Market Information and
Food Insecurity Response Analysis[#]

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Abstract: Food aid is no longer the only, or even the dominant, response to widespread food insecurity. Donors, governments, NGOs and recipient communities exhibit rapidly growing interest in and experimentation with cash-based alternatives, both in the form of direct cash distribution to food insecure persons, and of local or regional purchase of food using cash provided to operational agencies by donors. But the humanitarian action and social protection communities lack a systematic, field-tested framework for choosing between food- and cash-based responses to food insecurity. This paper outlines the rationale for "response analysis" and introduces a new, field-tested, systematic approach to this emergent activity. The Market Information and Food Insecurity Response Analysis (MIFIRA) framework provides a logically sequenced set of questions, and corresponding analytical tools to help operational agencies anticipate the likely impact of alternative (food- or cash-based) responses and thereby identify the response that best fits a given food insecurity context.

Keywords: acute food insecurity, chronic food insecurity, emergency response, food aid, food security, local and regional purchase, markets analysis

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1. Introduction

For at least half a century, food aid[1] has been the most readily available resource for responding to food crises of all kinds, from chronic food insecurity associated with endemic poverty to acute humanitarian emergencies following natural or manmade disasters. But this is changing rapidly. Global food aid availability has been declining for two decades, down from 14 million metric tons in 1988 to just 5.9 million tons in 2007 (WFP 2008). While the proportion of food aid devoted to humanitarian response – rather than to longer-term development activities – has risen considerably over the past twenty years (Barrett and Maxwell 2005), even emergency food aid availability has been relatively stagnant since 2000.

In spite of significant economic growth in low-income countries over the past twenty years, hunger and vulnerability have increased. Demand for assistance has grown as household-level food insecurity associated with insufficient household-level food access has multiplied. Moreover, the annual number of natural disasters worldwide has roughly quadrupled in the past 25 years, while the number of persons affected by disasters has roughly tripled over the same period (Guha-Sapir et al. 2004). Africa and Asia combined now average a Katrina-style humanitarian disaster each fortnight. And the past few years have brought rapid increases and greater volatility in food prices as growth in commodity demand has outstripped that of supply.

Meanwhile, interest in cash responses[2] to food insecurity has grown considerably since the December 2004 Indian Ocean tsunami. That disaster elicited an overwhelming response by private and public donors, virtually all of it in cash. The loss of human life from the tsunami was enormous, and coastal infrastructure, livelihoods, housing and fishing fleets were demolished. But the tsunami did little damage to food production and marketing systems beyond coastal areas. These factors created the near perfect combination of ample cash resources for emergency response and an emergency in which cash was precisely the right resource because local and regional food production and marketing channels were largely unscathed by the disaster. The result was impressive, in terms of both the short term impact cash transfers had on affected populations and also the lessons learned about cash-based responses to emergencies (Telford et al. 2006). Relatively limited research on cash programming in emergencies turns up prior to 2005, but there has been an explosion of studies since the tsunami, with ample evidence on the impact of cash responses.[3] This literature has done much to highlight the possibilities offered by cash transfers in emergency intervention.

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[1] We do not distinguish between food aid (transoceanic or locally or regionally procured) distributed directly as free rations, as food-for-work wages, in school feeding programs, or via other mechanisms. Agencies may prefer particular distribution mechanisms, depending on the program objectives.
[2] We use cash responses as shorthand to denote conditional or unconditional cash transfers, vouchers, cash for work or (non-food) asset transfer programs.
[3] Much of this experience is summarized in Harvey (2007).

The simultaneous growth in demand for assistance to address food crises, stagnation of traditional food aid programs, and growing popularity of cash responses to chronic and acute food insecurity fundamentally changes the landscape for operational agencies trying to reduce food insecurity.[4] On the supply side, donors have begun transitioning from exclusively food-based programming founded on intercontinental commodity shipments from the donor country, towards cash-based programming wherein agencies distribute cash, food vouchers, or food purchased in developing countries rather than in the donor country. In mid-2008, the United States – which accounts for well over half of global food aid volumes in any given year – finally began allowing small amounts of "local and regional procurement" of food aid in developing countries. With donors now granting agencies some flexibility in resource options for responding to food crises, program managers face new choices: what resource do they request for a given situation?

On the demand side, in many low-income countries, target subpopulations are gaining greater voice in the design and implementation of programs intended to help them manage episodes of widespread food insecurity. For example, in several countries the food price spike of 2008-9 led program beneficiaries who previously preferred cash transfers to request food commodities instead; in-kind food aid suddenly became the resource of choice to food-insecure households, putting considerable pressure on agencies to adjust their programming.[5] The development-humanitarian assistance community has recognized the dearth of tools it has for analyzing how best to respond (ALNAP 2009).

The confluence of changing donor resources and growing beneficiary voice is forcing adaptation of agency programming cycles. For decades, those designing food security initiatives commonly presumed a food aid response. The only questions the donors, governments and agencies needed to answer had to do with needs assessment: who to target for food distribution, how much food do they need, and for how long? By contrast, post-tsunami response planning has often favored cash responses when and where cash resources are available.

But resource-driven programming presumes recipient need. Response must be tailored to context. In order to do so, agencies urgently need better decision-making tools to help guide both emergency response planning and programs that help protect consumption and assets in situations of chronic food insecurity. Between the needs assessment and response planning/implementation functions exists an equally important – but commonly neglected – step of analyzing the likely impact of alternative responses, an emergent function that is coming to be known as "response analysis."

In this paper, we outline a suite of analytical tools agencies can use to anticipate the likely impact of alternative responses to food insecurity, taking into account both the impact on food insecurity at the household level, and the way in which alternative responses (cash or food aid) may impact local markets. Barrett and Maxwell (2005) outlined the basic idea for such a tool, but did not flesh it out in detail. The Market Information and Food Insecurity Response Analysis (MIFIRA) framework introduced here – and explained in far greater detail for agency analysts and managers in Lentz (2008a) – represents the fruits of an academic-agency collaboration aimed at developing rigorous-

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[4] Organizations such as the World Food Programme (WFP) and other United Nations bodies, government relief agencies, and national and international non-governmental organizations (NGOs), are referred to collectively as "agencies" hereafter.

[5] Ethiopia is a good example. By mid-2008 the prices of all basic grains were about three times their five year average, but the budget for the national Productive Safety Net Program could only accommodate about a 30% rise in cash transfers. Thus, the demand for food aid suddenly increased dramatically (Wahenga 2008, FEWS NET 2008).

yet-practical analytical and planning tools for agency staff to fill the response analysis gap. Section 2 explains the notion of response analysis. Section 3 describes the logic of the MIFIRA framework. Section 4 presents the results of demonstration-of-concept applications of the MIFIRA framework in Malawi, Bangladesh, and Kenya. Section 5 presents our conclusions.

