

IZA DP No. 6621

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The Experience of Afghan Households**

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June 2012

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Discussion Paper No. 6621  
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## ABSTRACT

### **Conflict, Food Price Shocks, and Food Insecurity: The Experience of Afghan Households<sup>\*</sup>**

Using nationally-representative household survey data and confidential geo-coded data on violence, we examine the linkages between conflict, food insecurity, and food price shocks in Afghanistan. Spatial mappings of the raw data reveal large variations in levels of food insecurity and conflict across the country; surprisingly, food insecurity is not higher in conflict areas. In a multivariate regression framework, we exploit the 2008 spike in wheat flour prices to estimate differential effects on household food security – measured by calorie intake and the real value of food consumed – based on the level of conflict in the province where the household is located. We find robust evidence that households in provinces with higher levels of conflict experience larger declines in food security than households in provinces with lower levels of conflict. Therefore while conflict may not be the driving factor in overall levels of food insecurity in Afghanistan, it may limit the coping mechanisms available to households in the face of rising food prices. Gaining a better understanding of such linkages and knowing the spatial distribution of food insecurity can serve to inform policymakers interested in targeting scarce resources to vulnerable populations, for example, through the placement of strategic grain reserves or targeted food assistance programs.

JEL Classification: D12, I3, O12

Keywords: Afghanistan, food security, conflict, nutrition, poverty, spatial distribution

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<sup>\*</sup> Findings from this analysis provide background information for the World Bank's poverty assessment for Afghanistan, and have informed the Ministry of Economy (MoEc), Government of Afghanistan (GoA). The authors are grateful to GoA Central Statistics Organization for granting access to the NRVA data and United Nations Department of Safety and Security for allowing access to their restricted incidents data. They also gratefully acknowledge financial support from the World Bank's Research Support Budget. The authors wish to thank for comments Amanullah Assil, Byron Ponce-Segura, and Ismail Rahimi. The views expressed here are those of the authors and may not be attributed to ERS-USDA, the World Bank, IZA, or NPC.

## 1. Introduction

Most wars of the late 20<sup>th</sup> century and early 21<sup>st</sup> century are ‘food wars’, meaning that food is used as a weapon, food systems are destroyed in the course of conflict, and food insecurity persists as a legacy of conflict. (Messer and Cohen, 2006)

Since the 2008 global food price crisis, food insecurity has risen to the top of many national and international policy agendas. Given the potential implications for poverty, health, and nutrition, and the outbreak of food riots, the impact of high food prices on food security is of concern to governments and aid organizations alike. These issues are particularly salient in conflict-afflicted countries where food production and distribution networks are strained and where distributing emergency food aid can be a challenge. The broader relationship between food insecurity and conflict is a complicated one. Much of the existing literature (and conventional wisdom) on the relationship between food insecurity and conflict suggests that food insecurity can be a consequence of conflict (i.e., due to the destruction of agricultural resources or the disruption of markets) and also can be a cause of conflict (i.e., through economic and social grievances) (Bora et al., 2010; Messer et al., 2002; Teodosijevic, 2003). In these cases, this harmful cycle can result in chronic food insecurity and, more broadly, can exacerbate poverty.

In this paper, we examine the linkages between food insecurity, conflict, and food price shocks within the context of Afghanistan, using nationally-representative household survey data and confidential geo-coded violence data. After decades of external and internal conflict, along with prolonged droughts, Afghanistan has one of the poorest, least well-nourished populations in the world. According to the 2004 National Nutrition Survey, approximately 60% of children under five suffered from chronic malnutrition (stunting) and 8% suffered from acute malnutrition (wasting) (Johnecheck and Holland, 2007). According to the 2007/08 National Risk and Vulnerability Assessment, nearly 30% of the Afghan population do not meet minimum daily food requirements (2,100 kilocalories per person) (Islamic Republic of Afghanistan, 2010).

In 2008, due to a confluence of domestic (drought), regional (export bans), and international (food price crisis) factors, the price of wheat flour (the dietary staple) doubled. Such an economic shock could have serious implications for households in Afghanistan, many of whom are impoverished

and live in conflict-afflicted areas. We estimate the differential effects of wheat flour price increases on household food security – as measured by calorie intake and the real value of food consumed – based on the level of conflict in the province where the household is located. That is, we test whether being located in a province with higher levels of conflict is associated with more or less pronounced price effects. This approach brings a new dimension to the study of food price effects, as there is little empirical research from conflict countries on such topics. This work builds on D’Souza and Jolliffe (2012), who find that increases in wheat flour prices lead to declines in household food security, but who do not consider any dimensions of conflict in their analysis.

As a first step in our empirical analysis, we map the geo-spatial distribution of food insecurity and conflict across provinces for the entire survey year to understand the bivariate correlation between these core variables. Our analysis reveals that levels of food insecurity and conflict vary greatly across the country, which is not surprising given Afghanistan’s diverse terrain, climate, and agricultural zones. What is surprising, and in some contrast to the portrayal of the relationship in the existing literature, is that the prevalence of food insecurity is not higher in conflict areas. In fact, households located in the insecure provinces of the south have relatively lower levels of food insecurity, while households in the north and northeast suffer from very high levels of food insecurity. For example, in Balkh and Badakhshan, two provinces in the north, over 50% of households do not meet the minimum daily requirements of 2,100 kilocalories per person. In contrast, in both Kandahar and Helmand, southern provinces suffering from significantly more conflict, less than 25% of households fall below this threshold. Thus from this simple mapping, conflict does not appear to be the major driver of household food insecurity.

