

**OPERATIONALIZING HOUSEHOLD FOOD
SECURITY IN DEVELOPMENT PROJECTS:
AN INTRODUCTION**

John Hoddinott



**International Food Policy Research Institute
2033 K Street, N.W.
Washington, D.C. 20006 U.S.A.**

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1. INTRODUCTION¹

Some development agencies and academics regard the concept of household food security—often defined as "access for all people at all times to enough food for an active, healthy life"—as a guiding principle for designing interventions in rural areas. Although there is a large literature on food security, much of its focus lies in developing and testing research issues. As such, it is not always directly relevant to the work undertaken by development practitioners designing, implementing, monitoring, and evaluating projects.

The purpose of these eleven Technical Guides is to bridge the gap between theory and practice. They provide a set of operational methodologies that will assist development practitioners in integrating household food security and nutrition concerns into their projects. They take as their point of departure the fact that project staff often face an "information constraint." That is, information is often lacking on the nature of the food security and nutrition problems facing a country, or region within a country, the location of food insecure areas, and the causal links between potential interventions and food security outcomes. These guides show how practitioners can obtain such information and how they can use it to improve the food security and nutrition impact of their projects.

This is an introductory guide in two senses. First, it provides a brief introduction to the concept of food security. (An introduction to nutrition issues is found in Technical Guide #5.) It outlines the links between the types of projects often designed and their impact on food security and nutrition. By doing so, it provides a framework for thinking about what projects would be most appropriate in a given situation and indicates what types of information are needed in order to maximize impact on food security. It can also be the case that collaborators in developing countries are not always fully conversant with food security concepts. The material presented in this guide can also be used to sensitize such individuals. Second, it introduces the remaining ten guides, showing how using these can assist in easing information constraints often faced by development practitioners. By doing so, it should be possible to improve the targeting of

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interventions, to understand their likely effects, and to develop improved monitoring and evaluation methods.

2. THE LINKS BETWEEN DEVELOPMENT INTERVENTIONS, HOUSEHOLD FOOD SECURITY, AND NUTRITION

Food security is a concept that has evolved considerably over time. There are approximately 200 definitions and 450 indicators of food security. One volume on household food security (Maxwell and Frankenberger 1992) lists 194 different studies on the concept and definition of food security and 172 studies on indicators. A review that updates this literature (Clay 1997) provides an additional 72 references. Both publications are highly recommended to development practitioners who are interested in understanding the development of the concept of food security. Other highly recommended reviews of this literature are Riely et al. (1995), Chung et al. (1997), and Christiaensen and Tollens (1995).

Understanding the Concept of Food Security

One of the most commonly accepted definitions of food security is adequate access to food at all times, throughout the year and from year to year. Access is ensured when all households and all individuals within those households have sufficient resources to obtain appropriate foods for a nutritious diet (Riely et al. 1995). As will be explained below, it is dependent on the level of household resources—capital, labor, and knowledge—and on prices. Note that adequate access can be achieved without households being self-sufficient in food production more important is the ability of households to generate sufficient income which, together with own production, can be used to meet food needs. Moving from household to individual food security requires consideration of two factors. First, how is food allocated within the household? In households where distribution is unequal, it is possible for aggregate access to improve and for some individuals to experience no change in their food security status. A second consideration is biological utilization; the ability of the human body to take food and translate it into either energy that is used to undertake daily activities or is stored. Utilization requires not only an adequate

diet, but also a healthy physical environment (so as to avoid disease) and an understanding of proper health care, food preparation, and storage processes.

The concept of food security also has spatial and temporal dimensions. The spatial dimension refers to the degree of aggregation at which food security is being considered. It is possible to analyze food security at the global, continental, national, sub-national, village, household, or individual level. The temporal dimension refers to the time frame over which food security is being considered. In much of the food security literature, a distinction is drawn between chronic food insecurity—the inability to meet food needs on an ongoing basis—and transitory food insecurity when the inability to meet food needs is of a temporary nature (Maxwell and Frankenberger 1992). Transitory food insecurity is sometimes divided into two subcategories: cyclical (where there is a regular pattern to food insecurity, for example, the 'lean season' that occurs in the period just before harvest); and temporary (which is the result of a short-term, exogenous shock such as droughts or floods).