2. Situating Response Analysis

Response analysis analyzes a range of information – some readily available through secondary sources, some that must be collected anew – to evaluate what resource(s) transfers will most effectively address a particular food insecurity situation. This is a departure from the common practice of taking a particular response (e.g., transoceanic food aid) as pre- determined due to resource constraints and then evaluating how much of that resource is needed. Response analysis has emerged only quite recently as a distinct step in linking information – early warning and needs assessment – and response. Where human life is at risk, there is a premium on quick response. But while there may be general agreement on the *objectives* of rapid response, there is often sharp disagreement on the *means* of response (Hoddinott 2006). The MIFIRA framework described and demonstrated in this article can guide the choice between in-kind food aid (potentially sourced in different places) and cash transfers (or some equivalent, such as food stamps or vouchers). The broader notion of response analysis is not tied to food insecurity in particular. Response analysis remains a critical step in all programming cycles.

Various "program cycle" concepts have informed development interventions over the years, several of them developed specifically for emergency programming (e.g., ALRMP n.d.). While heuristically helpful in terms of conceptualizing how various functions fit together in programming contexts with often-intense time pressures, virtually all of these depictions of program cycles mix information collection processes, analytical and planning tasks, and program implementation. Few of them make clear the distinct step of response analysis, likely because resource flexibility has historically not been an option in responding to food insecurity. The FAO Integrated Phase Classification (IPC) clearly situates response analysis and planning between emergency needs assessment and program planning (FAO 2006). But no program cycle conceptualization to date fully acknowledges the multiple tasks simultaneously involved in emergency and social protection response.

Figure 1 depicts various processes that must take place roughly simultaneously in the face of vulnerability and shocks that potentially cause food security crises. These can be summarized as information gathering tasks, planning and analysis tasks, and program implementation tasks. Several points about Figure 1 merit mention. First, while often depicted as a sequence of tasks that mix information collection, analysis, planning and implementation, these are separate and largely simultaneous activities. Contingency planning is informed by baseline analysis, but cannot wait until baseline analysis is completed. The mitigation of shocks and rapid response likewise cannot wait until all needs are assessed. And so on.

Second, when they are thought of at all, response analysis and response planning are typically assumed to follow needs assessment. However, some response analysis can – indeed, must – precede emergency needs assessment in order to facilitate rapid decision making. A complete response analysis cannot be finalized until needs are clear. But if analysis does not begin until needs are assessed, response delays can prove fatal.

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Third, monitoring, although depicted as one of a sequence of tasks, should pervade the program cycle. This includes the monitoring of early warning indicators, program inputs and expected impacts, as well as unintended impacts on markets or other subpopulations. Ongoing monitoring must identify the evolving impacts of program intervention choices so as to inform appropriate programming adjustments.

Fourth, although depicted in Figure 1 as if triggered by a specific incident or shock at a particular point in time, many food crises do not have such time-specific causes. For example, chronic food insecurity situations typically have diffuse causality. This temporal indeterminancy underscores the necessarily cyclical nature of the planning, analysis, implementation and monitoring process.

Finally, while Figure 1specifically represents an emergency programming cycle, a similar programming cycle can be readily adapted to address chronic food insecurity due to recurring household-level food access shortfalls. For example, such a cycle would underpin social protection programs, designed to respond to chronic food insecurity and poverty. The primary differences between emergency and non-emergency programming are (i) the time frames within which analysts must operate, (ii) the greater possibility in emergency situations for significant disruption of conditions from those present during baseline assessments – e.g., floods or earthquakes necessitating emergency response may have also destroyed critical food marketing infrastructure – and (iii) a less specific shock or causal factor in non-emergency situations.

The latter point especially underscores that response analysis must be informed by both good baseline analysis – in particular, knowledge of how local and regional food markets work and identification of reliable data sources – and early warning information – e.g., market indicators such as prices – and must gauge the requirements for a response *before* needs assessments are completed. This simultaneity between response analysis and needs assessment reinforces the iterative nature of programming cycles; these are not linear, once-and-for-all decision-making processes.

By familiarizing analysts in advance with available data and the functioning of local and regional markets, ongoing monitoring and data analysis should prepare them to quickly inform decision-makers about which aspects of the response analysis are most critical to an emerging or ongoing crisis. Especially in rapid-onset or complex emergencies, more fluid and less predictable conditions can impact households, markets, infrastructure, etc. and require analysts to collect new data or update on-going analyses. More predictable and slow-moving emergencies or chronic food insecurity situations will likely require less frequent reassessments of data and analyses.

3. The Market Information and Food Insecurity Response Analysis Tool

Barrett and Maxwell (2005, pp. 199-203) advanced a decision tree, depicted in Figure 2, to guide response analysis in food security crises. This has been adapted by various agencies and authors.[6] The logic of their framework identifies when food is or is not an appropriate response, as follows. As a rule of thumb, food aid is an essential resource for response to food insecurity situations that are underpinned by both a *significant food availability deficit* and a *market failure.* An outright deficit of food, whether at the level of a local community or a nation state, requires importation of the food necessary for human consumption. When coupled with a market failure, even increased

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[6] See, for example, Creti and Jaspars (2006) and Gentilini (2007).

demand stimulated by cash transfers does not reliably stimulate sufficient commercial inflows of food; it may only cause local prices to rise, thereby creating a whole new group of food insecure people. This combination of circumstances (food availability deficit and market failure) represents the context for the "first-best" use of food aid. Though such circumstances are becoming less frequent in an era of globalized markets, they are by no means rare. But neither are they the norm.[7]

In situations underpinned by just one of these two criteria (food availability deficits or market failures), food aid is sometimes appropriate. When and where food is available within the country or in nearby countries, but local markets have failed, food aid remains a logical option because local food markets cannot reliably deliver commodities to intended beneficiaries. But local or regional purchases (LRP) of food commodities, even if funded from abroad, often offer a faster, cheaper and more effective procurement method than intercontinental food aid shipments.[8] In such situations, the right mix of intercontinental food aid shipments and LRP food aid depends on the available quantity, cost, quality and accessibility of local surpluses relative to donor country commodities, as well as the willingness of a donor to provide cash for LRP.

By contrast, when and where adequate food is available and affordable through markets that remain accessible to people suffering a food access crisis, food aid is *not* necessary, and is usually not the most appropriate resource transfer for a food insecurity response. Rather, cash transfers – whether through direct payments, vouchers, public employment schemes, or other transfer systems – are generally preferable when operational agencies can reasonably effectively target vulnerable households. When local food markets function reasonably well and ample food is available and affordable, local private sector traders can typically move food in more quickly, cheaply and reliably than can international agencies, who in turn can typically deliver cash more quickly and reliably than they can deliver food.

