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## THE FORGOTTEN POPULATION? YOUTH, FOOD IN SECURITY, AND RISING PRICES: IMPLICATIONS FOR THE GLOBAL FOOD CRISIS

**Craig Hadley,**

Department of Anthropology, Emory University

**Tefera Belachew,**

Department of Population and Family Health, Jimma University, Ethiopia

**David Lindstrom,** and

Department of Sociology and Population Studies and Training Center, Brown University

**Fasil Tessema**

Department of Epidemiology and Biostatistics, Jimma University, Ethiopia

### Abstract

The global food crisis has led to increased interest in food insecurity and its causes and consequences. Much of the focus however has been on mothers and young children, with little attention paid to the possible impacts on the large population of youth in developing countries. The objectives of this paper are to (1) draw attention to the food insecurity experience of a forgotten population, youth; (2) test whether the prevalence of food insecurity among Ethiopian adolescents is increasing with the rising cost of foods; and (3) to identify some individual, household, temporal, and spatial predictors of vulnerability. Data are drawn from a baseline survey in 2006 and a follow-up survey round conducted in 2007 of an ongoing population-based longitudinal study of approximately 2,100 youth living in southwestern Ethiopia. Results show high levels of food insecurity among youth, a marked increase in the experience of food insecurity among youth, and a bias in vulnerability toward youth in the poorest households and in rural households. During the intersurvey period boys were also more likely than girls to become food insecure. This latter finding effectively eliminates the gender bias in food insecurity observed in the baseline survey. Youth who became food insecure between survey rounds were also more likely to report worse health in 2007 than in 2006. Collectively our results suggest that youth are not being adequately buffered from food insecurity, and that generalizations about the current food crisis may be too broad and, thus, misrepresent vulnerable groups. Future research should focus on how to best protect vulnerable youth from the experience of food insecurity and its consequences.

### Keywords

livelihoods; food security; youth; social support; covariant risk

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The recent and rapid rise in global food prices has led to a increased interest in food insecurity (Benson et al. 2008). Much of the focus has been centered on the vulnerability of mothers and young children, with little attention paid to the possible impacts on the large population of youth in developing countries. Yet, like mothers and children, youth are also likely to experience the poor physical and mental health outcomes, poorer quality diets, worse self-reported health, and lower levels of school attendance that have been attributed to food insecurity. Youth might be at additional risk because food insecurity may also negatively impact on outcomes such as schooling and reproductive health; indeed, evidence

is emerging that females in food insecure households are more likely to engage in risky sexual behavior (Weiser et al. 2007). For these reasons, food insecurity is a critical variable to measure and mitigate for youth, who are experiencing a range of social, biological, and mental transitions as they shift into adult roles. Food insecurity is however typically measured at the household level and as a result understanding how food insecurity affects youth is often obscured by the absence of direct measures of food insecurity at the individual level. From a demographic perspective understanding how food insecurity impacts youth is increasingly important as youth represent an increasing proportion of the population in many developing countries, including sub-Saharan Africa (UN Population Fund 2006). Understanding the impact of food insecurity on African youth is also increasingly important from an economic perspective. In the past few years predictions, based on economic trends at the regional and national levels, have suggested broad improvements (mainly in Asia) in food security. In contrast, the predictions for many countries within sub-Saharan Africa were for minimal reductions or even worsening of the food insecurity situation (Benson et al. 2008; Runge et al. 2003). These predictions were based generally on forecasts of economic growth and continuing declines in real food prices. In marked contrast to many other countries, Ethiopia has been experiencing a steady increase in food prices since 2004, culminating in the 2007–08 food crisis spike. Both compared to world markets (Ulimwengu et al. 2009) and to neighboring countries (Honda et al. 2008); the available data lead Ulimwengu and colleagues (2009) to conclude that, “it is obvious that since August 2004 the Ethiopia food price index has been consistently higher than the world index.” (See Heady and Fan 2008 for further evidence of the extraordinary food inflation in Ethiopia.) The aim of this chapter is to examine if youth are being impacted by food insecurity, what factors protect them from food insecurity, what factors increase their risk, and the extent to which these factors are consistent over time.