It is worth noting that because the academic literature addresses food security and differently spatial and temporal levels, the concept of food security can become confusing at times. For the purposes of operationalizing it at the project level, a helpful first step is to limit these dimensions. In particular, the discussion that follows (as with most of the technical guides), focuses primarily on household- and individual-level food security. Some attention is given to regional and national food security issues because they impinge on household food security and because they are relevant for country background studies and for targeting, but these are not the primary point of interest here. Attention in these technical guides is focused on chronic food insecurity, and to a lesser extent, 'transitory cyclic' food insecurity. Predicting and addressing 'transitory, temporary' food insecurity problems brought about by events such as droughts are not discussed here.

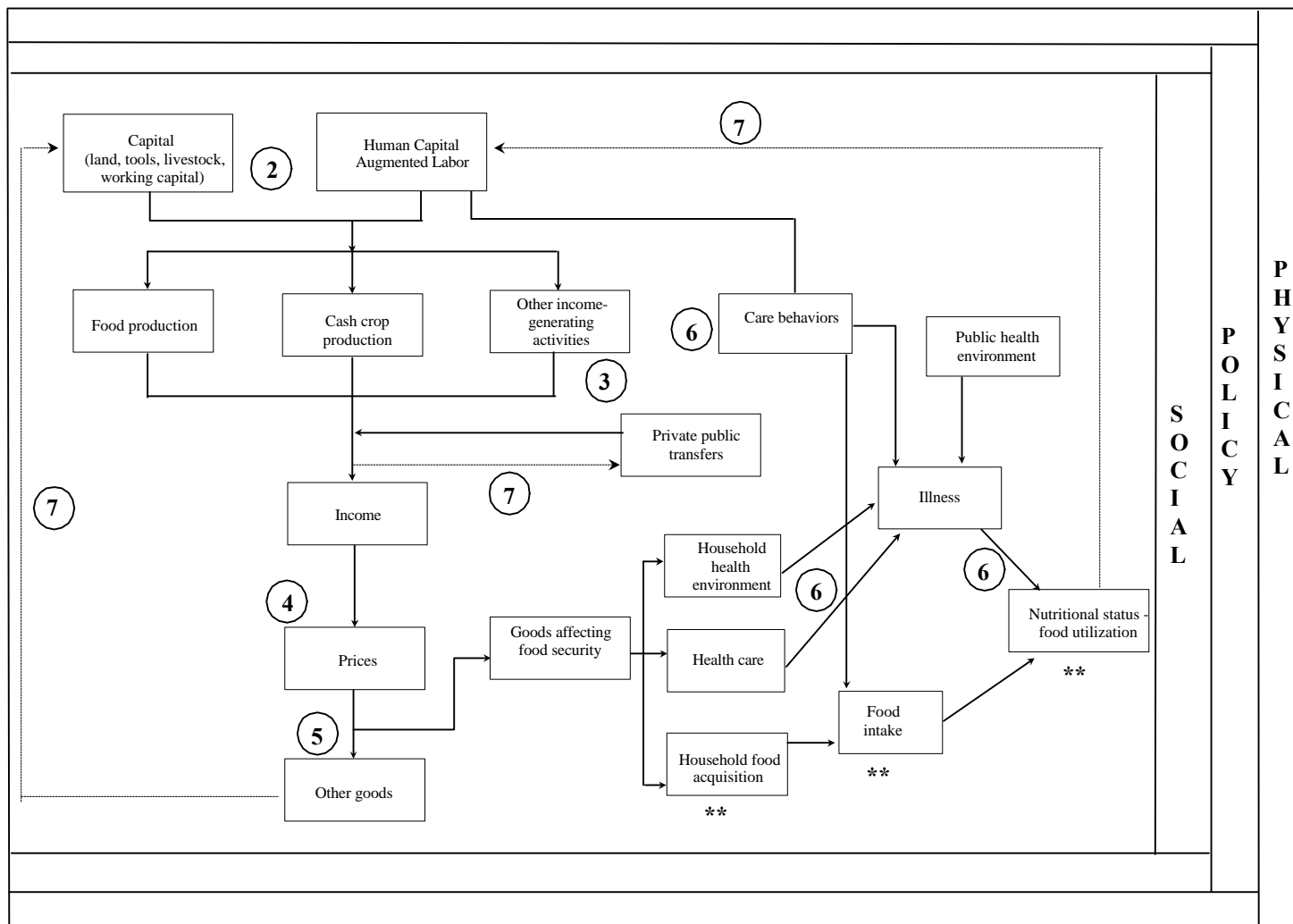
Linking the Determinants of Food Security to Development Interventions