Since Barrett and Maxwell (2005), various authors have outlined the relative merits of cash versus in-kind (usually food aid) transfers (Levine and Chastre 2004; Ali, Toure and Kiewied 2005; Gentilini 2005; Harvey 2005; Adams and Harvey 2006; Hoddinott 2006; Jaspars 2006; Gentilini 2007; Harvey 2007). Table 1 presents the general thrust of findings from these studies. The primary objective of transfers in response to food insecurity is to ensure that minimum requirements for healthful living are met, especially in terms of food, but also with respect to other necessities. An additional objective is to respect the dignity of the recipient by ensuring that s/he retains the right to make her/his own choices.[9]

There is a smaller, more recent literature on the choice of whether to source food aid locally or in distant donor countries. Tschirley (2006) outlines key considerations for choosing between local or regional purchase (LRP) and transoceanic imports of in-kind food aid from donor countries. He defines these in terms of risks. The three first-order risks include: (i) determining whether LRP will have an inflationary impact on local food markets; (ii) whether traders who deliver food aid under LRP contracts are likely to default on tenders; and, (iii) whether food procured through LRP will meet adequate food safety standards. Other considerations that Tschirley (2006) mentions include (iv) the whip-saw effect on markets of erratic or poorly planned LRP, which may ultimately discourage producers rather than create incentives for local producers, as is often intended in LRP

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[7] For an example from Ethiopia, see Lautze and Maxwell (2006).

[8] For detailed evidence on LRP performance, see Tschirley (2006) and Tschirley and del Castillo (2006).

[9] See "Section 2.1.2.2 of Action Contre la Faim (2007) for further discussion.

programs; and (v) that LRP may play into the hands of large traders and producers to the expense of smaller traders and smallholder producers.

A. Market Information: The Crucial Ingredient

Market analysis is the common denominator to most of the considerations raised, both by the literature that explores the choice between cash (or cash-equivalent) and food transfers, and by the literature on local and regional purchases of food aid. One needs to know how well intended beneficiaries interact with local markets and those markets respond to external interventions. Thus fleshing out the Barrett and Maxwell decision tree framework into an operationally useful approach to food insecurity response analysis requires primarily identification of suitable (i.e., reliable, quick, and not excessively technical) market analysis tools.

The MIFIRA approach unpacks the two core questions of the decision tree illustrated in Figure 2, breaking them into subsidiary questions analysts can feasibly answer using data and analytical tools commonly available to them. It then overlays those questions with methodological options for answering them. The optimal method depends on data and resource availability, time, staff technical skills, and the food insecurity context at hand. In some cases, it may be feasible and desirable to combine several methods in order to triangulate. Some analytical tools cut across multiple questions, so there is no strict one-to-one mapping of questions and tools. Rather, the set of questions constitute a logical framework for conducting response analysis, and the set of methods comprise the toolkit from which analysts draw the most appropriate tool for the tasks at hand.

The objective of MIFIRA is to identify the present context of the food markets facing the target food insecure population(s) and the likely behavioral responses of key market participants – such as traders, importers, households, government, and NGOs – so as to identify the resource most appropriate to the circumstances. Response analysis for food insecurity must first identify how local supply and prices in the target distribution market will likely respond to increased demand following an injection of cash given to households or to increased supply from local distribution of donated food. Then, if food aid appears necessary, the second step examines how prices will likely respond to food procurement in local or regional markets and how producer prices may be impacted by food aid distribution in a target recipient community. We break down the two fundamental questions in Barrett and Maxwell's original decision tree framework as follows.

Question 1. Are local markets functioning well? The objective in answering this question is to establish whether cash transfers offer a feasible, effective response for addressing a food security crisis. If so, for everyone or only for some sub-populations? Completely, or only up to some limit beyond which complementary food aid deliveries will be required?

This question must be further broken down in order to become operationalizable. We find that the minimum manageable disaggregation consists of five component questions. The motivation behind these specification questions is spelled out in greater detail in Maxwell et al. (2007), while Barrett et al. (2007) and Lentz (2008a) enumerate possible data sources and analytical tools helpful in answering these questions. Space constraints prohibit delving into these details here, although section 4's demonstration of concept provides several examples of how analysts can answer the following five questions.

1a. Are food insecure households well connected to local markets?
1b. How will local demand respond to transfers?

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1c. How much additional food will traders supply at or near current costs?
1d. Do local food traders behave competitively?
1e. Do food insecure households have a preference over the form/mix of aid they receive?

Indicators point in the direction of relying on market-based mechanisms to expand food access if food insecure households routinely participate in local markets for staple foods (1a), targeting needy households is feasible or the amount of aid given to each household is low relative to their total purchasing power, thereby minimizing market distortions associated with delivering aid to households who do not need assistance (1b), traders can readily expand deliveries into the local market at or near current costs so that the inverse price elasticity of supply (the percentage change in supplier cost for a percentage increase in supply) is low (1c), markets are reasonably competitive so that powerful intermediaries cannot simply mark up prices to extract the transfers provided to food insecure households (1d) and target households indeed want cash (1e). Conversely, if target households do not routinely participate in food markets (1a) or clearly prefer food to cash (1e), supply is quite price inelastic, especially if demand response would be strong (1b and 1c), or traders can exert real market power (1d), then the analysis favors greater reliance on importing food through noncommercial channels. Intermediate answers will be common, indicating either limited capacity to use markets, or capacity to use markets only for certain commodities or for particular target subpopulations. This disaggregated decision tree is reflected in Figure 3.

Unless markets are truly failing, as in the face of hyperinflation, or when logistical or financial bottlenecks limit additional throughput capacity to relatively remote and inaccessible locations, or when one or a small number of traders has considerable market power over pricing, a mixture of cash and food is commonly desirable, with cash targeted to those with relatively good market access under more competitive conditions, and food to those with relatively poor market access under less competitive conditions. While this can be administratively complex, and there are few good rules of thumb available regarding appropriate mixtures of cash and food, the inherent flexibility of mixtures means that agencies can adjust the mixture as market conditions improve or deteriorate. As mentioned earlier, ongoing monitoring of markets and of recipients' and communities' needs is necessary. Once-and-for-all response analysis is typically inadvisable. In the face of poorly functioning markets and limited supply, this sort of flexibility can both improve livelihoods by offering households greater choice combined with some food security while enhancing market functioning.

Cumulatively, the answers to sub-questions 1a-1e equip analysts to come up with a strong, evidence-based answer to the first fundamental question of response analysis: are local food markets functioning well? If they are, then cash based responses are generally preferable. In that case, analysts can typically stop after this section of the response analysis as there is no need to explore food sourcing options. If, however, food markets do not function well, then food deliveries are typically necessary and one needs to tackle the second fundamental question of the MIFIRA framework.

Question 2. Is there sufficient food available nearby to fill the gap? The objective in answering this question is to establish from whence the organization should procure food to distribute into the target delivery market so as to provide the most effective response, taking into consideration cultural and nutritional appropriateness, cost, food safety, timeliness and generalized market effects considerations. The historical default has been transoceanic shipment from donor countries. Local or regional purchases are increasingly an option with some donor or private resources, however.

As with the first core question, this second question can be broken into three related sub-questions:

2a. Where are viable prospective source markets?
2b. Will agency purchases drive up food prices excessively in source markets?
2c. Will local or regional purchases affect producer prices differently than transoceanic shipments?