Examining Ethiopia youth during a period of rapid price increases has clear implications for the global food crisis that occurred in 2007–08, and for future food crises. In 2007–08, food prices were increasing at a rapid pace, a trend that stands in stark contrast to the historical decline in food prices, but one that matches what has been occurring in Ethiopia since 2004. Upward pressure on food prices is projected to be felt most acutely by those populations already living at the margins of food security. Ethiopia is one such country with a large proportion of the population living at the margins with approximately 44 percent of its now 80 million people living below the World Bank’s poverty line and approximately 40 percent of children under 5 nutritionally stunted. FAO food balance sheets are also suggestive: mean per capita caloric income is estimated at around 2,000 kcal. Although the relative impacts are contested, the global food crisis has its roots in the use of grains for nonfuel purposes, poor harvests, and natural disasters in 2005–06, rising demand for grain-fed meat, and increasing costs of fertilizer. In a prescient analysis, Ford Runge and colleagues (2003) asked what would happen to the prevalence of hunger (a severe state of food insecurity) in sub-Saharan African if the price of staple foods increased such that individuals were able to purchase 10 percent fewer calories, a shift that would be associated with a 20 percent increase in food prices. Under this scenario the total number of food insecure people was projected to increase by 120 million. Few studies have assessed the extent to which rising food prices co-occur with rising levels of food insecurity, and fewer still have examined the impact on adolescents, a large but understudied segment of many developing country populations.

Others studies have suggested that food prices may not have the assumed negative impact on food insecurity. Aksoy and Isik-Dikmelik (2008) argue that low food prices might actually not be pro-poor because a majority of households in developing countries are “marginal” net food buyers. That is, they spend only a fraction of their income on food purchases and therefore would not be adversely affected by rising food prices. Net food buyers also have

higher incomes, on average, than net food sellers in the countries that they studied. Higher food prices, they continue, essentially transfer income from the higher income food buyers to poorer net food sellers. The extent to which high food prices cause food insecurity will depend on the proportion of the population that allocates a large fraction of their income on food purchases. In the empirical section of the Aksoy and Isik-Dikmelik paper they note that Ethiopia sits precariously among a subset of countries with a high proportion of vulnerable households or households that spend a significant share of their income on food purchases. For this reason, it is expected that in the Ethiopian case high food prices will have a negative impact on poor households.

The above analyses and arguments are broadly similar to those made in the media and policy-oriented outlets (e.g., Collier 2008:70) as well as discussed by individuals living the study area (see below) suggesting that rural farmers are profiting from the rising food prices. The basic argument is that rural farmers may benefit from selling their crops at higher prices, while urban households will suffer because they are forced to purchase foods at a higher cost. This line of argument is, again, based on the assumption that rural farmers are net food sellers, which may or may not be the case. If true, then the food crisis based on rapid rises in food costs will potentially lead to a reversal in food insecurity trends: urban households may be more likely than rural households to be food insecure. This trend has been noted in the popular media: for instance, one paper quotes a rural cooperative farming president in Ethiopia as saying, “Think of all the poor people in the towns, at least you can feed your family, even if only with some toasted barley. In the cities, there are people that only eat once every two days” (Benequista 2008). The hypothesis that rural farmers are benefiting or at least not feeling the full negative impacts has not yet been tested.

In the face of economic crisis, individuals will enact various coping strategies that may mitigate negative impacts. In the livelihoods literature (Corbett 1988; Devereux 2001) and the anthropological literature (Dirks 1980) scholars have noted that households may rely on their social capital to buffer individual members when the household experiences a shock. By drawing on the resources of other households during difficult times, individuals might not experience food insecurity, or may experience it to a lesser degree. These “horizontal” redistributive networks are hypothesized to be particularly effective when households experience asynchronous shocks. Networks are also likely to be effective when households are linked with other wealthy households that have surplus resources to share out (Hadley et al. 2007). The efficacy of redistributive networks has been hypothesized to be vulnerable to community-wide shocks; this is referred to as covariate risk. When all members of a community, and hence within a network, experience a shock and no one has surplus resources, then being a member of redistributive networks may not protect households from food insecurity (see, e.g., Adams 1993; Sukkary-Stolba 1989; Devereux 2001). Thus, the global food crisis in addition to increasing the prevalence of food insecurity and shifting sites of vulnerability may also render redistributive networks ineffective. We assess this issue in our analysis below.

