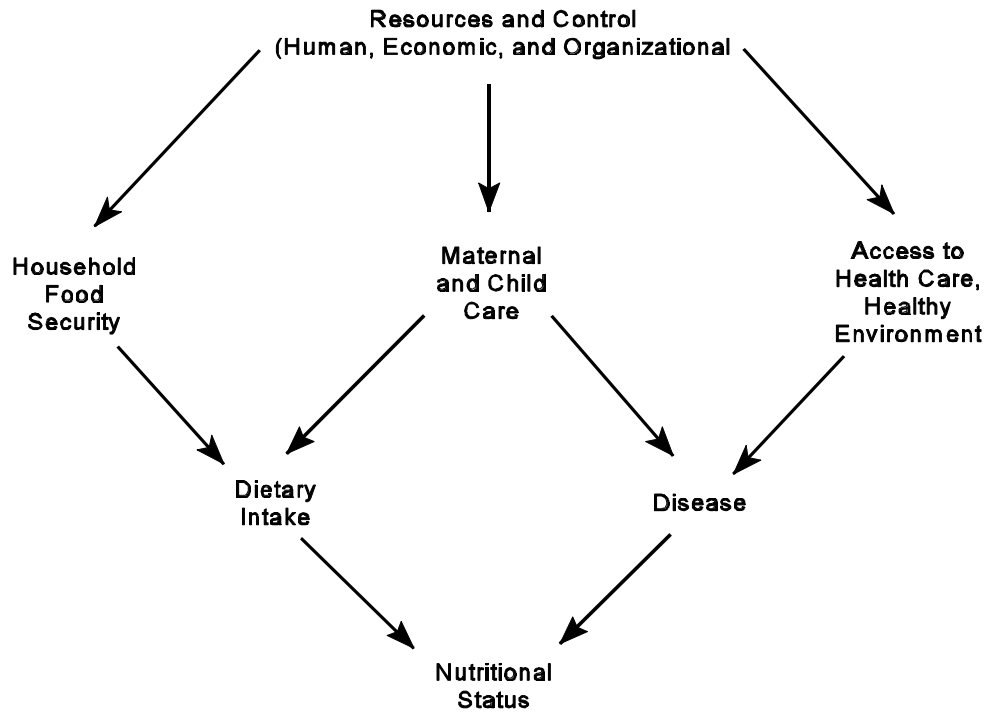
only captures the food sufficiency element of the more complex notion of food security.

Nevertheless, it is possible to check the results of this method against various other indicators that measure related phenomena. First, it is reasonable to expect that there would be a relationship between a measure of food security and both income level and seasonal variation in food availability and price. As is evident in Table 1, there is a notable relationship between the cumulative food security index and both income and seasonal variability, particularly for the lower-income groups.

Second, it is reasonable to expect that a measure of food security would be statistically associated with related factors in Figure 1. Table 3 depicts the correlation of the cumulative food security index with dietary and nutritional indicators, including the three commonly used anthropometric measures. The dietary measure is a semi-quantitative indicator of diversity based on food groups, following the methodology of Guthrie and Scheer (1981). It is not an indicator of caloric sufficiency per se, but rather of overall dietary adequacy, including energy, protein, and micronutrients.

A simple correlation with each measure is presented in column 3 for both rounds of the survey. Columns 4 through 7 present a four-cell analysis for the

Figure 1—Relationship of food security, dietary intake, and nutritional status



Source: Adapted from UNICEF (1990).

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Table 3—Association of the cumulative food security index with other measures

Other Indicator	Cumulative Food Security ("Coping Strategies") Index					
	Round <sup>a</sup>	r	Sensitivity	Specificity	Predictive Value Positive <sup>b</sup>	Predictive Value Negative <sup>c</sup>
Height-for-age Z-score <sup>d</sup>	1	0.13*	0.37	0.42	0.15	0.89
	2	0.17*	0.45	0.30	0.18	0.90
Weight-for-age Z-score <sup>d</sup>	1	0.12*	0.38	0.29	0.13	0.91
	2	0.15*	0.55	0.29	0.21	0.91
Weight-for-height Z-score <sup>d</sup>	1	0.00	0.27	0.33	0.19	0.76
	2	-0.03	0.56	0.31	0.41	0.79
Dietary adequacy <sup>e</sup>	1	0.40*	0.55	0.30	0.46	0.83
	2	0.17*	0.59	0.32	0.38	0.84

Source: Author's survey, 1993.