If some food aid deliveries are necessary per the decision tree of question 1 (Figure 3), question 2 helps the analyst identify which possible local or regional market sources likely provide the most cost effective and timely supply, while minimizing harmful price effects to consumers in source markets and to producers in the target delivery market(s). Once candidate markets have been identified based on available supply, comparing transport capacities, inter-country and intra-country regulations on moving food, and availability of traders regularly engaged in moving large quantities of food can further narrow the search for the best source market (2a). Among these ideal source markets, the tools in sections 1b and 1d enable analysts to examine the potential impact of purchasing food on the source market, in order to limit prospective harm to non-beneficiaries who buy food in that source market. Intuitively, the smaller the purchase relative to the overall market size, the smaller the potential unintended price impact (2b). Comparing how LRP food aid may impact producer prices differently than transoceanic food aid is the final step in identifying the best source of food aid. Appropriate forms of food aid reaching beneficiaries during a lean season or when prices are abnormally high will limit harm to domestic producers (2c).

When a marketing hub can provide food readily, cost effectively, and face minimal delivery delays (2a), purchasing from this marketing hub will have little impact on the hub's prices (2b), and LRP will arrive at a more seasonally appropriate time than transoceanic shipments or the LRP food is more culturally appropriate (2c), then LRP will typically be the preferred procurement mode for food aid. Conversely, when local or regional marketing hubs do not have adequate supply or will face long delays in moving the food to the domestic distribution area (2a), purchasing from these hubs will significantly drive up prices, harming source-market consumers (2b), or deliveries associated with LRPs are more likely than transoceanic shipments to coincide with or follow soon after a harvest, or food available in local or regional markets is not culturally appropriate, transoceanic shipments are preferred. This disaggregated decision tree is reflected in Figure 4.

As with question 1, question 2 will not always yield unequivocal answers. Analysts need to weigh the relative importance of each aspect in the particular contexts they face. For example, during rapid onset emergencies, the speed of delivery is especially important. This relates back to contingency planning, prepositioning and early warning, all important programming concerns, but ones not directly addressed by MIFIRA. During slower onset or chronic crises, ensuring no harm comes to domestic producers that could render them more susceptible to future crises may be a top priority. Similarly, if an entire region is at risk, the desire to avoid spreading price increases to nearby, vulnerable marketing hubs may point to transoceanic shipments. Finally, food purchased locally or regionally can have the added benefit, when done correctly, of supporting local and regional producers and traders. This support could have the added benefit of improving market ties, possibly lessening the need for later external interventions in the form of food shipments.

The best indicators and analytical methods to use depend on the context: the data and human resources available to an agency, the situation on the ground, etc. The MIFIRA framework is not a

mechanical formula to be implemented identically in all places and times. It merely offers a carefully and logically structured set of questions backed up by methods for feasibly yet rigorously answering those questions. As increasing donor resource flexibility makes operational agency response analysis ever more important, the MIFIRA framework fills an important void. We hope and anticipate that others will build on and improve MIFIRA, which we offer merely as a first generation toolkit to refine as the response analysis experience base develops. But the need for such a framework is palpable as operational agencies increasingly wrestle with these questions.

B. Scales of Analysis and Division of Labor

The range of questions raised by MIFIRA may still seem daunting to some operational agencies. In particular, some MIFIRA questions must be answered both at the national and regional (macro) levels and at local marketshed (meso) levels, while others must be answered at the household (micro) level. Thus one approach to implementing the framework is to consider the data collection and analysis processes at these three distinct – micro, meso, and macro– scales of analysis. This raises the possibility of division of labor according to the comparative advantage of different agencies involved in the response to a given food insecurity context.

District governments and NGOs typically have a comparative advantage in collecting primary data at the household (micro-) level because of their field presence and more nuanced understanding of the communities where they work. They sometimes have a similar comparative advantage in collecting and analyzing primary data at the meso-level linking the community's marketshed to the broader national and regional economies. However, understanding markets at the meso level often requires more economic analysis and better access to a mixture of primary and secondary data than does understanding household level relations to markets. Thus meso level data collection and analyses are sometimes beyond the capacity of local governments and NGOs and better handled by national governments, donors or regional organizations. And at the macro-level, understanding national and regional markets typically requires ongoing monitoring and analysis of secondary data, often complemented with key informant interviews. These tasks commonly require staff and skills beyond the reach of smaller local governments and NGOs and fit with national government, donor and regional organization mandates. Figure 3 depicts a typical assignment of MIFIRA market analysis questions to the most relevant level of analysis, as well as the inherent complementarity of different agencies' skills, as reflected in the width of the twinned triangles at any given scale of analysis.

Macro scale analyses examine whether traders are likely to increase supply at reasonable prices (question 1c) and, whether they behave competitively (question 1d). These analyses require information on international and national market prices, production, imports, markets and trade policies, the number and characteristics of major traders, etc. Collecting and analyzing such data is costly. Food security monitoring groups and early warning systems supported by governments, donors, UN agencies, and consortiums of government agencies and NGOs already collect and synthesize much of the relevant macro data such as, import parity prices, and whether/how trade policies pose barriers to timely and affordable commercial import of food. Obtaining key analyses and data from established sources can help agencies avoid reinventing the wheel.

Meso scale analyses are extremely important and much less commonly available through existing institutions. Most currently available secondary data sources are highly aggregated. Secondary data tend to be collected from major cities, district capitols, or major market centers and are rarely available for smaller market centers. A critical gap in understanding markets remains in determining

the relationship between the macro scale market assessments that are often readily available (i.e., those based on national or regional trading centers) and smaller markets in an agency's specific programming areas. For example, as we discuss in the next section, while Blantyre and Lilongwe, the two largest cities in Malawi, are reportedly well integrated with one another, it was not clear from secondary sources if the smaller markets surrounding Lilongwe city were integrated either with Lilongwe city or with each other.

The meso scale analysis links the marketsheds relied on by targeted food insecure populations to regional and city markets. Smaller traders are typically able to provide quantitative and qualitative data on general market functioning, competition levels, supply chains, volumes and prices in markets, seasonal differences, costs, and any constraints on their trade. But meso scale data collection and analysis typically needs to be undertaken from scratch. Similar to macro scale analyses, meso scale analysts must attempt to understand how prices are formed and how they are related to larger markets (question 1c), how much aggregate demand may increase (question 1b), whether traders can meet increased demand (question 1c), and if traders will behave competitively (question 1d).

The focus of micro scale analysis is households' likely responses to transfers. Generally, some household survey data are available from needs assessment, baseline studies or other related exercises. These data typically provide information on expenditures, income, and consumption, all of which can help in estimating (question 1b) how local demand should respond to transfers. Estimation of the necessary elasticities may also be available from pre-existing empirical studies based on household survey data (e.g., by local or international research institutes). Identifying who has unhindered access to markets and who is unable to access markets (question 1a) is often best answered through rapid primary data collection in a sample of recipient communities. Single sex focus groups generally suffice when assessing market access and market characteristics, complemented by purposively sampled marginalized individuals to avoid the elite capture that sometimes arises in focus group discussions. To understand household preferences for different transfers (question 1e), individual interviews with likely (or current) recipients tend to be most effective. Lastly, discussions with households about local market competition, prices, and products, and about the size of the marketsheds they frequent help to provide context as well as to direct meso level data collection to a few key markets within or nearby the sampled communities.