Much of the research on food insecurity has focused on mothers and children so little is known about the impact of the crisis on youth. It is possible that households are experiencing heightened levels of food insecurity because of rising food costs but that adolescents may not show evidence of increased food insecurity. This would be the case if adult household members protected or buffered younger household members during periods of food insecurity or during economic crises. Buffering may also be preferentially doled out such that only certain members benefit from this protection (Quisumbing 2003). Such intrahousehold biases in food allocation have been widely noted (although see Haddad et al. 1996). Evidence from Ethiopia and elsewhere suggests that it is often the youngest individuals in a household and girls and women who bear the brunt of food insecurity in

households. Consistent with theoretical expectation and the empirical observations, recent popular writings on the global food crisis have also singled out women and children as the most vulnerable to the experience of food insecurity (Benson et al. 2008). Indeed, some evidence from our earlier study in Ethiopia suggests that there is gender bias in the youth experience of food insecurity, but that the bias exists only among the poorest households (Hadley et al. 2008). Theory, the media, and previous results suggest that as the household food security situation deteriorates certain members are buffered potentially at the expense of others.

These various claims about the impact of the global food crisis on food insecurity and the regional and intrahousehold distribution of food insecurity have been difficult to assess, in part because few large-scale surveys include information on food insecurity. Rarer still are surveys that also include an independent assessment of the experiences of food insecurity within households, especially among adolescents. Finally, existing food insecurity assessments are often cross sectional in nature and rely on proxy indicators of food insecurity. Here we use data from a population-representative longitudinal sample of youth in rural, semiurban, and urban settings in Ethiopia to address the following questions:

1. Are adolescents experiencing higher levels of food insecurity because of the rise in food prices?
2. Is the experience of youth food insecurity being felt equally among youth in urban, semiurban, and rural households?
3. Is there any evidence of gender bias in the experience of youth food insecurity?
4. Are redistributive networks equally protective when food prices are rising?
5. Is youth food insecurity associated with poorer health?

## METHODS

### Study Design and Population

Data for this study come from the ongoing Jimma Longitudinal Family Survey of Youth (JLFSY). The JLFSY began in 2006 and is a longitudinal study of adolescents designed to examine the social and economic determinants of adolescent health and well-being. The study population includes urban, semiurban, and rural settings in and around the town of Jimma, Ethiopia. The town of Jimma, three nearby small towns, and the rural areas around each town were purposively selected to represent a range of ecological and development contexts. Stratified random sampling was used in each of the sites to select households for inclusion in the study. The study had a target sample of 2,100 adolescents and used a two-stage sampling plan. At the first stage, households were randomly sampled from within each study site with the sample size in each site determined by the relative proportion of the study population in the site and the overall target sample size. In the second stage, one adolescent boy and one adolescent girl were randomly selected from each household using a Kish table. This sampling plan produced representative samples of households and adolescent boys and girls ages 13 to 17 in Jimma Town, the three outlying towns, and nine rural peasant associations. The study selected 13 to 17 year olds to capture the major transitions into adulthood experienced by youth (e.g., exit from school, start of work, initiation of sexual activity, entry into marriage, and start of child bearing). Approximately 3,700 households were initially screened, which resulted in a sample of 2,106 boys and girls ages 13 to 17 years. Approximately one and one-half years later the same adolescents were reinterviewed using a similar survey instrument that included the food insecurity items from the baseline survey. In the analysis presented here we use data for 2,084 boys and girls for whom there was no missing information on the variables of interest.

The household questionnaire included a household registry that collected sociodemographic information on all current resident and nonresident household members including information on their weekly income. This information was aggregated to produce a household level measure of income. The second stage adolescent interview was conducted by an interviewer of the same sex as the adolescent respondent and was conducted in private at a later date. The adolescent questionnaire focused on issues related to education, health, and youth experiences of food insecurity. The first round household and adolescent interviews were completed in mid 2005–06 and the second round in 2007. All survey data were double entered using SPSS Data Entry templates. All participants provided consent and all study protocols were reviewed by appropriate ethical review boards.