Having established the relevant dimensions of food security, the next step is to outline a framework that links the concepts of food security to interventions. This is shown in Figures 1

and 2. We begin with Figure 1. As it is a little complicated, it is helpful to consider it in several steps.

1. The diagram is "framed" by the physical, policy, and social environment. The purpose of this framing is to remind the analyst that household food security issues cannot be seen in isolation from broader factors. Examples of these 'environmental' issues are as follows:
 - The physical environment plays a large role in determining the type of activities that can be undertaken by rural households.
 - Government policies toward the agricultural sector will have a strong effect on the design and implementation of household food security interventions. For example, a pricing policy that is hostile toward agriculture will discourage production. Interventions that proceed obliviously to this fact are unlikely to succeed.
 - The presence of social conflict, expressed in terms of mistrust of other social groups or even outright violence, is also an important factor in the design and implementation of interventions. In such circumstances, maximizing beneficiary participation becomes especially problematic. For example, wealthier groups may take control of projects for their own benefit, to the exclusion of poorer members. Alternatively, social conflict may encourage groups excluded from an intervention to take active steps to subvert it. A certain degree of social cohesion is necessary if group activities, such as group-based microcredit schemes or collective work on an infrastructure, are to succeed.
2. The resources, or endowments, of households can be divided into two broad categories: labor and capital. Labor refers to the availability of labor for production. It incorporates not only a physical dimension of how many people are there available to work but also a 'knowledge' or human capital dimension. For an agricultural household, this knowledge includes formal schooling, formal training in agricultural production, and also the informal knowledge obtained via trial and error, past farming experiences, discussions with friends

Figure 1 The determinants of household food security



and relatives, observations made about practices on neighbors' farms, and so on. Capital refers to those resources such as land, tools for agricultural and nonagricultural production, livestock, and financial resources that, when combined with labor produce income.