<sup>a</sup> 1 = rainy season; 2 = dry season.

<sup>b</sup> Rate of predicting true positives.

<sup>c</sup> Rate of predicting true negatives.

<sup>d</sup> Individual measure, children < 5 years.

<sup>e</sup> Based on major food groups (household measure, cutoff point = 25th percentile in data for Round 1; same absolute value for Round 2).

\* Statistically significant,  $p < 0.05$ .

comparison between the cumulative food security index and more widely accepted nutritional and dietary indicators, using standard cutoff points in the nutritional measures (a Z-score of -2.00 for height-for-age and weight-for-age, -1.00 for weight-for-height) and the 33rd percentile as the cutoff for the cumulative food security index. For the dietary measure, the 25th percentile was used as the cutoff for Round 1 data, and the same absolute number used again for Round 2 data, although that figure was closer to the 20th percentile in the second round.

The food security index outlined here is not highly correlated with nutritional status, which is probably to be expected, since the former is a household-level measure and the latter is an individual-level measure, and household food security is only one of several determinants of child nutritional status as depicted in Figure 1. The Round 1 (rainy season) data demonstrate a fairly strong correlation between the food security index and dietary adequacy; the relationship is weaker, though still significant, for Round 2 (dry season) data. Given the relatively low prevalence of malnutrition in the study area (prevalence of moderate to severe stunting, for example, was 19 percent of the entire sample of 293 children), the cumulative food security index appears not to have strong sensitivity or specificity in detecting dietary or nutritional problems. But in such a relatively low-prevalence situation, the index appears to have a fairly high predictive value negative (PVN in Table 3). In other words, it generates relatively few false negatives; if a simple four-cell test indicates that a household is food-secure, chances are relatively low that such a household faces

dietary inadequacy or that individual children are malnourished. Theoretically, under high prevalence conditions, the predictive value positive of the index would be more effective—that is, it would generate relatively few false positives. This suggests that this method is relatively accurate, and is a potentially important tool for applied work in food security monitoring or famine prediction: it can be used to sort out relatively accurately and quickly those households in which there may be a food security problem.

Data for two of the alternative indicators suggested by Haddad, Kennedy, and Sullivan (1994) were also collected in the survey—household size and the dependency ratio. The dependency ratio did not correlate significantly with any of the indicators depicted in Table 3. Household size correlated significantly with the dietary adequacy measure ( $r=0.23$  and  $0.22$  in Rounds 1 and 2, respectively), but results were completely altered when controlling for a single third factor (semi-subsistence farming). Neither household size nor the dependency ratio lends itself to the four-cell analysis in Table 3 because there is no implied cutoff point in either, as there is in some measures of food consumption or nutritional status, although a percentile cutoff could be determined from a given data set.

## 7. GENERALIZING THE USE OF THE INDEX

This approach to measuring food insecurity has potential advantages that other measures do not. Perhaps the most important of these goes back to points noted earlier by de Garine (1972) and by Maxwell and Frankenberger (1992) about human intentionality and the subjective judgment of food sufficiency. This indicator is a direct measure of intentional responses based on decisions about the sufficiency of food. An important point about this method is not simply to measure gross consumption, but to shed some light on what people actually do when faced with food insufficiency. This method is based on food preparation and distribution, not on production and purchase alone. It thus captures elements of "sufficiency" and "security" in the judgment of the person responsible for food preparation and provision within the household. Furthermore, women are often solely responsible for food preparation, whereas both men and women may, to some extent, be jointly responsible for production and purchase. In this particular study, joint responsibility made measurement of production and purchase extremely difficult, because both were the subject of intense intrahousehold competition over control of resources; food preparation, on the other hand, was not. Women who were extremely reluctant to divulge their income, even when their husbands or other adult members of the household were not within hearing range, spoke openly about their means of coping with food insufficiency.

