

# **Cash, Food, or Vouchers? An application of the Market Information and Food Insecurity Response Analysis framework in urban and rural Kenya**

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## Abstract

This paper uses the Market Information and Food Insecurity Response Analysis Framework to analyze data on food market intermediation and on consumer behavior and preferences in order to clarify whether market-based cash and voucher programs are likely to prove effective for addressing food insecurity in rural and urban study sites in Kenya. The findings carry important implications for food security interventions by government and operational agencies. We confirm that context matters when undertaking a response analysis. While we find that cash and/or vouchers are appropriate in both urban and rural locations, markets in surveyed urban settlements can respond better to a large injection of cash or vouchers than can surveyed rural areas. Moreover, household vulnerabilities are associated with household preferences in different ways across the two sites. In rural areas, female headed households and households reporting a physical limit to market access were among the groups that strongly preferred food aid to cash or vouchers while in urban areas, households with these characteristics preferred the flexibility of cash or vouchers to food.

**Keywords:** food insecurity, Kenya, response analysis, urban food insecurity, MIFIRA

### 1. Introduction

Donors, development agencies and governments working to alleviate chronic or acute food insecurity have new response choices that allow them to replace or supplement in-kind food aid with cash or vouchers. Increased response choice requires careful ex ante analysis of expected market outcomes to identify which type(s) of transfers are appropriate, given the local and regional economic and social context. Several response analysis tools have recently been developed to help direct the transfer choice among food, cash, and vouchers, once an agency or government has identified a target population and the scope of need (Barrett et al. 2009). Response analysis tools can be used both to guide response to sudden-onset food emergencies and to help protect households' consumption and assets in areas plagued by chronic food insecurity. Response analyses often incorporate a framework for collection and interpretation of local and regional price data, market and supplier information, and recipient preferences. They may explicitly guide the incorporation of collected data and insights into program design.

Increased response choice also requires greater cross-institutional coordination among governments and agencies. Without careful coordination, institutions' response choices can work at cross-purposes. For example, within recipient communities, transoceanic or regionally procured food aid distributions are supply-side interventions that increase the amount of food available. In contrast, cash and voucher distributions are demand-side interventions that lead to increased spending by recipients. Both types of interventions can impact local prices, consumers and producers, but in opposing directions. The combination, particularly without coordination, has the potential to create price volatility and instability. Response analysis can guide agencies selecting between demand and supply side interventions, or can assist agencies determining if an intervention combining or sequencing supply and demand components is warranted.

Moreover, understanding the scope and scale of current and planned interventions across institutions can help analysts more accurately assess the additive effect of a prospective intervention. Evaluating likely total effects is of special concern when multiple institutions seek to procure food aid and / or deliver cash and vouchers within the same marketshed. One agency's

assessment may indicate that a certain tonnage of food can be procured from a region without inducing inflation. If a second agency fails to incorporate the first's intent to purchase into its own analysis, it may proceed with local purchases or distributions of cash and voucher transfers that it otherwise would not. The net effect in the market could be increased prices, harming food purchasers and potentially decreasing the value of distributed cash and voucher transfers. Thus, there is growing need for locally-based coordination across operational agencies and food security institutions, including joint or shared assessments situational and response analysis and program monitoring.

The Market Information and Food Insecurity Response Analysis (MIFIRA) framework is a response analysis tool designed to evaluate the feasibility of transfer options given market conditions and household circumstances and preferences (Barrett et al. 2009). While other response analysis tools such as the Emergency Market Mapping and Analysis (EMMA) tool (Albu, 2010) are intended for rapid-onset emergency market response assessments, MIFIRA's approach assesses how markets, consumers, and traders will respond to transfers and can be tailored for use in both chronic and emergency food insecurity crises.

MIFIRA is organized around two questions. First, are local markets functioning well? Second, if local markets are not functioning well enough to supply aid, is there sufficient food available nearby to meet the shortfall? For example, if markets cannot meet increased demand generated by cash or vouchers without increases in prices, delivering these forms of transfers will not support the targeted population as well as in-kind transfers of food. In addition to this analysis, MIFIRA has been field tested in Somalia (FEWs Net 2011) and northern Kenya (Ouma et al. 2010).

Each MIFIRA question is subdivided into a set of sub-questions to focus and facilitate analysis. The first question, which examines whether local markets are functioning, is analyzed in five dimensions: (1a) to what degree are food insecure households connected to markets, (1b) what is the estimate of increased demand on food markets generated by the proposed intervention, (1c) are local traders able to meet such an increase in demand without increasing food prices, (1d) is there sufficient competition among traders in local markets, and (1e) do households have a preference over the form of aid. The second MIFIRA question, is there sufficient food available nearby to meet the shortfall, examines the potential effect of agency food purchases on source markets. Kenya is a food deficit country and thus an unlikely candidate market for large-scale procurement. This study therefore focuses on the question of recipient market functioning, leaving aside the analysis of source markets.

It is important to note that non-market factors can narrow the set of feasible transfers. Security, specific nutritional objectives, gender dynamics in the recipient population, cost, implementing agency capacity, and timeliness can all shape the choice among food, cash, or vouchers. In other words, while MIFIRA assesses whether markets are functioning adequately to support cash and/or voucher transfers, other factors out of MIFIRA's scope will shape agency and donor

decisions. The ability of various transfers to meet institutional objectives is highly context dependent. Recent reviews can be found in Harvey et al. (2010), and Upton and Lentz (2011).