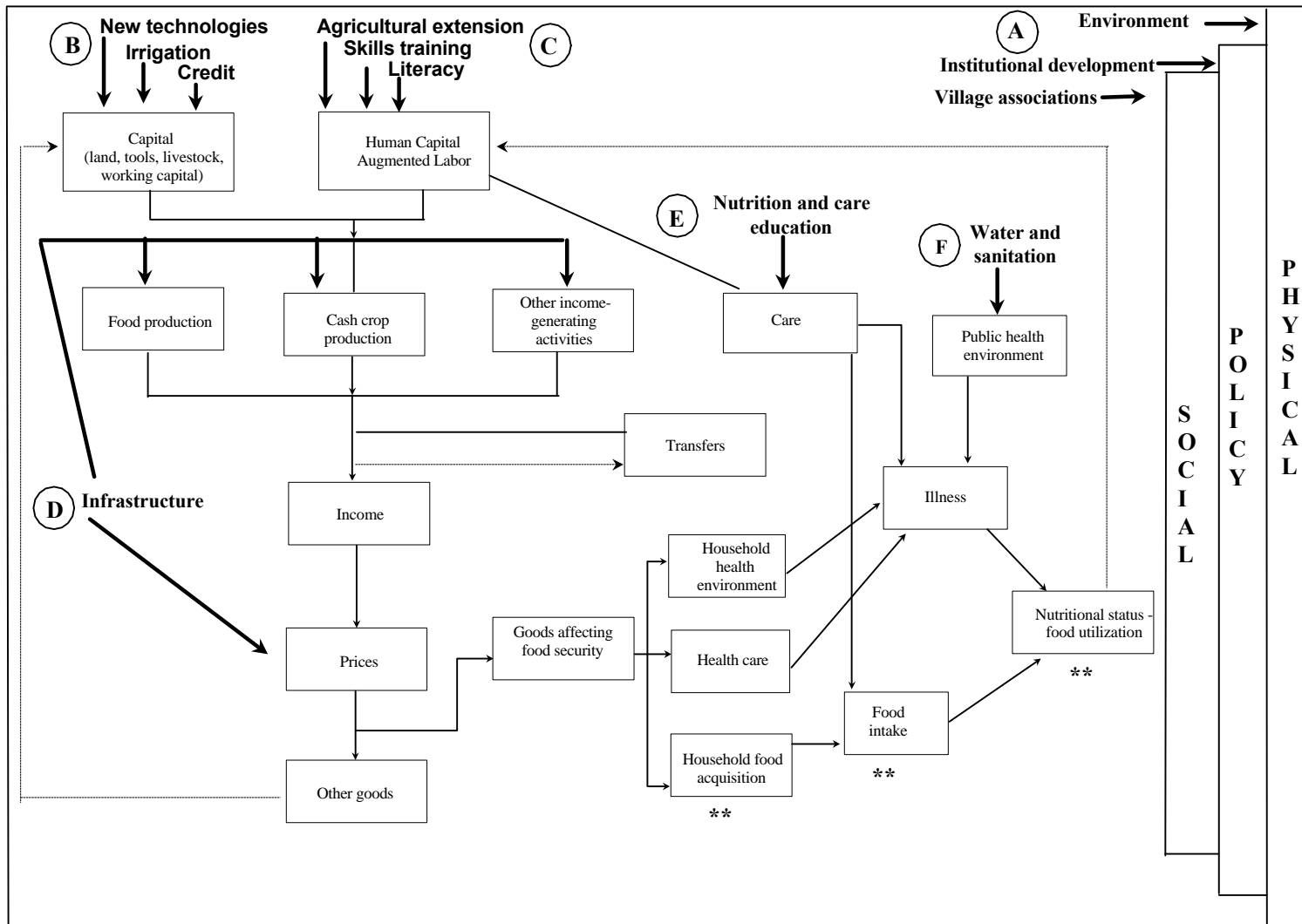
3. Households allocate these endowments across different activities such as food production, cash crop production, and nonagricultural income-generating activities (such as wage labor, handicrafts, food processing, services, etc.) in response to the returns each activity generates. In addition, households may receive transfer income from other households or from some public body such as the State or an non-governmental organization (NGO). Together, these four sources determine household income.
4. Households face a set of prices that determines what level of consumption can be supported by this level of income.
5. Consumption is divided between those goods that effect household and individual food security and all other goods.
6. Those goods that will affect food security include food consumption, or acquisition, at the household level, referred to as food access in much of the food security literature—goods directly related to health care (e.g., medicines), and goods that affect the health environment, such as shelter, sanitation, and water. These three goods, together with knowledge and practice of good nutritional and health practices—called 'care behaviors'—and the public health environment (for example, the available of publicly provided potable water), affect illness and individual food intake, which, in turn, generates nutritional status or food utilization. Stars are placed beside the household food acquisition, food intake, and food utilization boxes to emphasize that these are food security and nutrition outcomes.