The results of our multivariate model, however, suggest that the relationship between conflict and food insecurity may be more complex. When estimating the impact of wheat flour price increases, we find robust evidence that households in provinces with higher levels of conflict experience larger declines in food security than households in provinces with lower levels of conflict, holding all other factors constant. Therefore while conflict may not be the driving determinant in overall levels of food insecurity, it may limit the coping mechanisms that households can employ in the face of food price increases.

This article is the first to incorporate conflict into an examination of the impact of food price shocks on food security. It provides evidence that conflict may exacerbate the impact of economic shocks (such as food price spikes) on already vulnerable populations. Further, it is the first to map the spatial distributions of food insecurity and conflict in Afghanistan. Knowing the geographic distribution of food insecurity can aid in targeting resources to vulnerable populations, for example, through the placement of strategic grain reserves or the improved targeting of safety net programs. Such interventions are of particular importance during periods of high food prices.

The rest of the article is as follows. The next section describes the data and section 3 presents the empirical model. Section 4 presents descriptive statistics and maps of food insecurity and conflict. Section 5 presents and discusses the regression results. And section 6 concludes.

## **2. Data**

We combine data from two primary sources: household and price data from the National Risk and Vulnerability Assessment (NRVA) 2007/08 and confidential geo-coded data on violent incidents from the United Nations Department of Safety and Security.

The NRVA 2007/08 was conducted by the Afghanistan Central Statistics Organization and the Ministry of Rural Rehabilitation and Development between August 2007 and September 2008. The frame used for drawing the sample was the 2003-05 national household listing – a listing of every house in the country; the sample was selected following a stratified, multi-stage design. The survey covered 20,576 households (about 150,000 individuals) in 2,572 communities. The effective sample size for our analysis is 20,483 households in 394 districts in all 34 provinces.<sup>1</sup>

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<sup>1</sup> Thirty-two households were dropped due to missing female questionnaires, which include the consumption data. All of these households are located in four communities, suggesting systematic errors in field operations. Fifty-two households were dropped due to missing consumption data and seven households were dropped due to missing asset data. One household is missing data on household size and is dropped because per capita measures of consumption and food security cannot be calculated.

The NRVA 2007/08 survey was stratified implicitly over time, which ensures that the samples for each quarter reflect the overall composition of the country.<sup>2</sup> This aspect of the design means that each quarter can be viewed as a representative sample, allowing us to measure seasonal variation in food security. This feature also allows us to exploit the temporal price variation, giving us additional power to measure how prices affect food security outcomes.

Another key feature of the survey is the year-long fieldwork, which allowed coverage of conflict areas. Enumerators informally secured permission from local leaders in conflict areas and when a primary sampling unit was considered too insecure to interview at the scheduled time, it would be re-considered at a later date within the quarter, instead of replaced immediately. This flexible design helped to ensure a low replacement rate. It is often difficult to obtain reliable data from conflict areas; thus the current analysis is able to provide a rare perspective on the relationship between food insecurity and conflict.

The survey includes detailed consumption information, which allows us to calculate several measures of food insecurity at the household level. The survey asks respondents about the amount and frequency of consumption of 91 food items from nine food groups over the previous week. The NRVA's broad coverage of foods, including seasonal varieties, allows more precise estimation of food consumption and calories than is possible in surveys with fewer items.

Finally the NRVA included a district market price survey; local market prices on food items in the consumption module, along with the prices of domestic and imported grains and fuel, were collected during visits to the primary sampling unit area.

The geo-coded conflict data cover the survey timeframe from August 2007 to September 2008. The department collects information on fatalities and injuries, as well as violent incidents more generally. According to the official U.N. definition, violent incidents include the following: abduction; air strike; armed clash; arrest; assassination; finding a weapons cache; confrontation/dispute; crime;

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<sup>2</sup> Implicit stratification means that the frame was sorted both spatially and temporally to ensure that (with a systemic interval selection) the selected sample would be seasonally representative. See Kish (1965, p.235-6) for a discussion of implicit stratification.

demonstration; IED detonation; IED discovered; information; intimidation; mine/UXO incident; narcotic incident; stand-off attack; suicide attack; and other.

### *2.1 Measures of food security*

We calculate two core indicators of food security for each household (incorporating population weights): per capita daily calorie intake and per capita monthly food consumption. These indicators relate to the access to food, a key pillar of food security (Food and Agriculture Organization, 2006). We use these indicators as dependent variables in the regression analysis.

Daily per capita calorie intake is calculated by dividing weekly total household calories by seven days and by the effective household size. The effective number of household members accounts for guests eating meals within the home, as well as household members eating meals outside the home. Food quantities were converted to kilocalories using the FAO Food Composition Tables for the Near East.<sup>3</sup>

The real value of food consumption (in Afghani) is calculated by combining quantity data from the consumption module with price data from a district price survey. Food consumption data include food bought, produced or obtained through other methods, e.g., food aid, gifts. Weekly values were multiplied by 4.2 to get monthly values. Prices were matched by month, item, and district. Since not all food items were available in all district markets at all times of the year, we imputed the missing elements to obtain a complete price matrix.<sup>4</sup> We calculated average prices for domestic and imported varieties separately to account for differences in price and quality between domestic and imported wheat and rice.<sup>5</sup> The value of expenditure on food away from home (approximately 2% of household food expenditure) is included in the calculation of food consumption, but not included in the calculation of calorie intake since quantity data on such food were not collected.