We apply the MIFIRA framework to one urban and one rural site in Kenya where Catholic Relief Services (CRS) is considering a significant scale up of food security voucher projects. We use MIFIRA as an ex ante assessment of the scale up; specifically, whether vouchers and/or cash are an appropriate transfer type and at what scale they could be delivered without likely adverse market impacts. The Kenyan urban and rural sites studied are characterized by distinct market systems and populations with different livelihoods. Mathare is the oldest slum in Nairobi. Its ten densely populated villages are informally estimated to be home to between 500,000 and 1,000,000 people, though official 2009 census figures put the population of Mathare valley closer to 87,000<sup>1</sup>. Mathare's population is mostly occupied in casual labor and informal sector business activities. The second research site, Makueni District in Eastern Province, has experienced several consecutive years of severe drought, a significant challenge to household food security in a rural region where most families depend on agriculture and livestock production to meet a part of their consumption needs. Catholic Relief Services-Kenya (CRS) operated food security interventions at both of these sites. In Mathare, CRS's 2010 food voucher-for-work pilot delivered transfers worth 1,000 Kenyan Shillings per month to 250 recipients. In Makueni, CRS implemented a three-month food voucher-for-work project for 2500 households. The value of the monthly vouchers was equivalent to 150 shillings per day for up to ten days of work per month. These value-based vouchers (also called cash vouchers) were redeemable from pre-selected vendors for products from a pre-determined list.<sup>2</sup>

### **Comparison of Urban and Rural Dimensions of Food Security**

The three components of food security are food availability, food access, and food utilization.<sup>3</sup> In urban areas, food availability is rarely a source of food insecurity because food is generally on hand in markets. In rural areas, food production from local farms constitutes a much larger proportion of household diets and production shortfalls can lead to both food scarcity (i.e., low availability) and limited household purchasing power (i.e., poor access) through reduced income from agriculture. Due to a greater reliance on cash income and limited access to land for agricultural production, the urban poor may be more vulnerable to food and fuel price shocks than those in rural areas (Ruel et al. 2010). In contrast to urban areas, where over 90% of food comes from markets, 59% of food in the marginal agricultural areas of Kenya comes from market purchases, 37% from own-farm produce, 1% from hunting and gathering, and 2% from gifts and food aid (Kenya Food Security Steering Group (KFSSG 2008).

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<sup>1</sup> 2009 Population and Housing Census, Kenya

<sup>2</sup> Further details about the design and implementation of the CRS voucher programs are available upon request from the authors.

<sup>3</sup> The FAO's *State of Food Insecurity in the World 2009* defines food security as when "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (p. 8).

Given the strong household and market contrasts between the two locations, we present the site analyses separately. A detailed analysis of our second site, Makueni, is available on request from the authors. In this paper, we retain only those components of the Makueni analysis that emphasize differences in findings between the two sites.

## **2. Mathare Food Security and Survey Results**

Over 60% of Nairobi's population of approximately four million people lives in slums (United Nations-Habitat 2006). Mathare, one of Nairobi's most densely inhabited slums, is located in the city's Starehe constituency, an area in which 44% of the population is below the poverty line (Central Bureau of Statistics et al. 2005). According to the Kenya Food Security Steering Group (KFFSG) (2010), at least 3.5 million urban dwellers in Kenyan cities have difficulty meeting their food needs on a regular basis.

### ***2A. Sampling Strategy for Mathare Voucher Recipients and Non-recipients***

The Mathare sub-location consists of ten villages, all served by CRS's food voucher for work program. Participants in the food voucher project were food insecure households identified by CRS as female and/or child headed, or HIV/AIDS-affected. We selected four villages with varying access to the primary commercial markets in Nairobi's Eastleigh neighborhood: Kosovo, Mlango Kubwa, and Villages 3A and 3B.

The majority of respondents lived in Mlango Kubwa or Kosovo villages where we surveyed between 30 and 40 respondents, split between randomly-selected samples of voucher recipients and non-recipients. A sample of previous aid recipients was drawn from the list of CRS voucher program participants. A transect strategy was employed in all three villages to obtain a random sample of food insecure non-recipients. Given that there might exist systematic differences in income and livelihoods between houses on a primary path and those on a side alley, we sampled representatively from each. Our method was to enter the village along the primary dirt path and to sample the inhabitants of every fifth house we passed, entering into side alleys that intersected the main path. In selecting households, we attempted to exclude those who were not food insecure and surveys were terminated if it became clear that the respondent was food secure. Because we sampled directly from the CRS list of food insecure recipients, recipient households in the transect sampling were skipped. Finally, to increase the number of food insecure households we added a random sample of fifteen non-recipients in Villages 3A and 3B.

### ***2B. Food Security in Mathare***

Although food is readily available in the markets used by urban slum residents, access and utilization prove difficult for many households. Among our 83 respondents, less than 5 percent of male household heads reported their main economic activity as wage or salaried employment while no female-headed households reported regular wage employment. The remainder of households were involved in less reliable income generating activities, including casual labor (9.8% of male heads; 45.2 % of female heads), petty trader (12.2% of male heads and 31.0% of

female heads) and small business or shop ownership (73.1% of male heads and 9.5% female heads). 14.3% of female heads reported engaging in housework or being dependents. Forty-two of the 83 households surveyed were female-headed.

The average per capita daily income in the July 2010 CRS-CU research was KSh 72, or \$0.88 (n=83)<sup>4</sup> and mean total household income was KSh 260 (\$3.17). Because we sampled only food insecure households, this figure underreports mean income in Mathare. Surveyed households in the settlement spent an average of 72% of their reported daily income on food. Table 1 presents the mean per capita food expenditure in Mathare disaggregated by household daily income bracket and suggests that a share of the respondent households may be not merely food insecure, but food poor; that is, unable to purchase the minimum amount of basic food needed to meet the minimum daily requirement of 2,250 calories per adult. According to a KFSSG report (2008) on the impacts of rising food prices on livelihood groups in Kenya, the June 2008 threshold for food poverty in Kenya was Ksh 47.7 per capita expenditure on food. Using the most recently available (June 2008) food poverty threshold, at least 16% (13 of 82) of surveyed households could be classified as food poor.