### **Adolescent Food Insecurity Items**

Adolescent insecurity was measured with three items, all of which were adapted from published food insecurity scales used in developing countries (Swindale and Bilinsky 2006). The items were included after much discussion with the interviewing team and pilot testing and reflect what appear to be universal expressions of food insecurity (Swindale and Bilinsky 2006). The items included whether in the three months prior to the interview, the respondent worried about the possibility of a reduction in the food supply, experienced a reduction in the number of meals consumed, or skipped a whole day without eating because of a lack of food or lack of money to buy food. In the analysis presented here, adolescents who responded yes to one or more of the three food insecurity items were considered food insecure.

### **Socioeconomic Status and Capitals**

To predict which youth were most vulnerable to food insecurity, we used in our multivariate analysis the highest education of any member of a household, a measure of household asset ownership, and a measure of the ease with which a household could access a variety of services through informal means. These correspond loosely with human capital, economic capital, and social capital (Yaro 2004). Household asset ownership was measured by a composite index based on ownership of various durable goods and the materials used in the construction of the household's residence. The index was constructed using principal components analysis following a procedure used by the Demographic and Health Surveys. Social capital has been defined by many different scholars, most notably by Bourdieu (1986) and Coleman (1988). Social capital is defined by Bourdieu as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition ... which provides each of its members with the backing of the collectively-owned capital a 'credential' which entitles them to credit" (1986:249). In other words, social capital measures the extent to which an individual can reliably draw on the resources of a network within which he or she is embedded. The social capital construct was measured in the JLFSY survey questionnaire by reading a list of tasks and asking the household head how difficult it would be to get help with each task from someone outside of the household. The questionnaire therefore directly assessed the "credit" an individual had within a large social network by recording expectations of assistance. The tasks included finding someone to watch your children; borrowing a small amount of salt or coffee; getting help with a task like lifting a heavy object or engaging in agricultural work; borrowing 25 kg of flour, maize, teff, or wheat; borrowing money for medicine for a child; and borrowing 10, 50, and 100 Ethiopian birr. Possible responses were very easy, easy, difficult, and very difficult. Reliability analysis on these items revealed a Cronbach's alpha of 0.84, which suggests that the individual items are highly related to one another, and can be summed together to create a single measure of social capital. The measures of capitals were collected at the household level and in the baseline study only.

## Statistical Analysis

In general the analytic strategy was to compare the prevalence and distribution of youth food insecurity in the first round and the second round, assess how food insecurity varied between rural, urban, and semiurban sites, and test for gendered differences in the food insecurity experience. Bivariate tests (e.g., the chi-square test) were used to statistically assess whether the observed differences between rounds were significantly different at the 0.05 level of statistical significance. To assess changes in the relationship between independent variables and year of the survey we estimated statistical interactions between year of survey and gender, household income, highest education in the household, household social capital, and whether the household was in a rural setting. All youth contributed data from 2006 and 2007. To account for the non independence of the youth's observations we used general estimating equations (GEE) models to calculate corrected standard errors (using SAS ver. 9.1).

## RESULTS

Measures of adolescent food insecurity from two survey rounds and household characteristics from the baseline survey were available for 1,874 adolescents, which represent approximately 90 percent of the baseline adolescent sample. Of these, 48 percent ( $n = 895$ ) of these youth were female. At the baseline survey, the mean age of the adolescent sample was 14.8 years. Youth were approximately evenly divided across urban, semiurban, and rural communities. Other characteristics of the study sample have been published elsewhere (Hadley et al. 2008). Household income varied widely across study areas. In the urban setting, mean household income was 171 Birr per week ( $SD = 248$  Birr/week; \$1 = ~9.6 Ethiopian Birr); in the semiurban setting, it was 127 Birr per week ( $SD = 196$  Birr/week), and in rural settings it was 39 Birr per week ( $SD = 51$  Birr/week). Borrowing the consumption loss estimates from Ulimwengu et al. (2009), a 50 percent increase in food prices would result in a consumption loss of 1,089 Ethiopian Birr for rural households; this represents approximately 54 percent of their household budget. For urban households, a 50 percent price increase would lead to a 949 Ethiopian Birr consumption loss, which represents 10 percent of the household budget. These figures can be interpreted as the Birr needed for a household to maintain stable food consumption levels in the face of rising food prices. Clearly, poor households and rural households would be most affected by food price increases. Although household income and the other capitals were measured only in 2006, shortly before the first round adolescent survey, we expect the relative position of households in the distribution of socioeconomic position to have remained relatively stable over the approximately one and one-half year interval between the first and second round adolescent surveys. The mean highest level of education achieved by anyone in the household was 8.4 years ( $SD = 3.6$ ).