7. Finally, note that food security is not static over time. There are second-round, or feedback effects, denoted by the dashed lines in Figure 1. Suppose that a development agency funds a project that improves the provision of agricultural extension. This can be thought of as a project that increases the human capital of the household. In turn, this raises income. Some of this income might be used to acquire additional capital stock such as agricultural implements. In turn, this raises household income in subsequent years. Allocations of food, expenditures on education, and health will affect the level and distribution of human capital within the household. These investments will also affect the household's ability to generate income in subsequent years. In other words, a well-designed intervention has the potential to set in train a virtuous circle of development whereby increased income generates greater wealth that, in turn, generates higher levels of income, consumption, food security, and nutrition. But it is also worth noting that not all these feedback effects are benign. Increased income generation may induce an offsetting reduction in private transfers received from other households, a phenomenon known as "crowding out".

It is now possible to uncover the links between development projects and household or individual food security. In Figure 2, these links, or interventions (written in bold), are superimposed on Figure 1. They are placed within the diagram at the point where their direct impact is observed.

- A. There is a series of interventions designed to improve the broader environments that affect household food security. Examples of these include field operations such as the soil, water and forest management (environment); providing an appropriate institutional environment for private agriculture (policy); and strengthening small farmers' associations (social).
- B. There are interventions that increase the level and returns to capital. The rehabilitation of irrigation facilities, the provision of credit, and the development of new technologies are examples of this.

Figure 2 The impact of development interventions on household food security



- C. There are interventions that increase the stock of knowledge or human capital. Examples of projects that incorporate these include provision of extension services, rural development projects that aim to provide skills training to young rural men and women, and literacy training.
- D. There are interventions that improve rural infrastructures, most notably roads. These affect household food security in two ways: by increasing the returns to undertaking activities via reducing transport costs and by reducing the costs of obtaining food and other goods for consumption.
- E. There are interventions to improve knowledge of good health care and nutrition practices.
- F. There are interventions that improve the health environment such as improved access to safe drinking water and health services.

It is worth noting that many development interventions fall into groups A, B and C—interventions that improve the broad environment in which households exist, or those aimed at raising levels of human or physical capital. These do not directly affect food security outcomes. Instead, they raise incomes. The links between income and these outcomes, however, are weak, and these weaknesses stem from several factors.

In the case of nutritional status or food utilization, food is not the only input. Increased food access will not necessarily improve food utilization where other factors, such as the health environment, are not favorable. A second cause is ignorance. Households and individuals may simply not be aware of all the components of a healthy diet or of good health practices. These considerations imply a complementary approach between "traditional" development activities and complementary health and nutrition interventions. The third reason for these weak links is that households, and individuals, face many competing demands for their limited financial resources. They may want to increase the level or quality of their food consumption, but they may also want to reduce labor drudgery, be better dressed, be able to send their children to school, and so on. In those projects where there is to be an emphasis placed on beneficiary participation, it might very well be the case that beneficiaries choose interventions that have their largest impact on an outcome other than food security or nutrition.

One attraction of the framework here is that it provides some a priori indications as to which interventions are most likely to have an impact with regard to food security and nutrition. For example, interventions directed at strengthening local institutions are unlikely to have direct impact on nutritional status. Further, greater beneficiary involvement in project selection, design, and implementation may also result in interventions that do not address food security and nutrition concerns. It is important to stress that these observations address the challenges associated with linking development approaches to food security and nutrition.

It is also important to note that the strength of these links is not constant across all households within a given population. In particular, women often face particularly severe constraints or have access to weaker productive assets. Equally, there is now reasonable evidence to suggest that they devote a larger share of resources under their control to food security and nutrition objectives. This provides the potential for a clear win-win scenario. Interventions directed toward women both relieve constraints on a particularly disadvantaged group and have maximal impact on indicators by which development agencies can judge the success of their actions.

But the observation that the strength of these linkages differs within a given population also exposes tensions between the objective of many development agencies to improve the welfare of the "poorest of the poor" and the requirement that projects satisfy certain economic rates of return (ERR) criteria. If, in the short or medium term, fewer poor households can more easily increase incomes in response to development interventions, and if projects are evaluated in terms of ERR, there is an built in bias to avoid the poorest of the poor.