**Table 1: Average per Capita Food Expenditure in Mathare in KSh, by Household Total Income Bracket**

	<i>n</i>	Mean	Min	Max
Less than Ksh 50/day	2	22.6	16.8	28.5
Ksh 50 – 100/day	11	43.2	18.0	137.1
Ksh 101 – 200/day	35	50.0	15.2	135.0
Ksh 201 – 300/day	18	56.6	25.1	122.3
Ksh 301 – 400/day	6	54.4	20.3	126.0
Ksh 401 – 500/day	6	62.3	40.0	86.4
Over Ksh 501/day	4	74.0	29.2	112.5

CRS responded to food insecurity in Mathare by delivering monthly vouchers worth KSh 1,000 each to 250 food insecure households not receiving other forms of assistance. The project consisted of three voucher distributions between January and September, 2010. Other agencies active in Mathare have provided food aid. In our sample, 9 respondents received both food aid and vouchers.

### ***2C. Market Access and Participation of Food Insecure Households in Mathare***

To answer each of the MIFIRA questions, we conducted market analyses for commodities heavily consumed by food insecure residents of Mathare. We found that maize, maize meal, and pulses are most likely to be purchased with cash, redeemed with vouchers, or received as in-kind food aid. We also identified the likely value of a scaled-up intervention and number of targeted recipients. Consultation with CRS indicated that 2500 households, ten times the size of CRS's

<sup>4</sup> Exchange rates are from the Central Bank of Kenya, July 2010. See <http://www.centralbank.go.ke/forex/default.aspx>

pilot, is a likely target for CRS's programming in the immediate future. Based on the 2009 census population of 87,000<sup>5</sup> individuals and an average household size of 4.7 (CRS-CU survey) such a program would reach approximately 13 percent of the Mathare valley community.

### **MIFIRA question 1a: Are food insecure household connected to local markets?**

Households in Mathare rely almost exclusively on markets for food. Within the community's 10 villages, many small kiosk shops are located along the central lanes. Kiosks sell food staples including rice, packaged maize flour, cooking fat, oil, sugar and salt, along with non-food household items such as soap and paraffin. Kiosks buy and sell in relatively small volumes and often restock several times a week. Kiosks serve as a primary source of credit for food in Mathare. Both Kosovo and Mlango Kubwa have at least 30 kiosks; Villages 3A and 3B have slightly fewer. A handful of small cereals shops dealing exclusively in bulk pulses, rice, maize grain, and bulk maize meal are located throughout Mathare. There are also several small maize meal mills, where residents can either purchase ground grain from the mill owner or bring their own maize grain for grinding into maize meal. Eastleigh, a community within walking distance for able-bodied residents of Mathare, is the site of several small shops known locally as small supermarkets. Eastleigh also has several cereals shops and maize meal mills. Twenty-three percent of survey respondents reported purchasing food from other sources, including fresh vegetable sellers within the community or large, open-air markets outside of the community.

Most households in Mathare reported purchasing food on a daily basis, generally from a kiosk close to their home. The mean monthly frequency of kiosk visits was 36 per household and the mean number of market visits per household (kiosks, maize meal mills, supermarkets and open air markets) was 45 per month. Households spend an average of less than seven minutes to reach a kiosk, 18 minutes to a maize meal mill, and 28 minutes to a supermarket in Eastleigh. We find no evidence of seasonal commodity scarcity in local kiosks or markets.

Regarding physical constraints to markets, 16.9% of respondents reported at least one member of the household with limited physical access to markets. The primary reason was lack of safety and security, followed by illness. From among the 83 households surveyed, 27.7% reported only one member going to markets. While it is unclear whether another member could take over the responsibility of purchasing food if the only member going to markets fell ill or for some other reason could not physically access markets, physical access does not appear to be a binding constraint for most households.

The high frequency of market visits per household per month and the short average time to reach the market indicate that the response to MIFIRA question 1a is 'yes', food insecure households are well connected to local markets. Though we find a small number of households in which one or more members face a physical constraint to accessing a preferred market, all households

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<sup>5</sup> 2009 Population and Housing Census, Kenya



reported that at least one member had physical access to markets. Therefore, food insecurity in Mathare is predominantly due to insufficient or unstable cash flows for food purchases rather than a lack of commodity availability or a physical inability to reach markets.

**MIFIRA question 1b: How will local demand respond to transfers?**

To assess how local demand might respond to transfers, the survey team asked respondents how they would spend a one-time cash transfer. Responses were used to calculate households’ marginal propensity to consume (MPC) a cash transfer as food. These calculated household MPCs were used to estimate the additional market demand for food likely to be generated by a cash transfer program. The mean MPC for food in Mathare is 0.32 with a standard deviation of 0.29, indicating that in Mathare, the residents have a range of consumption needs beyond food. Many respondents answered that, in addition to food expenditure, they would use the cash transfer to pay rent or school fees. It makes sense that the average share of income spent on food exceeds the marginal propensity to consume food out of an additional increment of income, due to Engel’s Law, which states that as income increases, the share of income spent on food will go down.

In Table 2 we use the mean and one standard deviation above the mean to calculate the interval estimate of increased food demand generated by a one-time KSh 1,000 cash transfer to the maximum number of 2,500 recipients in Mathare. The total induced food demand if the vouchers could be effectively restricted to incremental food purchases appears in the far right column.

**Table 2: Additional Demand for Food Generated by a KSh 1,000 Disbursement**

# of Recipient Households	Mean Food MPC	High Estimate, Food MPC	Mean Estimated Transfer-Induced Demand	High Estimated Transfer-Induced Demand	100% of Transfer
2,500	0.32	0.61	KSh 800,000	KSh 1,525,000	KSh 2,500,000

We use the estimated demand response to analyze whether current traders can respond to the planned intervention and at what cost. We assume that the increased demand from a program scale-up would be spread across Mathare’s 10 villages rather than concentrated in the three villages surveyed.

**MIFIRA question 1c: How much additional food can local traders supply at or near current costs?**

Mathare is part of a diverse market system with multiple vendors and retail types. Wholesalers supplying staple food into Mathare’s kiosks, maize meal mills and small supermarkets include: traders in Eastleigh; industrial maize meal millers in Thika; and maize and pulse wholesalers in the Nyamakima central wholesale market.