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<sup>3</sup> Spices and 'other' foods do not contribute to total calories. USDA sources were used for a few items that were not available in the FAO tables. For details, see: <http://www.fao.org/docrep/003/x6879e/x6879e00.HTM>

<sup>4</sup> The imputation process filled in missing values using the first-feasible methodology according to the following order: 1) median of the 20 nearest neighboring districts of that month; 2) province median of that month; 3) national median of that month; 4) median price of 20 neighboring districts of the quarter; 5) province median of that quarter; and 6) national median of that quarter.

<sup>5</sup> The survey includes questions on the percentages of imported wheat and rice consumed; these percentages are used to calculate total expenditure for these items.

We adjust the consumption estimates to take into account spatial and temporal variation in prices in order to identify correctly those households that fall below the food poverty threshold and, in the regression analysis, to estimate the impact of the price increases on real values. We use a Laspeyres price index estimated by quarter for each region.<sup>6</sup> Real food consumption is relative to the chosen base: urban areas in the Central region in quarter 1; the capital, Kabul, is located in the Central region.

## 2.2 Measures of conflict

As measures of conflict, we use (i) the total number of individuals killed or injured (denoted as fatalities/injuries), and (ii) the total number of violent incidents. Each measure is calculated for each province in each survey quarter. We adjust the measures by total population or total land area in order to capture the intensity of conflict within each province; this adjustment provides per capita and per square kilometer terms, respectively.

## 3. Empirical Model

The objective of our empirical analysis is to isolate potential differential price effects (on household food security) caused by conflict. To achieve this objective, we construct a simple reduced-form OLS model that controls for household and district characteristics, as well as co-movements in other commodity prices. The model includes a base effect of the wheat flour prices increases and an interaction term that allows the total effect of the wheat flour prices to vary based on the level of conflict in a province. The specification is as follows:

$$\log(fs_h) = \beta_0 + \beta_1 \log(\text{price wheat flour}_{apq}) + \beta_2 \log(\text{price wheat flour}_{apq} \times \text{conflict}_{pq}) + \theta \log(\text{prices}_{apq}) + \alpha HH_h + \delta DIST_{dq} + \varepsilon_h$$

where  $h$  denotes household,  $a$  denotes area (urban or rural),  $d$  denotes district,  $p$  denotes province, and  $q$  denotes quarter.  $fs$  is one of the two measures of household food security described above.

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<sup>6</sup> The food price index is based on a reference bundle of goods consumed by relatively poor households; the reference bundle was constructed to reflect regional diversity in consumption patterns. There are eight regions in Afghanistan.

*Price wheat flour* is the price of domestic wheat flour.<sup>7</sup> *Conflict* is one of the measures described above. *Prices* represents a vector of commodity prices, *HH* represents a vector of household characteristics, *DIST* represents a vector of district-level variables, and  $\boldsymbol{\varepsilon}$  is an idiosyncratic error term (estimated with a standard Huber-White sandwich estimator). The coefficient of interest,  $\beta_2$ , represents the additional price effect (in addition to  $\beta_1$ ) due to conflict in the household's province.

We control for contemporaneous price increases in other important commodities since household purchasing decisions are based on relative prices. The price vector includes the prices of milk, lamb, rice, and vegetable oil – key foods that represent a large portion of household food expenditure – and kerosene, a commonly used cooking fuel.<sup>8</sup> We include the following household characteristics: log values of durable assets, housing and livestock; age of household head; a dummy for households in which heads are literate; and a dummy for households in which heads are married. We also include dummies, at the district level, for rural locations and for topography (plateau and mountainous areas, with plains excluded).

The asset values (in Afghani) are intended to control for wealth effects and are assumed to be quasi-fixed in the short run. The value of durable goods is estimated based on a detailed inventory of household assets; it accounts for depreciation and the opportunity cost of the funds tied up in the good. For housing, we estimate a hedonic model for housing based on characteristics of the structure, as well as the location, and derive an imputed rental value from this.<sup>9</sup>

#### **4. Food insecurity and conflict across Afghanistan**

In this section we present basic descriptive statistics and a series of maps that depict levels of food insecurity and conflict by province for the entire survey year. A surprising finding in this section is that provinces with higher levels of conflict have much lower levels of food insecurity. Additionally,

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<sup>7</sup> The results are robust to using the price of imported wheat flour instead of the price of domestic wheat flour.

<sup>8</sup> More specifically, the relatively poor (20<sup>th</sup> to 50<sup>th</sup> quantile of the total consumption distribution) spend eighty percent of their food expenditure on these five food items (including wheat flour).

<sup>9</sup> The log value of durable goods is a self-assessed valuation based on a list of 13 assets including items such as stoves, refrigerators, radios, sewing machines, and bicycles. The estimated housing value is the log of imputed, monthly rental value based on a hedonic model of the housing structure. For details of the estimation, see Islamic Republic of Afghanistan, Central Statistics Organization (CSO), World Bank Economic Policy and Poverty Sector, 2011a. Setting the Official Poverty Line for Afghanistan, Kabul.

the raw data reveal that many Afghan households live in a state of food insecurity, and that household access to food declined between 2007 and 2008.

We calculate the percentage of households that fall below conventional or policy-relevant thresholds for each food security measure. Specifically, for each province, we calculate the percentage of households that fail to meet the standard threshold of 2,100 kilocalories per person per day. We denote these households as *calorie-deficient*. And we define those households that are unable to meet the costs of the minimum basic food requirements of 2,100 kilocalories per day per person as *food poor*. Food poverty is a core component of poverty indicators (Islamic Republic of Afghanistan et al., 2011a; Islamic Republic of Afghanistan et al., 2011b). If the real per capita value of monthly food consumption is below the food poverty line, then all individuals in the household are considered to be food poor.