Accordingly, an attraction of this conceptual framework is that it encourages development practitioners to consider carefully the likely impact of a proposed intervention on food security and nutrition. A second attraction is that it indicates that practitioners designing interventions need to obtain and interpret information on the following questions:

- Who is food insecure, or at nutritional risk? *Or*, where should this intervention be located in order to maximize impact on these indicators?

- Why are they food insecure or at risk? *Or*, what interventions will have maximal impact on improving these indicators?
- How best can this intervention be monitored and evaluated? *Or*, how can staff assess how well the project is working?

The next section introduces and summarizes the technical guides that provide answers to these questions.

3. SUMMARY OF TECHNICAL GUIDES

This introductory guide is the first in a series of eleven additional technical. Table 1 lists these guides and indicates where, within a development project cycle, they can be used. Table 2 indicates how they are cross-referenced.

These guides can also be grouped by their basic function in terms of assisting project staff in *obtaining* food security and nutrition and aiding in *interpreting* this information. Guides that extensively discuss on issues and techniques for obtaining information, and sources of information include # 2 (World Wide Web guide), #5 (nutritional dimensions), #6 (rapid appraisal methods), #7 (outcome indicators), #8 (sampling), #9 (targeting), and #10 (monitoring and evaluation). Guides that emphasize the interpretation and analysis of this information are #3 (CART), #4 (*Epi Map*), #5 (nutritional dimensions), #7 (outcome indicators), #9 (targeting), and #10 (monitoring and evaluation).

Finally, these guides can be grouped according to the questions that they answer, which are listed at the end of the previous section. Specifically, the following guides can be used to

- *identify who is food insecure or at nutritional risk*—#2 (World Wide Web), #3 (CART), #4 (*Epi Map*), #5 (nutrition), #7 (indicators), and #9 (targeting);
- *identify causes of food insecurity and nutritional risk and the interventions that will alleviate these*—# 3 (CART), #5 (nutrition), #6 (rapid appraisal methods), #11 (institutional arrangements);

Table 1 Technical guides for household food security

Number	Title	Brief description	Points in a Development Project Cycle		
			Country background studies and project pre-planning	Formulation & Appraisal	Implementation (Monitoring & Evaluation)
1	Operationalizing household food security: An introduction	•outlines the links between the concept of household food security and development projects			
2	Food and nutrition security data on the World Wide Web	•uses existing secondary data located on the World Wide Web for targeting and needs assessment			
3	Classification and regression trees: An introduction	•software that identifies indicators that best explain vulnerability to food insecurity, facilitating targeting and intervention design			
4	Using <i>Epi Map</i> graphic data presentation software for regional targeting	•software that provides a visual representation of food security indicators, facilitating targeting, monitoring and evaluation			
5	Measuring nutritional dimensions of household food security	•outlines different measures of nutrition and explains how these can be implemented			
6	Rapid appraisal methods for the assessment, design, and evaluation of food security programs	•outlines community-based methods for the assessment and monitoring of food security			
7	Choosing outcome indicators of household food security	•outlines different measures of food security and explains how these can be implemented			
8	Constructing samples for characterizing household food security and for monitoring and evaluating food security interventions: Theoretical concerns and practical guidelines	•reviews different methods of selecting a sample for needs assessment, monitoring and evaluation			
9	Targeting: Principles and practice	•reviews different methods for targeting interventions			
10	Evaluation methods for the promotion of household food security in development rural development projects	• outlines rigorous, yet simple to implement, methods for project evaluation			
11	Designing institutional arrangements to maximize food security impact	•reviews institutional aspects of projects that affect their impact on food security			

Table 2 Cross-referencing of technical guides

		Guide number										
		1	2	3	4	5	6	7	8	9	10	11
cross-references guide number	1										X	
	2	X			X	X				X		
	3	X				X		X				
	4	X	X			X						X
	5	X	X					X		X	X	X
	6	X		X				X		X	X	X
	7	X		X		X				X	X	X
	8	X				X		X			X	
	9	X			X	X						
	10	X			X	X			X			X
	11	X			X						X	