We surveyed six of the more than ten small supermarkets in the marketshed, all five mills for grinding maize meal in the three villages, three of more than 25 small cereals shops, and 8 of more than 60 kiosk retailers. We used a transect strategy similar to the household approach to survey kiosk traders, choosing kiosks largely at random but with some attention to relative kiosk size and product mix. In order to adequately sample across our three commodities, we split the surveys within vendor types among packaged maize flour, locally milled maize meal, and pulses.

A majority of the retailers in Mathare procure their supplies from wholesalers and small supermarkets in nearby Eastleigh. We surveyed three small supermarkets in Eastleigh and three in Mlango Kubwa. We included small supermarkets both that had and had not participated as vendors in the CRS voucher program. Eastleigh wholesalers supply both small supermarkets and Mathare kiosks but were unwilling to participate in the survey.

We interviewed five cereals wholesalers in Nyamakima, again using a transect method to randomly select the wholesalers. We also sought out and interviewed the largest cereals wholesaler in the market.

Mathare's large number of kiosks and cereals shops is likely to spread increases in demand induced by cash transfers or vouchers over enough vendors such that the per-vendor increase is manageable. Table 3 evaluates the mean per kiosk demand increase generated by a hypothetical cash transfer program targeting 2,500 households with an allotment of KSh 1,000 each. Assuming 30 kiosks per village and our upper bound on the Mathare MPC calculation, the program could be expected to generate a per-tranche increase in demand of approximately KSh 5,083 per kiosk. Five thousand shillings is the equivalent of 3-4 90 kilogram bags of maize grain (at July, 2010 prices) or 6-7 bales of packaged maize flour. These quantities fall well within the range of kiosk owners' own estimated short-term additional sourcing capacity.

**Table 3: Suppliers' Restocking Frequency, Credit Access and Supply, and Margins**

	<b>Small Supermarkets (n=3)</b>	<b>Maize Meal Mills (n=5)</b>	<b>Cereals Shops (n=2)</b>	<b>Kiosk Retailers (n=8)</b>
Mean freq. of restocking (per month)	11.7	5.0	9.0	13.5
Percent receiving credit in the last five years from suppliers	100%	100%	100%	0%
Percent giving credit to their buyers	0%	60%	50.0%	87.5%
Mean total outstanding receivable credit, July, 2010	KSh 0	KSh 12,000	KSh 3,500	KSh 5,525
Percent of new entrants in previous five years	30%	75%	100%	25%
Mean margin, July 2010 as percent of trader purchase price <sup>6</sup>	8.9%	31.0%	34.0%	16.3%

<sup>6</sup> The margin is computed as the difference between sales price and purchase price, less transport costs. The mean margin is then computed by vendor type.

**Table 4: Mathare per Vendor Simulated Demand Increase, Small Supermarkets and Kiosks**

Number of Recipient HHs	Per HH allocation	Calculated MPC for food (High estimate)	Kiosks (N=300)	Supermarkets (N=10)
2,500	KSh 1,000	0.61	KSh 5,083	KSh 150,000

While we cannot estimate the total excess capacity of the Mathare marketshed, our calculations in Table 4 suggest that kiosks and small supermarkets can easily satisfy, with current capital and at current costs, the increased demand resulting from a ten-fold scale up in the number of transfer recipients in Mathare. Given that our findings are based on analysis of three of Mathare’s ten villages, our assessment requires the assumption that kiosks’ numbers and supply systems as well as household demand are similar in Mathare’s other seven villages. Some caution, therefore, may be called for if this assumption does not hold.

**MIFIRA question 1d: Do local food traders behave competitively?**

Mathare residents have a variety of food market options. Twenty-three percent of survey respondents reported purchasing food from a source other than a kiosk, Mathare supermarket or maize meal mill. These respondents reported their households were purchasing from a seller of fresh vegetables in the community or traveling to an open-air market, such as Gikomba, to purchase food items.

The presence of more than 30 kiosks in each village is evidence of a potential for strong competition in the retail sector within Mathare as are the small margins separating vendors’ mean sales prices and purchase prices. However, the fact that kiosks re-supply staple commodities nearly every other day (Table 3) and do not use or have access to supplier credit suggests that kiosks may be operating close to maximum current capacity. A number of surveyed kiosk owners did indicate that lack of easy access to capital hindered their expansion.

In Eastleigh, there is a network of traders who supply a large majority of goods to Mathare retailers. They were largely unwilling to speak about their business practices with the survey team and therefore, it is unclear whether these wholesalers operate in an uncompetitive manner. The operations of this supply market merit further investigation.

However, across all food traders, there was evidence of new entry within the last five years, suggesting that there are no formal or informal barriers to entry. In interviews with food traders about their downstream buyers and upstream vendors, traders did not report lack of competition to be a concern. Overall, our findings cautiously indicate that Mathare food vendors operate competitively.

## **MIFIRA question 1e: Do food insecure households have a preference over the form/mix of aid they receive?**

One outcome of the broadening of food assistance choices is that institutions can incorporate recipient preferences, allowing for a more needs-based approach (Barrett et al. 2009). Yet, food insecure individuals may prefer familiar forms of aid over unfamiliar ones. For example, in Malawi, the United Nations World Food Programme (WFP) found that respondents overwhelmingly preferred food to cash but after gaining an understanding of how cash projects work, some respondents changed their minds (WFP 2007). Harvey also warns, “there may be a tendency for recipients to express a preference for what they have received before” (2007, p. 45). Therefore, after asking respondents which form of assistance they would prefer (cash, vouchers, food, or an unspecified mix of these), we estimate a multinomial logistic regression to explore not only how preferences vary by demographics, income and location, but also whether previous experience with transfers shapes preferences.

During interviews eliciting their aid preferences, Mathare respondents were informed that all other aspects of the hypothetical transfer including the value, the frequency of receipt, and the recipient within the household, would be fixed across transfers. The percentage of Mathare respondents preferring a mix of cash, food, and/or vouchers is 42.7%, cash is 23.2%, and food alone and vouchers alone is each 17.1%.