Similar scale-differentiated analyses can be employed to examine local and regional purchase options associated with question 2. Identifying which markets have adequate surplus (question 2a) that can be purchased without driving up local prices (question 2b) in a timely fashion (question 2c) are macro scale questions except in cases of localized pockets of surplus, where they may be meso scale questions. Monitoring the impact of LRP on source and beneficiary communities must occur at macro, meso, and micro scales simultaneously. Purchases will likely be less disruptive from larger marketing centers with many traders transacting in large volumes than from a much smaller, thinner market. However, even purchases from smaller, more isolated markets can be effective; they just need to be informed by a careful analysis of the potential local impacts.

The MIFIRA framework is a sequential process. The amount of resources invested in answering question 1 versus the local and regional procurement issues raised in question 2 depends on the issues and risks faced by the target community. In particular, when the analysis of question 1

establishes that cash transfers can likely succeed, there is little reason to invest further time and resources in exploring question 2.

4. Demonstrating the MIFIRA Concept

Having laid out the rationale for response analysis and the MIFIRA framework in general, we now briefly describe the results of two recent demonstrations of the concept through field visits and pre-testing with CARE in Malawi in November 2007 and in Bangladesh in July 2008. In these field tests we focused on developing possible implementation strategies for micro scale and meso scale analyses because CARE country offices' comparative advantage lies in their strong community-level field presence. We did not undertake rigorously sampled primary data collection, but focused instead on relatively quick and inexpensive primary data collection, supplemented by accessible secondary data, and the use of feasible analytical tools to determine what it would take for an NGO country office to generate a reasonable response analysis. These field tests validated the MIFIRA concept; these initial applications generated a useful snapshot of local markets' ability to respond to cash-based programming. Further, these demonstrations of concept underscored that some external support (e.g., through local consultants or in collaboration with macro scale partners) may be necessary for the more technical aspects of response analysis where an NGO's technical staff are limited or overburdened with other functions.

In what follows, we review a few sample results from the field tests, one or two sub-questions at a time. These provide some insights that agencies can glean from using the MIFIRA framework. These examples are not meant as a comprehensive recitation of field test results, especially because in both cases cash-based transfers appeared the preferred response and thus there was no need to go into depth on the second question, about sourcing of food for direct cmmodity distribution. Readers interested in the complete details on the data and methods used and the findings of each specific application are encouraged to consult Lentz (2008b, 2008c).

1a. Are food insecure households well connected to local markets?
Disaggregated assessment of household-level market access can reveal a need for differentiated targeting, with cash appropriate to some households and food to others. Toward this end, our field trials found it very important to purposively sample individuals who are food insecure, at risk of becoming food insecure or who are marginalized within communities. The use of community-level averages can mask serious constraints faced by a sizeable minority of at-risk households. For example, many households in Malawi's Lilongwe district are able to access remote markets by walking and for most cash appeared a desirable form for transfers. Yet, some households with people living with HIV/AIDs were too labor-constrained to walk to local markets and needed to rely on neighbors or relatives to go to market on their behalf. By specifically directing attention to household-level market access and encouraging analysis that differentiates among households, the MIFIRA approach readily identified this important and actionable heterogeneity in optimal response.

1b. How will local demand respond to transfers? and 1c: How much additional food can traders supply at or near current costs?
Response analysis differs from, and is complementary to, a needs assessment. For example, CARE-Bangladesh's SHOUHARDO Maternal Child Health Program (MCHN) program targets pregnant and lactating women with children under 24 months old with a semi-monthly food aid ration. We

used the MIFIRA framework to quickly assess whether markets were functioning adequately to allow a prospective substitution of cash- for food-based responses for this previously identified beneficiary population. We used SHOUHARDO's volume of food aid programming as a starting point to understand likely demand and broader market response to a prospective switch from food to cash.

Simple back-of-the-envelope computations suggest that switching from food aid deliveries to cash deliveries would make a relatively small impact on the total quantity traded in the main wholesale market in Sirajganj (Table 2). The same finding appears to hold true for the larger SHOUHARDO program nationwide. These calculations combined data from several readily accessible sources. The project needs assessment included a count of recipient households and the food aid ration size. The SHOUHARDO-MCHN program distributed 12 kilograms of wheat to each of 6500 Sirajganj District recipients in June, for a total distribution of 78,000 kg of wheat. To compute the equivalent volume of rice demanded, if cash were to be provided, we assumed the size of the cash grant would allow for a simple one-for-one substitution of rice for wheat. This is a very conservative assumption as households will typically not purchase baskets identical to their food rations, but will consume some non-food items as well. IFPRI (2007, p.68) found that among very poor households the marginal propensity to consume (MPC) food out of an additional increment of income lies in the range 0.30-0.45 (IFPRI, 2007. p. 68). In other words, given cash transfers, only 30% - 45% of the increased income will be spent on food, on average. Again making the most conservative assumption, at the upper end of the estimated MPC range (45%), the new demand for rice would be 35,100 kilograms.

In a brief interview, a single large wholesaler in Sirajganj City reported selling 1600 bosta of coarse rice per month, or 148,800 kilograms (1bosta≈ 93 kg). This one wholesaler would need to increase his monthly sales by only 25% in order to meet the entire extra market demand for rice that would result from converting existing food aid rations to cash transfers. He was confident that he could do so; but he would have to increase his price because the cost of his credit rises with the level of credit used. There are approximately eight to ten traders similar in size to this large trader in Sirajganj City. In order to meet the increased district-wide demand, each would have to increase throughput volumes by only 2.5-4.0%. Wholesale traders seemed able to increase their volume by that percentage without incurring extra costs. Especially given the conservative assumptions used, it seems unlikely that a conversion of the SHOUHARDO-MCHN food aid program to cash transfers would drive up rice prices in the community.

Thinking about the possibility of converting all MCHN programs in the country from food to cash, one needs to compare the resulting national-scale increment in demand to trade volumes. Central government data indicated 2.9 million metric tons of rice were imported in 2007-8. Following the same simple method of crudely estimated likely additional rice demand from a conversion to cash, we found it would amount to less than 0.2% of average import volumes. Again, the likelihood of inducing price increases seems extremely low. This exercise found only a modest expected shift in demand in the event of a switch from food aid to cash, and expansion that should be very feasible for traders to accommodate without triggering any significant price adjustment. Nevertheless, if a number of large food aid actors consider introducing cash transfers simultaneously without consulting each other, problems could result. The obvious implication is that some amount of inter-agency coordination is necessary.

As demonstrated in this one example, estimating the potential increase in demand is relatively easy provided one can synthesize data from multiple sources: basic needs assessment information; primary data from discussions with traders; and secondary data on estimated marginal propensities to consume and national trade volumes. In most settings, this should be feasible, especially with prior preparation through baseline analysis before agencies hit an emergency requiring rapid response analysis.

Question1c: How much additional food can traders supply at or near current costs?
This sub-question is probably the most complex as well as perhaps the most important to address. If traders cannot respond to the increased market demand resulting from cash transfers with additional supply at little or no extra cost per unit sold, then distributing cash will likely result in inflation and thereby hurt non recipient households. Getting a good sense of the local market's capacity to expand throughput volumes is therefore essential.