### Are Youth Food Insecure and Is the Prevalence Increasing?

Yes. As is clear in Table 1 there was a clear increase in the experience of food insecurity among youth. In the 2006 survey round, about 16 percent of youth reported being worried about having enough food. In the 2007 survey round, when the prices of staple crops had increased (Honda et al. 2008), this proportion rose to 42 percent—a more than twofold increase in the prevalence of worrying about having enough food ( $p < .01$ ). Similar increases were evident in the other two indicators of food insecurity: whereas in 2006, 18 percent of youth said that they had to reduce the amount of food they ate because of shortages of food or money, in the 2007 survey round more than 40 percent of youth reported reducing their food consumption ( $p < .01$ ). The proportion of youth who reported missing an entire day of food also increased by more than 25 percent (from 4.9 percent to 6.2 percent;  $p < .02$ ). The prevalence of youth food insecurity (defined as responding yes to at least one of the food

insecurity items) was 20 percent in 2006 and 48 percent in 2007; a statistically significant increase ( $p < .01$ ).

### **Is There Any Evidence of Gender Bias in the Experience of Food Insecurity?**

A qualified yes. Boys were more likely to become food insecure. In the 2006 survey round, 15 percent of boys and 25 percent of girls were food insecure ( $p < .0001$ ). Between the 2006 and 2007 study rounds, boys were more likely to become food insecure (29 percent of girls became food insecure vs. 38 percent of boys;  $p < .0001$ ). This increase in boys' food insecurity erased the gender difference in food insecurity identified in the 2006 survey round. In 2007, 50 percent of boys and 46 percent of girls were food insecure, a difference that was statistically significant ( $p = .04$ ).

### **Is Food Insecurity Being Felt Equally among Youth in Urban, Semiurban, and Rural Households?**

No. To assess whether youth in different areas were differentially experiencing the increases in food prices we examined the change in the prevalence of adolescent food insecurity across three different levels of urbanization. This analysis revealed a clear gradient of increased youth food insecurity (see Figure 1; see below for discussion of the wealth differences). In 2006, 23 percent of the urban youth responded yes to at least one of the food insecurity questions, as did 20 percent of semiurban youth and 17 percent of rural youth. In 2007, the food insecurity situation was quite different. There was an 8 percent increase in the prevalence of youth food insecurity among urban youth, but a 27 percent increase in the prevalence of youth food insecurity among semiurban youth, and an astounding 46 percent increase among rural youth. Youth in the poorest households experienced the largest increase in the prevalence of food insecurity. The increases were primarily because of a larger number of youth worrying about food and having to reduce their intake of food. There was no significant change across study locales in the percent of people who reported missing a full day of food because they lacked food or money to buy food.

### **Do Predictors of Vulnerability Change Over Time?**

A qualified yes. Next we fit a logistic model to further explore patterns of vulnerability to youth food insecurity. The logistic regression model predicting food insecurity (yes = 1) included covariates for gender, place of residence, baseline household asset score, baseline highest education in the household, baseline household social capital, and interactions with year of survey (results shown in Table 2). The results replicate what we have shown above and extend our understanding of vulnerability. Gender (male=1) and the gender  $\times$  year interaction terms are both significant showing that in 2006, males were less likely to experience food insecurity but that the difference between males and females disappeared by 2007. In 2006, rural and semiurban sites had lower levels of youth food insecurity than did the urban sites, but by 2007, this had reversed so that youth in rural and semiurban areas experienced a significantly greater likelihood of food insecurity than youth in urban areas. Similarly in 2006, high levels of household social capital were associated with a lower likelihood of youth food insecurity. But in 2007, when more households were experiencing food insecurity or at risk of being food insecure, differences in the occurrence of youth food insecurity across levels of social capital were no longer significant. In all years, however, higher levels of household wealth and high levels of education in the household were protective against youth food insecurity. The wealth effect was most pronounced for the poorest groups.