To establish the food poverty line we follow the guidelines set forth by the Islamic Republic of Afghanistan and the World Bank (2010). This threshold represents the minimum cost of obtaining 2,100 calories based on the consumption patterns of the “relatively poor”. The relatively poor are defined for each region as those individuals whose consumption level is between the 20th and 50th percentiles of real per capita total consumption in each region. The regional subsamples were aggregated to create a national typical food bundle for the relatively poor. The inclusion of households from each region in the construction of the reference food bundle ensures that the bundle reflects the regional diversity in consumption patterns. And aggregating the subsamples together into one bundle ensures that minimum food quantities and types are the same for everyone in the country. Therefore the food bundle reflects regional variation, but also anchors the definition of minimum needs to be the same for everyone. If the reference bundle varied across regions, it would be more difficult to assert that the utility derived from the bundle is constant. For example, if there were two reference bundles, and one had more meat than the other one, it would be reasonable to think that the more meat intensive bundle reflected a higher level of quality or higher utility. The estimated cost of this scaled food bundle is 687 Afghani per capita, per month when priced in terms of quarter 1, Central region urban prices. In real terms, the cost of the food poverty line is the same for everyone. In nominal terms, it differs across regions and over quarters. Households whose real monthly per capita food consumption is below 687 Afghani are designated as food poor.

Table 1 displays the measures of food security and insecurity over the four quarters of the NRVA survey. The nominal value of food consumption is basically flat over the year. But once we account for the surge in food prices (deflating by a Laspeyres price index), we observe a large decline (over 30%) in the real value of food consumption. Calorie intake also declines over the year. And the percentages of calorie-deficient and food poor households increase. By the fourth quarter, over thirty-five percent of Afghan households were unable to achieve 2,100 kilocalories per person per day and over forty percent were unable to meet the costs of the minimum basic food requirements described above.

Based on Consumer Price Index data provided by the Government of Afghanistan, during the survey timeframe nonfood prices increased by approximately 10%; whereas food prices increased by approximately 40% (Islamic Republic of Afghanistan, 2010). The price of wheat flour, in particular, more than doubled (table 2). (Table A1 displays summary statistics for all other control variables included in the regression, by quarter.)

During the survey timeframe, quarters one (fall 2007) and four (summer 2008) were the most violent (table 3); but these numbers mask a lot of variation across provinces, with the southwest provinces (e.g., Kandahar and Helmand) standing out as the most violent. To appreciate the spatial dimensions of conflict, we map, by province, fatalities / injuries per capita and violent incidents per capita in figures 1 and 2, respectively. The pictures support government reports and media coverage on the country's most insecure areas. While there was violence reported in the vast majority of provinces during the survey timeframe, the level of conflict and violence was higher in the southern provinces of Helmand and Kandahar and in their neighboring provinces of Uruzgan, Zabul, Ghazni and Paktika than in other regions.

Both calorie deficiency and food poverty vary across the country (see figures 3 and 4). Most of the worst off provinces in terms of calorie deficiency are concentrated in the east and the northeast, with the exceptions of Nimroz and Badghis provinces. In seven provinces, over half of the households are calorie-deficient. Furthermore, most northeast and central provinces have high rates of food poverty. Badakhshan and Laghman are the worst off provinces, with calorie deficiency and food poverty rates of over 60%.

Therefore this evidence suggests that, at least in the case of Afghanistan, conflict does not seem to be the predominant driver of food insecurity. This fact may be surprising to some donors and scholars who presume that households in conflict areas are more food insecure than those in non-conflict areas or that conflict is a driving factor in food insecurity. For example, Maplecroft, a risk management firm, states, "Conflict is also a major driver of food insecurity[.] and the ongoing violence in Afghanistan and DR Congo is largely responsible for the precarious food security situation in both countries," (Maplecroft, 2010). The patterns in Afghanistan also seems to stand in contrast to research that emphasizes the negative impact of conflict on food insecurity, for example, causing losses in the agricultural productivity levels and growth (Teodosijevic, 2003).

Households in the conflict-ridden provinces seem to be relatively better off – in terms of access to food – than households in less conflict-ridden areas. We draw on other data from the NRVA 2007/08 to verify that our measures of food insecurity are reasonable. We map average total monthly per capita consumption (Afghani) for each province (see figure 5). ('Per capita' consumption is calculated by dividing total household consumption by the number of household members. This is in contrast to the 'per capita' conflict measures that are derived by dividing the basic conflict measures by the total provincial population.) This measure is the total sum of expenditures of food and nonfood items (including imputations for the use-value of durable goods and housing) and is the basis for measuring poverty; it is calculated following guidelines in Deaton and Zaidi (2002). For nonfood items, we use a nonfood price index developed by the Central Statistics Organization to deflate the consumption estimates. The index accounts for temporal, but not spatial, differences in prices.

Given the somewhat surprising correlation between conflict and food security, we note that our measures of food security correlate in an expected way with per capita consumption. The poorest households – in terms of total consumption – are located in the east and in the north, while the richest households are mostly located in the south, with the exceptions of Kabul and a few of its nearby provinces. This pattern mirrors the patterns observed for the food security measures. For example, Badakshan, Balk and Lagham are some of the poorest provinces in terms of total per capita consumption and they have the worst outcomes in terms of the food security measures.