Among Mathare survey respondents who preferred a mix, 64.7% chose a combination of cash and vouchers. Twenty one percent preferred a combination of cash and food, while 2.9% preferred a mix of food and vouchers and 11.8% requested all three. More than 97% of respondents who preferred a mix wanted the mix to include at least some cash, indicating a strong preference for its flexibility.

We use a multinomial logistic regression to unpack the relationship between household characteristics and stated aid preference among Mathare respondents. The model breaks the analysis into three binary regressions, each comparing households’ stated preference for cash, vouchers, or a mix relative to food aid. We control for a range of household characteristics in the Mathare regressions, including: household’s prior receipt of food or food vouchers, whether the respondent is female, the age of the household head, the household size, the per capita daily income of the household, the percent of the household’s weekly income spent on food, whether the household reported owning their own business, whether the household reported a member with limited access to market, and whether the household used credit in the past two weeks for food.<sup>7</sup> We include an interaction between the sex of the respondent and the sex of the household head to test whether preferences are different for female respondents who were also heads of households.

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<sup>7</sup> All households reporting that they did not use credit in the past two weeks for food indicated that credit would be extremely difficult to get. It is not necessarily the case therefore, that households not using credit in the sample are better off financially.

Table 5 presents the odds ratios from the multinomial logit regression household characteristics on preference. Odds ratios greater than one indicate that the characteristic has a positive relationship with the household's preference for cash, vouchers, or a mix over food aid, while odds ratios less than one indicate that the characteristic has a negative relationship with the household's pair-wise preference. We find that, on average, surveyed Mathare households prefer the flexibility of cash or a mix of aid types. Past voucher recipients strongly prefer cash or a mix of aid types to food aid, as do households that spend a higher percentage of their income on food. Higher income households slightly but statistically significantly prefer cash, vouchers or a mix over pure food aid. While prior receipt of food aid does not statistically significantly shape Mathare respondents' preferences, the point estimates for those who have received food in the past indicate that they are less likely to prefer cash, vouchers or a mix over in-kind food transfers. Surprisingly, households reporting limited physical market access preferred cash or a mix to food alone. This may indicate that, with cash, households with physical constraints can more easily ask others to buy food on their behalf than they can ask others to pick up rations at a distribution site or redeem vouchers. Larger households preferred vouchers to food aid. Gender plays an interesting role. Female respondents preferred a mix of aid types to food aid alone. However, female respondents who were also household heads strongly preferred vouchers to food aid.

**Table 5: Multinomial logit odds ratio estimates of household aid type preferences**

Independent variables	Preference: cash over food aid	Preference: Vouchers over food aid	Preference: Mix over food aid
Household prior recipient of food aid	0.17	0.75	0.14
Household prior recipient of vouchers	10.59*	2.55	65.13***
Use of credit for food in last two weeks	0.10	0.78	0.94
Female respondent	3.56	0.22	16.63*
Female respondent*Female head	1.16	27.08**	2.08
Age of household head	1.03	0.99	1.06
Per capita household income (daily)	1.08**	1.07*	1.08**
Per capita household income <sup>2</sup>	1.00*	1.00	1.00*
Percent of income spent on food	61.07*	1.15	124.00**
Own business	0.96	19.24*	1.72
Access limit	21.46**	9.60	13.61*
Household size	1.53	3.04***	0.88
n=82			
LR chi2(36) = 67.37			
Prob > Chi2 = 0.0012			

“\*” indicates significance at the 10% level

“\*\*” indicates significance at the 5% level

“\*\*\*” indicates significance at the 1% level

In summary, our analysis finds that Mathare vendors could meet the increased demand for staple foods that would result from a scale-up of the CRS transfer program. Analysis of the aid preferences of surveyed respondents indicates that there is a clear preference for variety in households' aid baskets, even among households reporting a physical limit to market access and

households spending higher percentages of income on meeting food needs. Further, prior voucher experience shapes preferences by increasing respondents' desire for flexibility.

### **3. Makueni Sampling Strategy, Food Security Situation and Survey Results**

#### ***3A. Sampling Strategy for Recipients and Non-recipients***

We now turn to our response analysis findings in our rural site, focusing on differences in the MIFIRA findings between the urban slum, Mathare, and rural Makueni. In Makueni, our surveys almost entirely focused on small towns and households in outlying areas. We again sampled from both voucher recipients and non-recipients, using a combination of recipient lists and transect surveys, similar to the methods employed in Mathare. The villages sampled were selected by CRS' local partners as locations where voucher recipients could be distinguished from non-recipients. We surveyed 13 different sub-locations. Details regarding the sampling strategy and regarding the number of recipient and non-recipient households surveyed in each sub-location are available upon request.

#### ***3B. Food Security in Makueni***

Makueni District is generally a food deficit area, with a 66% headcount poverty rate (KFSSG 2007; CBS et al. 2005). Every household surveyed reported growing at least one staple crop.<sup>8</sup> Maize from own production meets households' consumption needs for an average of 4.3 months while pulses last 5.4 months on average. Households were surveyed in late July, just before the long rains harvest. Twenty-nine percent of households reported that in the month prior to the survey they purchased most or all of their maize consumption from the market.

In Makueni, rainfed crop production is a major livelihood for 25.6% of male and 75.0% of female respondents. Similar to Mathare, very few respondents reported engaging in regular wage or salaried employment. 53.9% of men owned their own business or shop; 7.7% of men and 16.7% of women engaged in livestock production. Fewer surveyed households were female-headed (23.5%) in Makueni than in Mathare (50.6%).

One of CRS' responses to food insecurity in Makueni has been a food voucher for work program that requires participants to work in groups to construct trenches on their farms for soil and water conservation. Recipients were eligible to participate in 10 days of work per month for 150 shillings per day. 2500 households participated in the program during 2009 and 2010; vouchers were distributed for several months in both years.