This method may have several other potential advantages. First, this method requires neither highly trained enumerators nor complex analytical procedures, and is readily understandable by both food policymakers and nonspecialists. Second, this method can be used in conjunction with rapid rural appraisal, anthropometric surveys, or other relatively quick methods of data gathering. It can also be used in conjunction with more traditional means of famine monitoring. Third, this method has a somewhat longer and more representative recall period, although this inevitably involves trade-offs regarding the reliability of the data. Last, and perhaps most important, this method begins to capture some element of vulnerability—the most elusive but most important element of the definition of food security. A fully developed indicator of vulnerability would have to take into account various means of food access and adaptive strategies to expand or diversify access, and it would have to include an evaluation of external threats to access. However, by quantifying a variety of short-term responses over a specified recall period, this method gives an indication of the likelihood or risk of food insufficiency and the potentially severe cumulative consequences of frequently-repeated coping strategies. All these points suggest that this method could potentially serve as a food security indicator in a variety of monitoring and research applications.

However, there are also several potential shortcomings with this indicator as it was developed for this particular study. These include the obvious problem of assigning cardinal values to ordinal rankings for severity, and the problem of

interpreting the meaning of words like "frequently," "rarely," and so forth, in different languages. The latter problem was addressed in this study by assigning some rough guidelines for actual numeric frequencies as shown in the notes for Table 1, but respondents were not asked to give precise answers—answers sought were deliberately impressionistic. Steps could be taken to correct for this by tinkering with the weighting factors for severity (that is, assigning a higher weighting factor than 3 for going whole days without eating, and so forth); by asking respondents to assign weighting factors to strategies rather than simply asking them to rank them; or by asking for actual frequency counts, rather than the impressionistic relative frequencies reported here.<sup>4</sup>

Because this indicator relies solely on food-related practices, it does not address competing minimum basic needs and the way in which competing needs affect food consumption. Likewise, by measuring short-term strategies, this indicator reflects current food security status, but results cannot be interpreted for predictive value of future food security. Nonfood practices and longer-term adaptive strategies could be measured by parallel indicators to address these shortcomings, but probably only at the expense of the simplicity of this method.

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<sup>4</sup> Experimental tinkering with the severity weighting, and with numbers that more closely approximated the actual frequency of occurrence rather than the relative frequencies used in the survey (and noted in Table 1), make the individual and cumulative scores in each category higher, but make virtually no difference at all in relative differences among categories in Table 1.

Another potential problem is related to the use of recall methods in determining eligibility for any type of assistance. If frequency of coping strategies is known by respondents to be a criterion for receiving food aid for other assistance, results of this method would clearly need to be confirmed by other, less subjective means. A major improvement to this indicator would involve adding some further questions to understand the basis of which decisions about coping with short-term food insufficiency. Some indication of why certain strategies are selected over others may provide insights into the perceived severity and longevity of food insecurity and enhance an understanding of vulnerability. The intent of publishing a less-than-perfect methodology is the hope that broader experimentation with similar kinds of methods will overcome some of these shortcomings.

In order to adapt this method for general applicability in any given location, care would have to be taken to first understand and describe local people's strategies for coping with short-term food insufficiency. A suggestive list was gleaned from the literature and presented in the introduction to this paper. Some of these were not applicable in the particular study for which the cumulative food security index described here was developed, but would be of greater importance in a rural context where subsistence production is the primary source of food, not a secondary strategy. Establishing an appropriate list of questions related to locally practiced strategies would require some initial fieldwork, but could very easily be accomplished through such means as ethnographic interviewing or rapid rural appraisal.

Care must be taken to differentiate between measures to deal with short-term food insufficiency and longer-term adaptations to changed economic, legal or environmental circumstances—the differences described by Davies (1993) between coping strategies and adaptive strategies. Examples of both have been presented in this paper. "Coping strategies" as used here refer to short-term means of dealing with food insufficiency within the current entitlements of the household or relevant consumption unit. The emphasis here has been on changes in means of immediate procurement, changes in diet, and changes in distribution and consumption within the household. "Adaptive strategies," on the other hand, may be characterized as risk-minimization, or food- and income-diversification mechanisms aimed at altering entitlements over the longer term. Similar indicators could be developed, aimed at capturing adaptive strategies, but it is important that separate indicators be utilized to differentiate current food sufficiency from other conceptual components of a complete analysis of food security.

Ultimately, of course, an indicator such as this must be tested against the two standard measures of food consumption: "disappearance" methods and 24-hour recalls. However, results presented here suggest that this method is a low-cost technique that does not require highly trained enumerators or sophisticated analytical procedures, and provides relatively accurate results for identifying potentially at-risk households and individuals. In other words, this may be the kind of tool that a review of recent literature on food security monitoring suggests should be further developed (Davies 1993; Eele 1994; Babu and Pinstrup-Andersen 1994).

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