## 5. The impact of rising food prices in a conflict country

When we extend the analysis on the relationship between food security and conflict, we find robust evidence that the level of conflict within a province influences the way in which food prices affect household food security. Tables 4 and 5 display the coefficients of interest for several permutations of regressions on calorie intake and the real value of food consumption, respectively. (Appendix tables A2-A3 display the full set of coefficients.) Regardless of the choice of food security or conflict measure, the coefficient of interest,  $\beta_2$ , is negative and statistically different from zero. Holding all other factors constant, households located in a province with a higher number of fatalities/injuries or a higher number of violent incidents experience larger declines in calorie intake and real food consumption than their counterparts in less conflict-ridden provinces.

This result is robust to a range of specifications and sensitivity tests. The base specification is shown in columns (1), (4), (7), and (10); these regressions include the control variables described above. In the adjacent columns, we include additional control variables to address potential biases. First, we include province-level variables that we believe may be correlated with household food security and conflict and for which we have data: the underemployment rate, the Gini coefficient of inequality, and the poverty rate. If not included in the regression models, these province-level factors could bias the coefficient of interest. We use provincial statistics as reported in Islamic Republic of Afghanistan and World Bank (2011b).<sup>10</sup> The coefficients of interest generally become smaller in magnitude, but their significance and signs remain the same. These variables and other control variables largely have the expected signs.

Next, we incorporate an additional interaction term to address the important distinction, in the literature and in the public discourse, between rural and urban areas. Much of the discourse surrounding high global food prices has centered on the vulnerability of urban households, who rarely have access to agricultural land and therefore are unable to turn to own-food production when prices soar (Food and Agriculture Organization, 2008). These households are typically net buyers of

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<sup>10</sup> Underemployment is defined as those who work on average less than 35 hours, per week divided by the total labor force. The exact definition of underemployment would require assessing workers' willingness to work for additional hours. Unfortunately, the survey instruments do not allow us to distinguish between those who are "underemployed" and those who willingly work "part-time". The Gini coefficient is a measure of inequality in the distribution of per capita consumption, and the poverty rate is estimated following the cost-of-basic-needs methodology. For details, see Islamic Republic of Afghanistan and World Bank (2011a).

food (who depend on the market to meet their food needs); households who produce enough food to consume as well as to sell on the market are net sellers of food.

If conflict levels are associated with rural or urban areas, then our coefficient of interest may suffer from omitted variable bias. Therefore we include an additional interaction between the log of wheat flour price and the rural dummy. (Recall that the rural dummy is included as a separate control as well.) We generally see a very slight reduction in the coefficient of interest. These interaction terms are significant in the calorie regressions, but are not significant in the food consumption regressions. In all cases our coefficient of interest remains significant.

We also test the robustness of our coefficient of interest to changes in the classification of “violent incidents”. Above we use the U.N. definition, which includes several events that may not be associated with elevated levels of conflict or violence, namely, ‘arrest’, ‘demonstration’, ‘information’, ‘narcotic incidents’, and ‘other’. We recalculate the measures of conflict excluding such incidents. The results (available upon request) are qualitatively the same.

Finally the results are robust to the inclusion of household composition variables (number of men, women, and children). The household composition variables, in addition to the other household characteristics, control for differences in consumption requirements between children and adults and for economies of scale in consumption.<sup>11</sup> (The results are available upon request from the authors.)

We now turn to other key variables in the model. The sign of the coefficient on the log of wheat flour prices depends on the measure of conflict and the chosen specification; however, for nearly all specifications the total effect (base effect plus interaction effect evaluated at a given level of conflict) is negative. In other words, regardless of the level of conflict in a province, an increase in the price of wheat flour is associated with a decline in both calorie intake and the real value of food consumption during the survey year.

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<sup>11</sup> An alternative approach to account for such differences employs equivalency scales that take into account nutritional requirements based on age and, sometimes, gender when calculating per capita measures. An advantage of including household composition in the specification, rather than using equivalence scales, is that this method allows the data to specify the parameterization of the scales.

The coefficient on the log conflict measure is positive and statistically significant across nearly all specifications (with the exception of the calorie results that use the fatalities/injuries measures). Thus the positive bivariate association between conflict and food security observed in the maps above is also found empirically, after controlling for a variety of factors. An explanation of this phenomenon is outside the scope of this paper; however such evidence is consistent with some recent research on conflict. For example, Collier and Hoeffler (2004) propose that a major driver of conflict, particularly civil conflict (which is not funded through taxation as with inter-government conflict), is the ability to finance rebellion. Thus groups in better off areas (with access to resources) may be more prone to violence. The conflict in Afghanistan is complicated, involving intra- and inter-state forces; for an overview of the conflict over the past thirty years, see Giustozzi and Ibrahimi (2012).

## **6. Conclusions**

Extended conflicts can disrupt markets, destroy resources (land, labor and capital), and take a psychological toll on the population. Under such circumstances, economic shocks (e.g., food price spikes) or natural disasters (e.g., drought) can have deleterious effects on already vulnerable populations. For households in Afghanistan, most of who spend the majority of their budgets on food, the 2008 spike in wheat flour prices represented a sudden and drastic decline in purchasing power. In this paper, we examined the consequences of this shock for households across the country, focusing our attention on differences in the level of conflict across provinces.

We found that the impact of an increase in wheat flour prices on household food security varies according to the level of conflict within the province. In particular, households living in provinces with higher levels of conflict, as measured by fatalities and injuries or violent incidents per capita or per square kilometer, experience larger declines in per capita calorie intake and the real value of per capita food consumption than households in provinces with lower levels of conflict. These results suggest that conflict may influence some aspects of food security, such as those related to food-based coping mechanisms (i.e., adjusting diets in response to price increases). While households in conflict areas are better off on average, they may have fewer available coping mechanisms during times of high food prices due to, for example, interruptions in market access, inability to trade and barter, and worse food production and distribution systems.