#### ***3C. Market Access and Participation of Food Insecure Households***

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<sup>8</sup> Staple crops included in the survey were maize, millet, sorghum, beans, and pulses (cowpeas, pigeon peas, dolichos, and green grams)

We identified maize and beans as the commodities most relevant for our target population. CRS’s initial voucher program reached 2500 households with a median number of 80 recipient households in each of 30 sub-locations. We examine the feasibility of doubling the median sub-location number of program recipients to 160 given a likely one-time transfer of KSh 1,500 Kenyan shillings. The most recently available district-level figures from 2005 indicate that the population was 887,000 (KFSSG 2007). Using an average household size of 7.1 (CRS-CU survey), we estimate coverage of a scaled up program to be 4% of the district population.

**MIFIRA question 1a: Are food insecure households connected to local markets?**

Our analysis indicates that, similar to Mathare residents, people living in Makueni tend to have regular physical access to markets. On average, people visited food vendors of any type 28 times per month and the average travel time to all vendor types was under one hour. More than 50% of survey respondents reported that a member of their household experienced limited physical access to markets. The most common factor inhibiting market access was other time commitments (29 of 51). Illnesses were also commonly reported (20 of 51). The information does not distinguish between short-term illnesses and more chronic illnesses or disabilities that constrain people for extended periods of time. The latter is a more significant impediment to market access. Other factors reducing physical access to markets identified by several respondents were safety of travel (9 of 51) and age (8 of 51).

**MIFIRA question 1b: How will local demand respond to transfers?**

Based on the responses of the households surveyed during the harvest season<sup>9</sup>, 52 cents of a dollar transferred to households in Makueni will be spent on food. In generating the upper and lower bounds for likely increased food demand, we used the mean MPC for food and then generated the upper bound by adding one standard deviation above the average. Table 6 reports the estimated induced demand interval associated with a transfer of KSh 1,500 to 160 recipient households in a sub-location, a doubling of the current size of 2010 CRS Makueni voucher project. The right-most column reflects the incremental aggregate demand if a KSh 1,500 voucher limited to food were distributed.

**Table 6: Additional Demand for Food Generated by a KSh 1,500 Cash Disbursement**

# of Recipient	Mean Food	High Estimate	Mean Estimated Transfer-Induced	High Estimated Transfer-	100% of Transfer
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<sup>9</sup> In contrast to Mathare, the marginal propensity to consume a cash transfer as food in Makueni may exhibit seasonal variation. A households’ staple harvest meets their staple consumption needs for between three and five months (CRS-CU survey), and a household’s propensity to use a transfer for food purchases may differ during the lean season, when they have no stored staples. We do not present findings on average share of income spent on food for Makueni because income is highly seasonal and recall was deemed too time consuming and susceptible to error, especially given MIFIRA’s focus on parsimonious data collection.

<b>HHs in Sub-Location</b>	<b>MPC</b>	<b>of Food MPC</b>	<b>Demand</b>	<b>Induced Demand</b>	<b>(i.e., restricted food voucher)</b>
160	0.52	0.81	KSh. 124,800	KSh 194,400	KSh 240,000

Each recipient could access at least two traders who would accept vouchers within their sub-location. These traders may source their products from a common, primary market. Each of the three main primary markets serves approximately 10 sub-locations. Therefore, we estimate that these primary market locations face an increase of about ten times the above stated demands. The ability of traders to handle increased demand for food is discussed below.

**MIFIRA question 1c: How much additional food can traders supply at or near current costs?**

Each of Makueni’s sub-locations includes a number of villages, the largest of which is a local market hub for the sub-location’s vendors who operate as both wholesalers and retailers. Outside of these larger centers lie smaller villages with a handful of kiosk retailers. The survey team sampled four sub-locations: Mithumba, Mavindini, Kithiki and Kitise. Details regarding the sampled wholesalers, wholesaler/retailers, and kiosk retailers are available upon request.

Larger villages generally have three to five kiosk retailers and at least one trader who is a wholesaler/retailer. This wholesaler/retailer has a standing relationship with a supplier from outside the community and sources in relatively larger quantities than the kiosk retailers. We refer to the traders from outside the community who supply wholesaler/retailers as dedicated regional wholesalers; they deal solely in large volumes of bulk cereals.

Table 7 presents traders’ characteristics by trader type. Kiosk retailers clearly operate in smaller volumes, with fewer sales and source markets while the mean maize volumes of dedicated regional wholesalers vary between 180 bags (low season) and 400 bags (high season), using the July 2010 wholesale maize purchase price of KSh 1,300 per 90 kg bag.

**Table 7: Trader characteristics in Makueni**

	<b>Dedicated regional wholesalers (5)</b>	<b>Wholesaler/retailers (12)</b>	<b>Kiosk retailers (5)</b>
Mean frequency of restocking per month from primary supplier, high season	7.6	4.1	3.8
Mean frequency of restocking per month from primary supplier, low season	0.8	1.6	2.2
Percent receiving credit in the last five years from suppliers	60%	66.7%	80%
Percent giving credit to their customers	100%	100%	100%
Mean total outstanding receivable credit, July 2010	KSh 285,800	KSh 38,360	KSh 7,050



Percent new entrants in previous 5 years	20%	42%	40%
High Season <sup>10</sup> : mean maize and beans weekly volume values	KSh 520,425	KSh 74,100	KSh 19,810
Low Season: mean maize and beans weekly volume values	KSh 240,305	KSh 22,030	KSh 5,070
Number of supplier types, maize <sup>11</sup>	2.6	2	1.6
Number of supplier types, beans	2.4	1.58	1.0

Because kiosk retailers often source from wholesaler/retailers in their own communities or in a proximate village, it is the wholesaler/retailers' relationships, constraints, and capacities that largely determine supply response in a community. We therefore focus on the capacity of wholesaler/retailers and their dedicated regional wholesalers to meet the estimated food demand generated by a cash or voucher transfer. Note that because most small retailers reported sourcing from suppliers other than the sub-location's group of wholesaler/retailers we likely underestimate the excess capacity in the sub-location market.