### Do Youth Who Become Food Insecure Also Self-Report Poorer Health?

Yes. Youth health was assessed by self-reports in 2006 and again in 2007. Over 25 percent of youth reported worse health in 2007 than in 2006. Changes in youth health were associated with changes in food insecurity status ( $p = 0.002$ ) in the expected direction. Among those youth who went from being food insecure in 2006 to food secure in 2007, 19.8 percent reported worse health in 2007 than they did in 2006. Among youth who went from being food secure in 2006 to food insecure in 2007, 31 percent reported worse health in 2007. Among youth who were food secure in both study rounds, 23 percent reported poorer health in 2007 than in 2006. Finally, among youth who were food insecure in both rounds, 27 percent reported worse health. The greatest reduction in health status was among those who became insecure and the smallest reduction in health status was among those who became food secure.

## DISCUSSION

Our results suggest the environment of dramatically increasing food costs is negatively impacting youth in Ethiopia, a country known for its enduring food security challenges. Our results also show that youth in the poorest households are most affected, and this is especially true in rural areas. The results also show that boys were more likely to become food insecure between survey rounds. We also show that social capital loses its ability to protect youth from food insecurity during the follow-up survey round but traditional indicators of socioeconomic status that do not rely on the surplus of others remain protective. These empirical results suggest that broad generalizations about the current food crisis might obscure important regional and local level variation. They further suggest that predictors of variability in food insecurity reflect a dynamic interaction between local cultural and economic factors and global economic trends.

A limitation of the study is that the food insecurity scale has not been formally validated. However, there are five reasons to believe the scale is valid. Youth's independent assessment of food insecurity is associated with the household head's independent assessment of household food insecurity (Hadley et al. 2008). Youth living in households with lower socioeconomic status are more likely to be food insecure, consistent with theoretical expectations. Response frequencies decline with increasing severity of the item. Youth who respond yes to food insecurity items were less likely to have consumed high quality diets rich in animal source foods (unpublished data). And, the items are similar in nature to those asked elsewhere in the world and are consistent with ethnographic studies of food insecurity in East Africa (Coates et al. 2006). Still, more study is needed of these items and how they operate in large, longitudinal studies.

The evidence we present here clearly demonstrates that rural and semiurban youth are experiencing the brunt of the burden when food prices rise. This is contrary to the claims found among some urban dwellers and those reported in media outlets that suggest a possible reversal in the rural–urban food insecurity pattern. Additional evidence that rural individuals are more affected by food insecurity comes from qualitative data collected in 2008. We undertook a free listing exercise and asked rural and urban households to list the most powerful barriers to achieving the good life (“*туру hiwot*” in Amharic; “*jireenya gaari*” in afaan Oromo). Rural residents were substantially more likely than urban dwellers to report access to food as a barrier to the good life. Finally, rural dwellers expressed concern over the availability and cost of seeds and fertilizer. These results are all consistent with the suggestion of Aksoy and Isik-Dikmelik (2008) that in areas where many households are poor and net-food purchasers, such as Ethiopia, rural dwellers will suffer (see also Ulimwengu et al. 2009 for further support for this idea).