- *in designing monitoring and evaluation mechanisms—#4 (Epi Map), #7 (indicators), #8 (sampling), #9 (targeting), and #10 (monitoring and evaluation).*

Summary of Guides (# 2 through #11)

Guide #2: *Food and Nutrition Security Data on the World Wide Web*

At an early stage in the project cycle, there is a need to obtain secondary data at the sub-national level on household food security for both targeting and needs assessment. In the past, obtaining information on food security indicators was expensive, difficult, and time consuming. The rapid development of the World Wide Web is changing this. This guide explains how the Web can be used by development practitioners to obtain food security information at national and sub-national levels. It also identifies a number of Web sites that are of particular use to the food and nutrition development specialists. In particular, those operated by the African Data

Dissemination Service, the World Food Programme, and Macro International (who manages the Demographic and Health Surveys) have a wealth of data on both process and outcome indicators of food security and nutrition, which can be downloaded.

Guide #3: *Classification and Regression Trees: An Introduction*

This guide introduces practitioners to a statistical software package called Classification and Regression Tree (CART). CART analysis is a nonparametric statistical technique that selects, from a large number of variables, those variables and their interactions that are most important in determining the outcome variable to be explained. CART software is easy to use. Programming requirements are minimal. Applications include identifying food-insecure areas and food-insecure households, as well as the correlates of food insecurity. It can also be used as a tool for determining which households are most likely to apply, receive, and default on credit.

Guide #4: *Using Epi Map Graphic Data Presentation Software for Regional Targeting*

Increasingly, the visual display of data are an important component of project planning and monitoring. This guide introduces the reader to *Epi Map*. This is free software downloadable from the World Wide Web that creates and displays maps at a sub-national, and in some countries, a sub-regional level, for more than 80 countries in Asia, Africa, and Latin America. It is the most user-friendly mapping software currently available. It can be used as a first step in a sequential targeting process for identifying areas where food insecurity is most likely to be critical. The guide discusses how the software can be obtained, how data from various sources can be incorporated, how modifications to the maps can be made, and how various kinds of presentations can be made to identify potential project sites. Once the software has been downloaded and installed, the program can be used by a researcher or project controller with only limited experience with a spreadsheet or quantitative software, use of a mouse, and with access to reasonable updated computer equipment. This software is also well suited to assist in the monitoring of projects, particularly the evolution of their geographic coverage.

Guide #5: *Measuring Nutritional Dimensions of Household Food Security*

The means by which development interventions improve nutritional outcomes can be operationalized is still evolving. It has been recognized that many projects are constrained in their ability to optimize their impact on nutritional by a limited knowledge base. In particular, it is not clear whether the constraining factor to improved nutrition is poor access to food, weakness in the provision of health care, poor access to child care, the general health environment, or is some combination of these. The purpose of this guide is to explain how such knowledge bases can be expanded using the principles of nutritional assessment. This guide answers the following questions: What is nutritional assessment? How can nutritional assessment assist the process of targeting projects to those most in need? How can nutritional assessment direct the selection and sequencing of interventions? And how can nutritional assessment guide project monitoring and evaluation?

Guide #6: *Rapid Appraisal Methods for the Assessment, Design, and Evaluation of food Security Programs*

Rapid and participatory appraisal methods (PRA) techniques are "a family of approaches and methods to enable rural people to share, enhance, and analyze their knowledge of life and conditions, to plan and to act" (Chambers 1994a). These include mapping activities, transect walks, seasonal calendars, wealth ranking, and analytical "diagramming." Unlike traditional, more extractive data gathering methods, PRA techniques are premised on the notion that local people have an enormous amount of local knowledge. Rather than merely appropriating this information, in PRA local people dominate the agenda, decide how to express and analyze information, to plan and to evaluate. Outsiders are facilitators. They help establish rapport, and help in the use of methods.