In Makueni, we elicited the short-term trade capacity of suppliers in the four sub-locations by asking how many 90 kg bags of both maize and beans they could source given their current access to cash and credit. These short-term trade quantities for beans and maize were multiplied by the current trader-specific purchasing price for each commodity to yield a short-term trade value capacity for each supplier. Traders were *not* prompted to estimate their sourcing capacity given a hypothetical significant increase in demand. A significant demand increase would likely also increase the trader's expected cash flow and therefore the amount that they could source. For this reason, our method of elicitation again likely understates the traders' short-term sourcing capacity.

We sum traders' estimated short-term resupply capacity within a sub-location. We use the sub-location mean value to impute capacity of the few wholesaler/retailers that we did not interview. In this way, we generate the total value of short-term capacity (current season) at the sub-location administrative level (Row C of Table 8).

The sub-location excess capacity (Row D) is the difference between the calculated total value of wholesaler/retailer short-term maximum capacity (Row C) and the total value of current volumes (Row B). Our interviews indicated that the transacted volumes of Makueni suppliers are highly seasonal. Therefore, to compute a lower bound (Row E), we multiplied the suppliers' reported high season volumes (Row A) by the current season price. The current season price is relatively low compared with seasons in which there is less available local maize. Using the current season price in our estimate further understates traders' short-term excess capacity.

<sup>10</sup> Traders defined their own high and low volume seasons.

<sup>11</sup> Supplier types include regional wholesalers, assemblers / brokers, farmers, farmers' associations, transporters.

All excess capacity values in Rows D and E of Table 8 are well above the calculated mean sub-location transfer-induced demand of KSh 124,800 (Table 6), suggesting the sub-location markets would be able to handle the increase in demand generated by a cash transfer of KSh 1,500 disbursed to 160 recipient households per sub-location. But based on our conservative estimates, the Kitise sub-location lower bound excess capacity value is less than the upper bound estimate of a cash transfer induced demand.<sup>12</sup> This illustrates that additional data may be required and care taken before launching or expanding voucher or cash transfer programs in some sub-locations, even within an area with ample excess trader capacity to handle cash or vouchers, on average.

**Table 8: Sub-location Excess Capacity Calculation, KSh**

	<b>Mithumba</b>	<b>Mavindini</b>	<b>Kithiki</b>	<b>Kitise</b>
A. High Season: mean maize and beans weekly volume values (KSh)	54,000	440,903	170,489	78,637
B. Current Season: mean maize and beans weekly volume values (KSh)	2,970 <sup>13</sup>	301,013	91,713	44,212
C. Short-term capacity value (KSh)	324,000	1,740,600	1,022,400	259,200
D. Sub-location excess capacity, upper bound (KSh) (C-B)	321,030	1,439,588	930,687	214,988
E. Sub-location excess capacity, lower bound (C-A) (KSh)	270,000	1,299,698	851,910	180,563

According to the excess capacity calculations, dedicated regional wholesalers could meet these sub-location capacity increases.<sup>14</sup>

Excess capacity calculations are estimated using the current season as a reference. An evaluation of the potential effects of an intervention operating in multiple agricultural seasons should take into account possible seasonal variations in commodity availability, cash, and credit. When asked what constraints limit supply expansion, both wholesaler/retailers (66.7%) and kiosk retailers (40%) cited limited credit from their suppliers as a primary challenge to expansion.

<sup>12</sup> The induced food demand of 160 households receiving a restricted food voucher worth KSh 1,500 would be KSh 240,000 and would exceed both the lower and upper bounds of excess capacity in the Kitise sub-location. In this case, the maximum number of recipients is calculated to be 120 households (a demand increase of KSh 180,000 for food-restricted vouchers) so as not to exceed the lower bound excess capacity of traders in the sub-location.

<sup>13</sup> The Mithumba estimated current season volume value estimate is extremely low because the community wholesalers reported having purchased and sold small quantities in the past month during the local harvest.

<sup>14</sup> An important next step before program implementation is to aggregate estimated excess supply capacity within a market shed and compare the total estimate with the estimated excess capacity of the common source market. For example, if Mithumba and Mavindini wholesalers share a common set of dedicated wholesalers, one would verify that the shared dedicated wholesalers could also meet the estimated demand increase without increasing costs.

Dedicated regional wholesalers cited lack of transport (40%) as their primary constraint.

### **MIFIRA question 1d: Do local food traders behave competitively?**

Similar to Mathare, surveyed Makueni households reported access to a variety of local retailers and market types. Moreover, at the wholesaler/retailer and kiosk retailer trader levels there is evidence of ease of entry, a key indicator of a market's competitiveness. Forty-two percent of 12 wholesaler/retailers and two of the five surveyed kiosk retailers started their operations within the last five years.

Among dedicated regional wholesalers in Wote and Makindu, the level of concentration is higher and, likely due to the high capital requirements of the operation, entry is more difficult. Only one surveyed dedicated regional wholesaler had entered within the past ten years. In a 2009 Makueni District market profile, the KFSSG expressed concern about competition at the dedicated wholesaler level. They write, "cases of hoarding were not discovered but given the existing concentration ratio of 75 percent for wholesalers cartels are likely to exist" (p. 6). Our own interviews established that while several dedicated regional wholesalers may sell and source within a given administrative location and while most sub-location retailer/wholesalers report having bought from multiple suppliers, generally only one dedicated regional wholesaler provides a village trader with credit and on-call supply services. This is an indication of potential non-competitive behavior among regional wholesalers, and precautions such as monitoring staple food commodity prices should be taken when implementing a transfer program.

### **MIFIRA question 1e: Do food insecure households have a preference over the form/mix of aid they receive?**

Compared to Mathare, Makueni respondents are more divided over which form of aid they prefer. Thirty-two percent of respondents preferred cash, followed by 26% preferring food, 22% preferring a mix of transfer types, and 20% preferring vouchers. Among those survey respondents in Makueni who preferred a mix of the three primary forms, 40% indicated that a mix of cash and voucher was most preferred, 10% preferred cash and food, 10% indicated food and vouchers, and 40% indicated all three. Altogether, 90% of survey respondents wanting a mix identified cash as one of the preferred aid forms.