Food insecurity and conflict are driven by numerous factors and, in some cases, are closely associated with each other. In Afghanistan, their relationship is multidimensional. On one hand, overall levels of food insecurity and conflict are negatively correlated; that is, the more conflict-ridden provinces of the south are, on average, more food secure than the less conflict-ridden provinces of the north and northeast. But on the other hand, we find that conflict may worsen food security by intensifying the negative impact of food price shocks. Developing a better understanding of these interlinkages can be useful from a policy perspective as governmental and nongovernmental organizations try to address the causes and consequences of food insecurity on the ground.

## References

- Bora, S., Ceccacci, I., Delgado, C., Townsend, R., 2010. Food Security and Conflict, World Development Report 2011 Background Paper. World Bank, Washington, D.C.
- Collier, P., Hoeffler, A., 2004. Greed and Grievance in Civil War. *Oxford Economic Papers* 56, 563-595.
- D'Souza, A., Jolliffe, D., 2012. Rising Food Prices and Coping Strategies: Household-Level Evidence from Afghanistan. *Journal of Development Studies* 48.
- Deaton, A., Zaidi, S., 2002. Guidelines for Constructing Consumption Aggregates for Welfare Analysis. LSMS Working Paper Series.
- Food and Agriculture Organization, U.N., 2006. Food Security. Food and Agricultural Organization, United Nations.
- Food and Agriculture Organization, U.N., 2008. The State of Food Insecurity in the World 2008: High food prices and food security – threats and opportunities.
- Giustozzi, A., Ibrahimi, N., 2012. Thirty Years of Conflict: Drivers of Anti-Government Mobilisation in Afghanistan, 1978-2011, Afghanistan Research and Evaluation Unit Issues Paper. Afghanistan Research and Evaluation Unit Kabul.
- Islamic Republic of Afghanistan, Central Statistics Organization (CSO), World Bank Economic Policy and Poverty Sector, 2011a. Setting the Official Poverty Line for Afghanistan, Kabul.
- Islamic Republic of Afghanistan, Ministry of Economy, World Bank Economic Policy and Poverty Sector, 2011b. Afghanistan Provincial Briefs, Kabul.

- Islamic Republic of Afghanistan, M.o.E., and the World Bank Economic Policy and Poverty Sector, 2010. Poverty Status in Afghanistan: A Profile Based on the National Risk and Vulnerability Assessment (NRVA) 2007/08. Islamic Republic of Afghanistan, Ministry of Economy, and the World Bank Economic Policy and Poverty Sector, Kabul.
- Kish, L. 1965. Survey Sampling. Wiley, New York.
- Johnecheck, W., Holland, D.E., 2007. Nutritional status in postconflict Afghanistan: Evidence from the National Surveillance System Pilot and National Risk and Vulnerability Assessment. Food and Nutrition Bulletin 28, 3-17.
- Maplecroft, 2010. African nations dominate Maplecroft's new Food Security Risk Index - China and Russia will face challenges. Maplecroft, Bath.
- Messer, E., Cohen, M.J., 2006. Conflict, Food Insecurity, and Globalization, Food Consumption and Nutrition Division Discussion Paper. International Food Policy Research Institute, Washington, D.C., p. 45.
- Messer, E., Cohen, M.J., Marchione, T., 2002. Conflict: A Cause and Effect of Hunger, Environmental Change and Security Project Report. Food and Agriculture Organization, United Nations, Rome, p. 16.
- Teodosijevic, S., 2003. Armed Conflicts and Food Security, ESA Working Paper. Food and Agriculture Organization, United Nations, Rome, p. 30.

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Nominal Value of Per Capita Monthly Food Consumption (Afghani)	1197 (715)	1123 (567)	1129 (518)	1183 (527)
Real Value of Per Capita Monthly Food Consumption (Afghani)	1201 (709)	961 (479)	789 (352)	798 (350)
Food Poverty Rate (%)	20.08 (40.07)	30.45 (46.03)	44.81 (49.74)	42.11 (49.38)
Per Capita Daily Caloric Intake (kilocalories)	2885 (1244)	2725 (917)	2446 (738)	2387 (877)
Calorie Deficiency Rate (%)	23.98 (42.70)	23.06 (42.13)	32.69 (46.91)	36.39 (48.11)

Note: Estimated population weighted means, with standard deviation in parentheses. Real values in Afghani reflect adjustments for spatial and temporal price differences.  
*Source:* NRVA 2007/08

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Price of wheat flour	18.09 (3.20)	23.51 (2.50)	34.19 (2.99)	36.51 (3.93)
Price of vegetable oil	4.16 (0.12)	4.33 (0.13)	4.48 (0.10)	4.51 (0.12)
Price of rice	3.50 (0.20)	3.51 (0.17)	3.82 (0.17)	4.00 (0.14)
Price of lamb	5.20 (0.13)	5.22 (0.12)	5.24 (0.11)	5.18 (0.16)
Price of milk	3.14 (0.16)	3.23 (0.19)	3.28 (0.21)	3.40 (0.24)
Price of kerosene	3.76 (0.09)	3.82 (0.09)	3.84 (0.11)	4.01 (0.12)

Note: Estimated population weighted means, with standard deviation in parentheses. Prices are per kilogram, except those for kerosene and vegetable oil, which are per liter. *Source:* NRVA 2007/08