This guide outlines the advantages and disadvantages of rapid appraisal techniques in the context of rural development projects. Advantages are that these techniques are low cost, provide information quickly, require little equipment, and by deliberately seeking local opinions, provide insights that might be missed by more conventional methods. Disadvantages are that they require highly skilled personnel and are not suitable for targeting purposes. Six PRA

methods are outlined: concept definition, community mapping, household food security ratings, seasonal time lines, conceptual mapping of threats to food security, and the evaluation of interventions.

Guide #7: Choosing Outcome Indicators of Household Food Security

Measurement is necessary to characterize the severity of the food security problem and to provide a basis for measuring the impact of development interventions at the household and individual levels. This guide shows how to construct measures of food security outcomes of differing degrees of complexity and how the validity of simple measures can be tested. These tests of validity have been chosen so as to be accessible to anyone with a basic grounding in statistics and access to a spreadsheet software program. Four ways of measuring household food security outcomes are examined: individual intakes, household caloric acquisition, dietary diversity, and coping indices. For each, an explanation is given regarding what the indicator measures, how the data is collected, and how indicators of food security are calculated. Each description ends with a commentary on the strengths and weaknesses of the method. This is followed by an explanation of how these different measures can be compared, illustrated using data collected in the one region of Mali, in West Africa. The guide also proposes a possible sequence of activities that would use these indicators at different stages of the project cycle.

Guide #8: Constructing Samples for Characterizing Household Food Security and for Monitoring and Evaluating Food Security Interventions: Theoretical Concerns and Practical Guidelines

Reliable information on household food security is a prerequisite for the accurate and effective design, monitoring, and evaluation of projects. But collecting data is not a costless exercise. This guide discusses how random sampling techniques—methods that use some mechanism involving chance to determine which farms, households, or individuals are to be studied—can economize on the costs of gathering information while increasing the likelihood that it will be both accurate and available in a timely fashion. The guide has been divided into two parts: an overview and a series of technical appendices. The overview is written in a largely nontechnical fashion and is designed to be accessible to a wide audience. It begins with a brief

explanation of why random sampling techniques are a powerful means of obtaining information on household characteristics such as food security. It then takes the reader through a step-by-step process of constructing a random sample. Having outlined these issues, an example is then presented. The second part consists of a number of technical appendices that extend the discussion found in the overview.

Guide #9: *Targeting: Principles and Practice*

This guide provides an overview of mechanisms by which development projects can be targeted toward the poorest of the poor. It stresses that targeting only makes sense when the additional costs of doing so are outweighed by the additional benefits in terms of reduction in administrative and self-targeting. Administrative targeting is the process by which projects select regions, villages, or households as beneficiaries of an intervention. Self-targeting is the process by which projects establish an intervention, but the decision to participate is left entirely to individuals, households, or communities. This guide argues that projects are best served by using a mixed approach to targeting: specifically to administratively target regions and communities but to use self-targeting mechanisms at household and individual levels.

Guide #10: *Evaluation Methods for the Promotion of Household Food Security in Rural Development Projects*

Part of developing a project monitoring and evaluation strategy involves deciding what is the appropriate yardstick by which the project should be judged. The guides on food security indicators and nutritional assessment can provide input into this process. A second issue is the choice of an appropriate evaluation methodology. In other words, how should observed changes in these indicators be evaluated. Yet, often, it appears that the evaluation of impact fails to take into account confounding factors.

This guide outlines two simple methods that address common flaws in project monitoring and evaluation. Common to both of these methods is the requirement to survey non-beneficiaries. In the terminology of such methods, such individuals are referred to as the control group.

Guide #11: *Designing Institutional Arrangements to Maximize Food Security Impacts*

The preceding guides focus on methods for overcoming information constraints that limit the food security and nutrition impact of interventions. That is to say, more information and more skillful use of this information will improve project design and impact. The informational constraint, however, is not the only one that limits impact. There are important institutional issues that also play a role. This guide provides an introduction to the design of institutional arrangements—the relationship between donors and collaborators—that can play an important role in affecting the performance of development projects. It focuses on the role played by objectives, incentives, and evaluation and how the linkages between these can affect the implementation of a project.

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