Multiple analytical tools can prove useful in answering this question. The simplest approach, employed in Bangladesh, involved simply asking traders whether they could accommodate estimated demand expansion and whether this would increase their average or marginal costs. The most comprehensive approach to gauging supply responsiveness involves eliciting marginal cost information from traders and constructing an aggregate supply schedule (Barrett et al. 2007). In practice, however, it is often difficult to elicit cost information from wholesalers or larger traders. Not only do they consider such information valuable and proprietary, but also many traders think in terms of average costs, not marginal costs, while still other traders are unwilling to venture guesses about hypothetical situations. When successful, interviews with wholesalers about their cost structures can reveal the sorts of competition and constraints they face, and, critically, their ability to meet increasing demand.

Another approach to understanding supply responsiveness involves identification of the levels of spatial and temporal market integration so as to establish the extent of the relevant market.[10] Bigger markets can necessarily diffuse local demand shocks, damping any resulting inflationary pressures in a way that segmented markets cannot. In Malawi, we assessed spatial market integration by computing the simple bivariate correlation coefficient of first differences of monthly maize price data from spatially distinct markets. This statistic indicates the extent to which a price shock (the difference between one month and the next) in one market co-moves with a price shock in another market, with a coefficient of 1.0 indicating perfect integration and 0.0 indicating perfect segmentation. The government routinely collects these data from large markets throughout Malawi, within the Kasungu - Lilongwe livelihood zone, and across nearby cities connected to the Kasungu – Lilongwe livelihood zone.

As shown in Table 3, we found that markets within the livelihood zone are relatively well integrated with one another, with estimated correlation coefficients of 0.68-0.88. The market adjacent to an area with heavy informal cross-border trade (Mchinji) is especially well integrated with the other markets. Among the market towns covered by the government's price reporting service, there appears considerable market integration, suggesting that a demand shock due to cash distribution in one location would rapidly draw supply from any grain surplus areas, muting possible price rises in

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[10] Scott (1995) and Fackler and Goodwin (2001) provide an extensive discussion of various methods of spatial price analysis for market integration testing.

response to cash-based transfers. This holds true even for the furthest market from Lilongwe (Ntchisi).

Yet, current measures of market integration may not be able to capture traders' future abilities to expand capacity. When asked about the constraints they face to expanding throughput volumes, traders frequently remark on the risks inherent in relying on credit. For example, across Malawi's maize supply chain, traders face capital constraints. Even among those who can access credit, many prefer to operate on a pay-as-you-go system rather than put productive assets at risk as collateral on lines of credit.[11] Further, some traders are understandably wary of renting additional transportation or storage to expand their throughput capacity during periods when many households lack adequate purchasing power. This wariness with respect to borrowing and expanding trade may limit traders' abilities and willingness to meet demand during periods of shortage. Delivering cash, in this case, may be more successful when combined with a program that increases credit availability or provides credit guarantees for traders.

1d. Do local food traders behave competitively?
Markets with a greater number and variety of traders are less likely to be collusive, because it is harder for larger and disparate groups to organize (Timmer et al., 1984). In Malawi, we found that while there is a great deal of diversity of traders across the maize value chain, many traders operating at the same scale (e.g., wholesalers or retailers within communities) exhibited quite similar characteristics.[12]So although markets appeared workably competitive, and thus cash transfers appeared feasible in this context, this was an issue to focus on in ongoing monitoring, as competition in local markets could worsen rapidly if some itinerant and small traders exit markets, whether due to their own cash shortages, unanticipated predatory behavior by larger traders, or tightening commercial credit, transport and storage markets.

1e. Do food insecure households have a preference over the form/mix of aid they receive?
Households' preferences are sensitive to the relative values of transfers. Recently, in the face of food price increases and given that cash transfers were not inflation-indexed, the preferences of recipients in Ethiopia's Productive Safety Net Program switched from cash to food (Wahenga 2008). This finding strongly underscores both the importance of indexing cash transfers and that households clearly perceive terms of trade between different forms of transfer.

Further, we find when discussing preferences with households that program design affects the relative attractiveness of different forms of transfers. For example, female respondents during individual interviews responded more positively to cash that would be distributed to women within a household versus distribution to a (typically male) household head. Preferences need to be elicited carefully and programming design needs to be clearly explained to respondents in order for them to accurately give their preferences.

2. Is there sufficient food available nearby to fill the gap?

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[11] Boucher et al. (2008) explain this phenomenon of "risk rationing" in developing country credit markets.
[12] As Barrett (1997) shows, it is extremely important to disaggregate the crop value chain into distinct functions – farm-level collection and assembly, wholesaling, transport, milling, interseasonal storage, retailing – in order to identify both mobility barriers that inhibit growth in a marketing intermediary's throughput volume and specific bottlenecks due to noncompetitive behavior.

Our field tests focused on MIFIRA's micro and meso scale data collection and analysis components. And because the conclusion from question 1 in both field trials was that cash-based response was advisable, there was no need to conduct in-depth data collection and analysis of question 2, on local and regional food sourcing options. Nonetheless, during our discussions with traders about their ability to procure additional food, we also gathered limited information on prospective source markets that could supply food without driving up local prices (questions 2a and 2b). Wholesalers and large traders' descriptions of where they buy food, how quickly they can restock, the current directions of regional maize flows, and the risks and possible delays they face alerted us to possible source markets as well as some of the possible costs and benefits associated with these markets.

In particular, we found that traders in Malawi took very different approaches to sourcing food based on the size of their operations. Many medium size traders relied on informal cross border trade, and thus had a harder time identifying specific sources of food surpluses they could draw on for within-country or regional procurement. By contrast, the largest traders used official channels for regional trade and commonly have long-standing partnerships with traders operating in marketing centers in South Africa, Zambia, or other nearby countries. One Lilongwe-based trading firm felt confident that with adequate notice, it could meet tenders for purchase, even during periods of low domestic food availability, by tapping into its network of regional partners. In this region, it appeared likely that one could tap into adequate surpluses regionally through established commercial tendering arrangements.

Adequate and reliable product quality is another key concern in sourcing food locally or regionally. This same larger, Lilongwe-based firm had well-defined quality control procedures in place, including rigorous testing protocols. Many medium-sized traders appeared less able to ensure higher quality products that could sustain sometimes-long storage periods without advanced climate controls. In the Malawian case, it appeared that competitive procurement through large-scale traders tapping into the regional market could provide adequate quality and volume without affecting prices significantly. It was not at all clear whether one could generate reliable supply from procurements directed more strategically at medium- or small-scale marketing intermediaries. Thus it seemed that sufficient food was available nearby to fill emergent food gaps, but that procuring agencies would need to be careful about how and where they sourced needed commodities.