**Table 3. Conflict and violence by quarter**

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Fatalities and Injuries	221 (256)	112 (162)	131 (137)	297 (304)
Fatalities and Injuries Per Capita	2.56 (3.34)	1.15 (1.76)	1.53 (2.03)	3.35 (4.14)
Fatalities and Injuries Per Square Km	19.89 (22.44)	10.61 (12.78)	12.26 (14.36)	30.31 (35.81)
Incidents	128 (115)	96 (102)	116 (95)	196 (155)
Incidents Per Capita	1.39 (1.59)	0.95 (1.16)	1.21 (1.11)	2.02 (1.81)
Incidents Per Square Km	15.08 (19.46)	12.29 (16.17)	13.18 (16.47)	24.24 (28.03)

Note: Estimated population weighted means, with standard deviation in parentheses. Per capita and per square kilometer terms are based on province population and area, respectively. *Source:* NRVA 2007/08

**Table 4: Impact of Wheat Flour Prices on Calorie Intake**

	Measure of Conflict											
	Fatalities and Injuries						Incidents					
	Per Capita			Per Square Km			Per Capita			Per Square Km		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log Wheat Flour Price	-0.017 [0.024]	-0.088*** [0.025]	0.080** [0.037]	-0.024 [0.025]	-0.099*** [0.025]	0.062 [0.038]	0.390*** [0.064]	0.259*** [0.064]	0.408*** [0.068]	0.422*** [0.065]	0.264*** [0.064]	0.401*** [0.069]
Log (Wheat Flour Price X Conflict)	-0.070*** [0.011]	-0.032*** [0.011]	-0.029*** [0.011]	-0.062*** [0.012]	-0.023** [0.011]	-0.021* [0.011]	-0.481*** [0.068]	-0.388*** [0.067]	-0.364*** [0.066]	-0.540*** [0.071]	-0.416*** [0.068]	-0.396*** [0.067]
Log Conflict	0.019 [0.012]	-0.009 [0.012]	-0.012 [0.012]	0.050*** [0.013]	0.009 [0.013]	0.008 [0.013]	0.416*** [0.069]	0.351*** [0.068]	0.326*** [0.067]	0.532*** [0.072]	0.410*** [0.069]	0.390*** [0.068]
Underemployment Rate		-0.002*** [0.000]	-0.002*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]
Gini Coefficient		-0.219** [0.108]	-0.219** [0.107]		-0.013 [0.106]	-0.007 [0.105]		-0.004 [0.107]	-0.01 [0.107]		0.127 [0.108]	0.127 [0.107]
Poverty Rate		-0.005*** [0.000]	-0.005*** [0.000]		-0.005*** [0.000]	-0.005*** [0.000]		-0.004*** [0.000]	-0.004*** [0.000]		-0.005*** [0.000]	-0.005*** [0.000]
Log Wheat Flour Price X Rural			-0.193*** [0.033]			-0.184*** [0.034]			-0.191*** [0.033]			-0.175*** [0.034]
Observations	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483
R-squared	0.083	0.143	0.147	0.066	0.134	0.138	0.095	0.144	0.148	0.074	0.138	0.141

Note: Each column represents a separate regression; the measure of conflict used is listed at the top of the column. Dependent variable is the daily per capita calorie intake. Estimates are population weighted. Robust standard errors -in brackets- are clustered by stratum and adjusted for survey design. Controls include log values of durables, housing and livestock; log prices of vegetable oil, local rice, lamb, milk, and kerosene; age of household head, dummies for married household head and literate household head; dummies for plateau and mountainous areas; dummy for rural areas. \*, \*\*, and \*\*\* denote significance at 10%, 5%, and 1%, respectively. Source: NRVA 2007/08.

**Table 5: Impact of Wheat Flour Prices on the Real Value of Food Consumption**

	Measure of Conflict											
	Fatalities and Injuries						Incidents					
	Per Capita			Per Square Km			Per Capita			Per Square Km		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log Wheat Flour Price	-0.170*** [0.037]	-0.323*** [0.038]	-0.268*** [0.052]	-0.176*** [0.037]	-0.327*** [0.038]	-0.276*** [0.052]	0.505*** [0.088]	0.222** [0.089]	0.264*** [0.094]	0.501*** [0.090]	0.204** [0.089]	0.239** [0.094]
Log (Wheat Flour Price X Conflict)	-0.120*** [0.015]	-0.059*** [0.014]	-0.058*** [0.014]	-0.111*** [0.016]	-0.048*** [0.015]	-0.047*** [0.015]	-0.817*** [0.095]	-0.627*** [0.092]	-0.621*** [0.092]	-0.824*** [0.098]	-0.606*** [0.093]	-0.601*** [0.093]
Log Conflict	0.100*** [0.017]	0.050*** [0.016]	0.049*** [0.016]	0.097*** [0.018]	0.032* [0.017]	0.032* [0.017]	0.752*** [0.097]	0.602*** [0.094]	0.595*** [0.094]	0.796*** [0.100]	0.587*** [0.094]	0.582*** [0.094]
Underemployment Rate		-0.001** [0.000]	-0.001** [0.000]		-0.001** [0.000]	-0.001*** [0.000]		-0.001** [0.000]	-0.001** [0.000]		-0.001*** [0.000]	-0.001*** [0.000]
Gini Coefficient		-0.092 [0.149]	-0.092 [0.149]		-0.127 [0.146]	-0.125 [0.147]		-0.03 [0.147]	-0.032 [0.148]		0.009 [0.146]	0.009 [0.146]
Poverty Rate		-0.008*** [0.000]	-0.008*** [0.000]		-0.008*** [0.000]	-0.008*** [0.000]		-0.008*** [0.000]	-0.008*** [0.000]		-0.008*** [0.000]	-0.008*** [0.000]
Log Wheat Flour Price X Rural			-0.063 [0.044]			-0.058 [0.044]			-0.054 [0.043]			-0.045 [0.043]
Observations	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483	20,483
R-squared	0.204	0.275	0.275	0.204	0.277	0.277	0.227	0.284	0.284	0.22	0.284	0.284

See Notes for Table 4. Dependent variable is the real value of monthly per capita food consumption.