A second key finding is that boys were more likely than girls to become food insecure, although girls were more likely to be food insecure in the baseline round. This gendered shift in food insecurity meant that at the time of the follow-up survey, adolescent boys and girls were equally likely to report experiencing food insecurity. Others have hinted at gendered shifts in vulnerability to food. For instance, famine scholars have long noted that some evidence seems to suggest that during famines, there is a slight female advantage as indicated by lower odds of death relative to men (Macintyre 2002). Macintyre suggests that if the finding is true (and not due to biases in data collection) then it may be due to biological (e.g., greater proportion of body fat) or sociocultural factors. She hypothesizes that women may have greater knowledge of famine foods or, more likely, that a woman's "common role as cook and food preparer may provide some material advantage for them" (Macintyre 2002:250). In the 2006 survey round, girls living in food insecure households were more likely to be food insecure (Hadley et al. 2008). One hypothesis to explain the relatively greater rise in male food insecurity is that girls in poor households experience food insecurity up to a point, and then, rather than experiencing increasing deprivation as the household suffers, other members who had been buffered then become food insecure. We call this the staggered deprivation hypothesis, which to our knowledge has not been formally tested in other settings. It is possible that economically rational households attempt to manage the stress that individual household members experience, rather than allow one member to experience increasing deprivation that would lead to higher costs in terms of lost productivity and health care expenditures. An additional explanation builds on an earlier suggestion we made based on the ethnographic work of Mains (Mains 2007). Mains' work and others suggest that young men had differential access to alternative food and monetary sources. We hypothesized that this allowed young males to achieve a higher level of food security. In the face of the current food crisis, when many people are struggling, access to these alternative food and cash resources may be substantially curtailed. As one informant mentioned, "there are no more invitations in Ethiopia," indicating that people were less often inviting each other to their homes, or to restaurants (personal communication, Daniel Mains, August 2008). If this were the case, then it would effectively eliminate the pathway through which young males achieved food security in the earlier survey round.

The results of the regression model offer some support here: social capital, while protective of youth food insecurity in 2006 was no longer protective in 2007, and certainly not in mid-2008. Although the household measure of social capital does not directly capture adolescent male's networks, it does suggest that in general the efficacy of social networks has been reduced during the current inflationary period in food prices. Importantly, the other measures of capital and socioeconomic position that are not network based were significant in both years. This suggests that when the entire population suffers a shock, what has been referred to as covariant risk (Devereux 2001), redistributive networks lose their efficacy and social ecologies are reconfigured.

The results for gender and social capital hint at a broader theoretical implication of our study: Patterns of vulnerability are not static. Or, to borrow from Watts and Bohle (1993), in our study the spaces of vulnerability have been reconfigured, and we suspect are continuing to be reconfigured as prices further rise and then fall. Whereas in the baseline round important risk factors appeared to be low material capital, low social capital, and female gender; in the follow-up round gender and social capital were no longer predictive of youth food insecurity. And, rural dwellers who were not at elevated risk in the baseline, were now at heightened risk of food insecurity. Importantly, our study attempts to link these local level factors to larger global processes, and suggests that spaces of vulnerability are patterned by local level gender norms, norms of sharing and reciprocity, and place, and that these in turn are impacted by what is happening at the global level. In this way our study attempts to fill a gap in biocultural anthropology: the link between the global and local (Leatherman 2005).

In terms of direct application, our results suggest that relatively simple to administer instruments may be useful for assessing the impact of economic shocks, including the impact of such events on youth. In this sense, our results are comparable to other work that has used experience-based measures to assess the impact of economic crises on food insecurity. For instance, Studdert et al. (2001) used a modified version of the Radimer-Cornell scale to show that food insecurity was highly prevalent during the Indonesian economic crisis, which was a time that also saw a rapid and dramatic rise in the price of staple foods. Piaseu and Mitchell (2004) also report high levels of food insecurity among poor urban Thai households during the 1997 economic crisis. Our study differs from these earlier studies in two key ways. First, these studies measured the food insecurity of individuals in the household by asking an adult head of household, whereas the present study explicitly asked youth about food insecurity. It is especially important to assess youth food insecurity through experience-based measures because there are no established anthropometric norms for adolescents in developing countries. Also, collecting dietary data on youths may be difficult through the household head because youth may take meals outside of the house without the household head's knowledge. For younger children dietary recalls using the household head may be appropriate because young children and infants are unlikely to obtain a substantial amount of food on their own. Second, the two other studies that have sought to assess the food insecurity consequences of economic crises have been cross-sectional; the high prevalence of food insecurity identified in these studies is assumed to represent a marked increase over precrisis levels. The JLFSY results reported here compare levels of food insecurity among the same individuals at multiple points as food and nonfood prices increase dramatically.