Some similar issues emerged in Bangladesh, in particular related to product quality. Imported food aid from high-income donor countries is often of higher and more consistent quality than similar products sourced in low-income countries. For example, Bangladeshi consumers are not guaranteed that either imported or domestically produced vegetable oil meets safety standards and has not been adulterated. In particular, households residing outside of major urban areas may not be able to purchase cooking oil that is nutritionally equivalent to imported vegetable oil food aid. For this commodity, an important part of standard food aid rations in the region, it seemed unlikely that agencies could reliably source adequate volumes of satisfactory quality cooking oil. This raises the option of continued distribution of imported fortified vegetable oil food aid to meet associated nutritional objectives, combined with cash to purchase other staples and necessities (e.g., rice) that appear available locally and regionally. While this could be a logistically complex and administratively expensive option, it could alleviate nutritional concerns while keeping food aid pipelines open.

These issues of quality and the availability and costs of sourcing food clearly influence the responsiveness of firms (question 1c). They also provide initial indications of the functioning of possible source markets (questions 2a-2c). As we discovered in Bangladesh and Malawi, exploiting such informational synergies can provide analysts direction when they pursue more detailed analyses on local and regional procurement options.

5. Conclusions

As donors have grown increasingly flexible over the past decade in the range of resources they will provide operational agencies responding to food insecurity, and as agencies and recipient communities have gained greater experience with a range of transfers, there has emerged a growing need for systematic approaches to determining appropriate response. Agency programming cycles are adapting and practitioners are increasingly recognizing the imperative of "response analysis". This paper outlines the rationale for response analysis in general and argues that market analysis is a major and necessary component in identifying the range of appropriate responses to food insecurity. It then introduces a new, field-tested, systematic approach, the Market Information and Food Insecurity Response Analysis (MIFIRA) framework. MIFIRA advances a logical sequence of questions, supported by guidelines on a suite of analytical tools and data sources that agencies can employ to reliably and reasonably rigorously answer those questions. Well-structured response analysis of this sort can anticipate the likely impact of alternative (food- or cash-based) responses to food insecurity and thereby help operational agencies identify the response that best fits a given food insecurity context.

Not all donors are equally flexible, however, and an additional merit of the MIFIRA approach is that it generates quantitative data on expected costs of buying and moving food stocks domestically or between neighboring countries. Comparing this information to the cost of procurement in donor country markets and internal transportation storage and handling costs will provide an important evidence base for agencies advocating with still-skeptical donors to allocate scarce resources to the most cost effective kinds of response.

Several additional points should be noted about MIFIRA. First, it operationalizes a "do no harm" principle or "benefits/harms" framework, in that it explicitly analyzes possible market problems that might directly result from the inappropriate use of food aid. But it is not a complete tool for analyzing all possible unintended negative consequences of interventions. For example, it does not consider the possibility of fostering food aid "dependency" among recipients,[13] nor does it consider the possibility of food aid to fuel corruption or conflict, to name just a few oft-mentioned negative side effects of food aid.

Second, while the analysis presented here focuss on making initial program design choices, we re-emphasize the programming cycle depicted in Figure 1. Routine and ongoing monitoring of the same information is essential once the initial choices are made in order to permit appropriate program adaptation, as to sharp changes in food prices or local food availability that may alter the conclusions one reaches from the questions that comprise the MIFIRA framework. Trying to predict the impact of a given intervention is critical in early design stages; but monitoring the impact of that intervention is equally important. This not only helps to verify the appropriateness of

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[13] See Lentz et al. (2005) on the topic of food aid dependency.

the initial response choices, it also provides a much more robust evidence base on which to base future program choices.

Third, secondary data from macro and meso sources were relatively easy to access in our field tests in Bangladesh and Malawi, at least in part because both are chronically food insecure countries with reasonably functioning government institutions. That is, they are not failed or predatory states. It could be considerably more difficult (though no less important) to undertake certain aspects of this analysis in complex emergencies in places with far less, or less reliable, pre-existing data.

Because local contexts and market conditions are highly variable, and the nature and quality of available data are uneven, it would be inappropriate to promote a single, formulaic method for carrying out response analysis. The MIFIRA framework is neither simple nor mechanical; thus it offers no hard and fast decision rules based on simple statistics. Furthermore, MIFIRA is a necessary - but not the only –component of a well-designed response analysis. Food security analysts will need to weigh the relative importance of each aspect of MIFIRA as well as other considerations, such as gender, conflict, and leakages, in the particular contexts they face. Our hope is that operational agencies can field test, critique and update this framework over time so as to refine it into a flexible, reliable, broadly applicable instrument to help anticipate and respond to food insecurity crises in the most appropriate manner possible.

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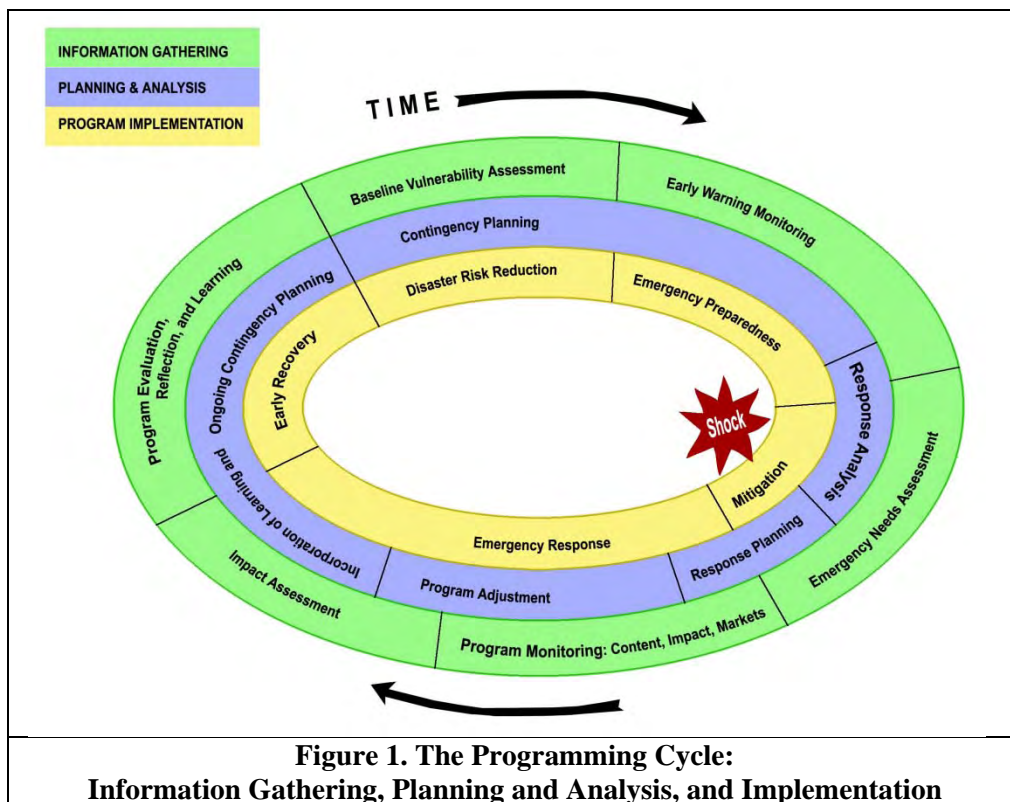
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Figure 1. The Programming Cycle:
Information Gathering, Planning and Analysis, and Implementation

Source: Maxwell et al. (2008), drawing on Maxwell and Watkins (2003), FAO (2006) and ALRMP (n.d.)