As in the Mathare analysis, we use a multinomial logit to analyze households' preferences. Table 9 presents the estimated odds ratios from these regressions. Makueni and Mathare surveys differed slightly to capture different livelihood strategies across the two sites. For this reason, the multinomial logistic regression specifications are slightly different for the two sites.

While surveyed Mathare households generally preferred the flexibility of cash or a mix of aid types, we see a different pattern than in Makueni. Households with prior experience with food vouchers strongly prefer cash, vouchers, or a mix to food aid alone. Among these choices, they have the strongest preference for vouchers. However, in a marked difference from the Mathare sample, female respondents strongly preferred food aid to cash or vouchers or a mix.<sup>15</sup> In addition, households reporting a member with limited physical access to markets strongly preferred food aid to either cash or vouchers.

**Table 9: Multinomial logit odds ratio estimates of household aid type preference**

Independent variables	Preference: cash over food aid	Preference: Vouchers over food aid	Preference: Mix over food aid
Household prior recipient of food aid	1.36	2.50	8.59
Household prior recipient of vouchers	29.31*	87.19**	43.27*
Credit	11.46	70.83**	8.81
Age of household head	0.96	0.97	1.00
Female respondent	0.003**	0.030**	0.02*
Per capita household income (daily)	0.85	0.80	1.00
Per capita household income <sup>2</sup>	1.00	1.00	1.00
Farming primary source of hh income	0.16	0.05*	0.64
Access limit	0.02**	0.01**	1.10
Household size	1.09	1.06	1.39
n=50			
LR chi2(30) = 44.33			
Prob > chi2 = 0.04			

In summary, our analysis finds that Makueni vendors could likely meet the increased demand for staple foods that would result from a doubling of the CRS voucher program but some evidence of potential non-competitive behavior among regional wholesalers suggests that precautions should be taken when implementing a transfer program. Analysis of the aid preferences of surveyed respondents suggests that some households may face special difficulty meeting their needs with cash or voucher-based programs. In particular, female headed households and households with a physical limit to market access report a preference for food aid.

## 5. Conclusion

While the urban slum of Mathare and rural Makueni differ markedly, MIFIRA analyses for each area yield similar conclusions: that cash and/or vouchers are appropriate responses for much of the population. However, we find differences among sites' local marketshed capacity to absorb increased demand volumes from cash or voucher interventions and in households' preferences for cash or vouchers over food.

Urban markets in Mathare can respond easily to a much larger injection of cash or vouchers than can the rural areas of Makueni. There is some cause for concern regarding dedicated

<sup>15</sup> We do not estimate an interaction term for gender of household head and gender of respondent for the Makueni sample because when only eleven female household head respondents are further subdivided by prior experience with forms of aid, the multinomial results are highly unstable.

wholesalers' potential collusion in both locations, indicating the value of monitoring prices and operations for non-competitive trader behavior prior to and during any program intervention.

Household survey respondents in both sites favor a market-based approach to food assistance. Both cash and vouchers were preferred over food by a majority of survey respondents, especially in the urban slum location. In the Kenyan contexts studied here, given the ability of traders to handle an increase in demand and the preference of most food insecure households for either cash or vouchers, it seems aid can be safely disbursed in the form of cash and/or vouchers to most recipient households. The optimal distribution could range from only vouchers to only cash or a mix of both. Researchers and practitioners have long noted that cash transfers and value-based vouchers may be used for non-food purchases (Harvey 2007; Barrett 2002). MIFIRA can also be used to identify possible market impacts of transfers spent on non-food items, based on beneficiaries; anticipated use of the transfers. For example, analysts can elicit the MPC for medicines or fuel and estimate the likely effect.

However, physical access constraints to markets and gender have different implications for preferences by site. In Mathare, female respondents preferred a mix of aid types to food alone but female respondents who were also heads of households strongly preferred vouchers to food aid. In contrast, female respondents in Makueni had a strong preference for food over all other types of aid. Similarly, while Mathare households reporting a member with a physical limit to accessing markets preferred cash or a mix to food aid alone, Makueni households reporting a member with an access limit strongly preferred food aid to either cash or vouchers.

The choice among aid types will be decided by the preferences of recipients, program implementers, and the donor organization. For Mathare and Makueni, we conclude that neither cash nor vouchers are likely to create market distortions given the likely size of the interventions. Nonetheless, there are distinct populations that seem to prefer in-kind food transfers over cash or vouchers, notably women and those with limited physical market access in rural Makueni.

Context matters when undertaking a response analysis. In regions such as Makueni, whose populations face periodic droughts, and in urban slums such as Mathare, whose populations face chronic food insecurity, harmonizing approaches across food security organizations could minimize adverse effects on recipients, local consumers, producers and traders. For example, during the 2008 drought, several aid agencies were active in Makueni. Both World Vision and the Kenya Red Cross distributed relief food during the prolonged drought to assist families in need while CRS distributed vouchers for work. The Kenyan Food Security Steering Group (KFSSG) is well placed to ensure that responses across agencies are complementary. An important step in that coordination process is food security organizations' increasing adoption of response analysis techniques that can provide insight into what approaches are most appropriate for the local context.

Response analyses such as MIFIRA are increasingly important tools that can both identify context-specific responses and support cross-institutional coordination of responses. Two

challenges for the implementation of response analysis in general, and MIFIRA specifically, are lack of existing institutional capacity and lack of donor flexibility. The MIFIRA framework is designed to be implemented by NGO staff but requires that staff is trained in its component methods and interpretation. It is also plausible that an institution like the KFSSG could use MIFIRA to make procurement and distribution recommendations at a regional or national scale. However, not all countries have coordination mechanisms such as KFSSG and broader donor, recipient country and institutional issues may hamper the adoption of response analysis. While MIFIRA and other response analysis methods are important tools to guide decision-making on transfer magnitude and type and the anticipated market effects of local and regional procurement, their dissemination must be combined with broader structural changes in the policy and management of food aid.

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