In conclusion, these findings suggest that youth are not adequately buffered from household food insecurity. Lacking data on adult women and young children we cannot say that youth are more or less vulnerable to the food crisis than adults, but our results clearly show that they are vulnerable. Despite this vulnerability, youth seem to be generally forgotten as a vulnerable group. This is unfortunate, as elsewhere we have shown that food insecure youth, especially girls, are more likely to miss school, consume low diversity diets, reported poor health, and lack the energy to carry out everyday activities (Belachew et al. 2008; Hadley et al. 2008). Our results also powerfully demonstrate that patterns of vulnerability are not static and instead reflect a dynamic interplay between the local and the global. That is, predictors of youth food insecurity varied across the study years. This is important because it undermines some of our assumptions about who is vulnerable. Our results, thus, offer a cautionary tale to broad generalities about who is vulnerable to food insecurity during the food crises. Future research would do well to examine pathways through which youth can be targeted. Failure to do so may lead to a large population of youth being negatively impacted during a critical period of their lives as they transition into adult roles.

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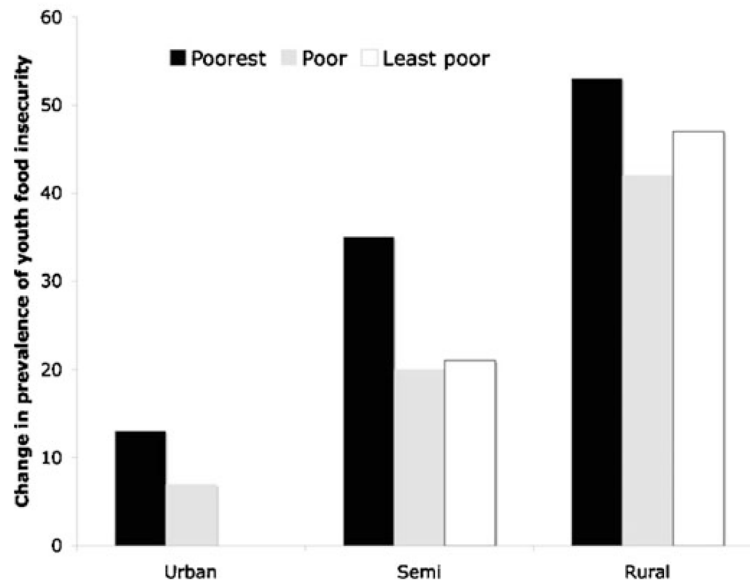
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**FIGURE 1.** Percent increase in the prevalence of youth food insecurity by study locale and relative wealth bracket. Note that there was no change in the prevalence of youth food insecurity among the least poor urban group. In the Y-axis, the change in youth food insecurity occurs between 2006 and 2007.

**TABLE 1**

Proportion of Youth in the JLFSY Reporting Experiencing Each Behavior in the Three Months Prior to the Survey in 2006 and 2007

<b>During the last three months:</b>	<b>2006 (yes,%)</b>	<b>2007 (yes,%)</b>
Were you ever worried that you would run out of food because you did not have food or money to buy food?	17	41
Did you ever reduce the size of your meals because you did not have enough food or money to buy food?	18	40
Did you ever go the whole day without eating because you did not have food or money to buy food?	4.6	6.2

Note: All differences are statistically significant ( $p < 0.05$ ).

**TABLE 2**

Generalized Estimating Equation Estimates of the Probability of Youth Food Insecurity

<b>Variable</b>	<b>Beta</b>	<b>SE</b>	<b>p</b>
Intercept	0.393	0.236	.0957
Social capital (higher = more)	-0.094	0.024	.0001
Year of survey (2007 = 1)	0.329	0.291	.2582
Social capital × Year	0.091	0.030	.0023
Highest education in household	-0.072	0.022	.001
Year × Highest education	-0.042	0.027	.1214
Household wealth index	-0.496	0.091	<.0001
Year × Household wealth index	-0.158	0.115	.17
Gender (Male = 1)	-0.688	0.115	<.0001
Year × Gender	0.766	0.140	<.0001
Semiurban	-0.352	0.151	.0197
Year × Semi urban	0.695	0.178	<.0001
Rural	-1.164	0.213	<.0001
Year × Rural	1.073	0.257	<.0001