Food Crisis Occurs

1. Are Local Food Markets Functioning Well?

Yes — Provide cash transfers or jobs to targeted recipients, not food aid.

No

2. Is There Sufficient Food Available Nearby To Fill The Gap?

Yes ⟶ Provide food aid based on local purchases/triangular transactions.
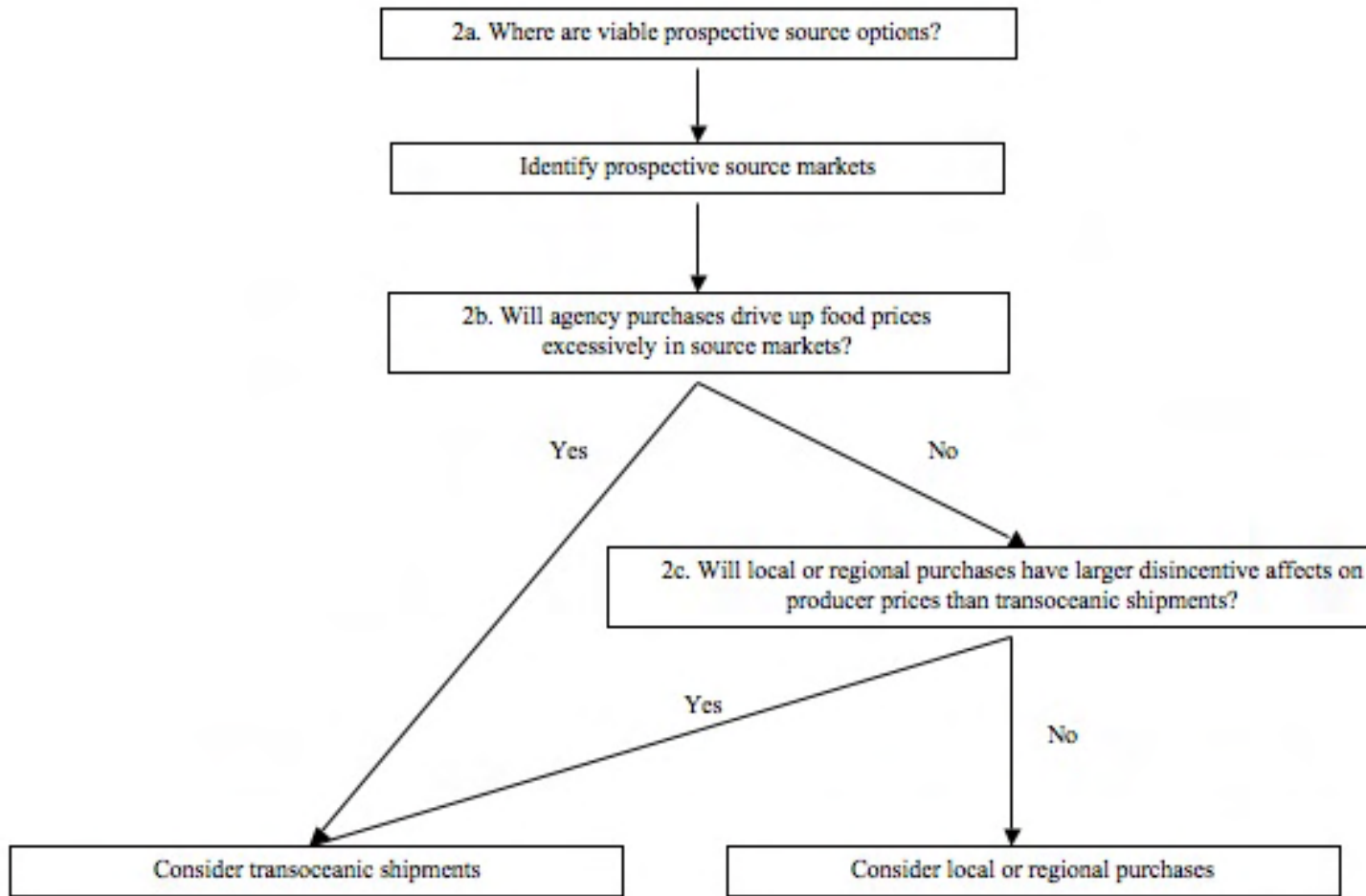
No ⟶ Provide food aid based on transoceanic shipments.

Figure 2. The Food Aid / Local Purchase / Cash Transfer Decision Tree

Reproduced from Barrett and Maxwell (2005)

Figure 3: First Stage of Market Information and Food Insecurity Response Analysis, Addressing the Question "Are local markets functioning well?"

Figure 4: Second Stage of Market Information and Food Insecurity Response Analysis, Addressing the Question "Is there sufficient food available nearby to fill the gap?

Figure 5: Scales of Analysis and Complementary Agency Analysis Capacities

Table 1: Comparing Cash and in-Kind Food Transfers	
Food transfers generally recommended when:	**Cash transfers generally recommended when:**
1. Food intake is prioritized for nutritional purposes (including targeted feeding and micronutrient objectives) 2. Markets do not function well 3. Markets are distant, or during the lean season 4. Inflationary risks are a significant concern 5. Security conditions permit (i.e., food commodities are highly visible) 6. Cash transfer systems do not exist 7. Cost savings is sought through individual / household targeting	1. Overall humanitarian need, as well as choice and flexibility are prioritized 2. Markets function well 3. Markets are nearby, or during the peak, post-harvest season 4. Production disincentives due to food aid delivery are a significant concern 5. Security conditions permit (i.e., cash is less visible but offers greater incentive for theft) 6. Cash transfer systems exist 7. Cost saving is sought through lower logistical and management overhead

Adapted from Levine and Chastre (2004); Barrett and Maxwell (2005); Gentilini (2005, 2007) and Harvey (2007).

Table 2: Estimated increase in demand if cash replaced food aid
in a community receiving food aid (Sirajganj district, Bangladesh)

	Number of recipient hhs	Grain given to each hh per month (kg)	Total foodaid per month (kg)	Marginal propensity to consume (MPC)food	Demand adjusted by MPC, per month (kg)	Monthly volume of largest seller in Sirajganj (kg)	Share trader would have to increase his trade volume	Estimated national imports per month (kg)	New demand as a ratio of imports
Sirajganj MCHN recipients	6500	12	78,000	0.45	35,100	148,800	0.236	241,666,667	0.0001
Total MCHN recipients	85,000	12	1,020,000	0.45	459,000	N/A	N/A	241,666,667	0.0019

Table 3: Kasungu-Lilongwe Plains Livelihood Zone Price Correlations

	Lilongwe	Dowa	Ntchisi	Kasungu
Dowa	0.88			
Ntchisi	0.69	0.87		
Kasungu	0.68	0.74	0.84	
Mchinji	0.80	0.83	0.79	0.77