<b>Table A1. Control variables</b>				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Log Real Value Monthly Housing Per Capita	175 (294)	152 (244)	171 (274)	161 (251)
Log Real Value Monthly Durables Per Capita	59 (173)	55 (192)	62 (168)	57 (162)
Log Real Value Monthly Livestock Per Capita	5903 (15391)	5606 (13827)	5308 (17832)	4874 (10004)
Age of household head	45 (14)	45 (14)	45 (14)	45 (14)
Dummy for married household heads	0.95 (0.22)	0.95 (0.23)	0.94 (0.23)	0.95 (0.22)
Dummy for literate household heads	1.65 (0.48)	1.70 (0.46)	1.69 (0.46)	1.69 (0.46)
Dummy for rural areas	0.80 (0.40)	0.80 (0.40)	0.80 (0.40)	0.80 (0.40)
Dummy for plateau areas	0.23 (0.42)	0.21 (0.41)	0.23 (0.42)	0.22 (0.41)
Dummy for mountainous areas	0.39 (0.49)	0.39 (0.49)	0.39 (0.49)	0.40 (0.49)
Underemployment Rate	46.77 (21.13)	46.66 (20.21)	47.10 (20.78)	46.63 (21.00)
Gini Coefficient	0.24 (0.05)	0.24 (0.05)	0.24 (0.05)	0.24 (0.05)
Poverty Rate	35.71 (17.42)	36.19 (17.17)	35.76 (17.24)	35.72 (17.03)

Note: Estimated population weighted means. Real values in Afghani reflect adjustments for spatial and temporal price differences. Caloric intake in kilocalories. Prices are per kilogram, except those for kerosene and vegetable oil, which are per liter. *Source:* NRVA 2007/08

**Table A2. Impact on Calories**

	Measure of Conflict: Fatalities and Injures					
	Per Capita			Per Square Km		
Log Wheat Flour Price	-0.017 [0.024]	-0.088*** [0.025]	0.080** [0.037]	-0.024 [0.025]	-0.099*** [0.025]	0.062 [0.038]
Log (Wheat Flour Price X Conflict)	-0.070*** [0.011]	-0.032*** [0.011]	-0.029*** [0.011]	-0.062*** [0.012]	-0.023** [0.011]	-0.021* [0.011]
Log Conflict	0.019 [0.012]	-0.009 [0.012]	-0.012 [0.012]	0.050*** [0.013]	0.009 [0.013]	0.008 [0.013]
Log Real Value Monthly Housing Per Capita	0.024*** [0.004]	0.016*** [0.004]	0.016*** [0.004]	0.021*** [0.005]	0.016*** [0.004]	0.015*** [0.004]
Log Real Value Monthly Durables Per Capita	0.022*** [0.003]	0.012*** [0.003]	0.012*** [0.003]	0.020*** [0.003]	0.011*** [0.003]	0.011*** [0.003]
Log Real Value Livestock Per Capita	0.004*** [0.001]	0.007*** [0.001]	0.007*** [0.001]	0.002 [0.001]	0.006*** [0.001]	0.006*** [0.001]
Head Age	0.040* [0.022]	0.01 [0.022]	0.011 [0.022]	0.068*** [0.023]	0.03 [0.022]	0.031 [0.022]
Head Married	-0.057*** [0.012]	-0.055*** [0.011]	-0.055*** [0.011]	-0.062*** [0.012]	-0.058*** [0.011]	-0.058*** [0.011]
Head Literate	0.01 [0.007]	-0.013** [0.006]	-0.014** [0.006]	0.005 [0.007]	-0.018*** [0.006]	-0.019*** [0.006]
Rural	0.044*** [0.014]	0.040*** [0.013]	0.654*** [0.108]	0.007 [0.013]	0.021 [0.013]	0.606*** [0.111]
Plateau	-0.015 [0.011]	0.034*** [0.012]	0.034*** [0.012]	-0.027** [0.012]	0.032*** [0.012]	0.032*** [0.012]
Mountainous	-0.030*** [0.011]	0.017 [0.011]	0.018 [0.011]	-0.032*** [0.012]	0.019* [0.011]	0.020* [0.011]
Log Kerosene Price	-0.015 [0.040]	-0.01 [0.037]	-0.019 [0.036]	-0.028 [0.041]	-0.008 [0.038]	-0.018 [0.038]
Log Vegetable Oil Price	-0.141*** [0.038]	-0.073* [0.039]	-0.084** [0.039]	-0.057 [0.038]	0.007 [0.038]	-0.002 [0.039]
Log Rice Price	-0.034 [0.026]	-0.045 [0.027]	-0.047* [0.027]	-0.125*** [0.027]	-0.119*** [0.029]	-0.122*** [0.028]
Log Lamb Price	0.101** [0.044]	-0.043 [0.040]	-0.035 [0.040]	-0.081** [0.041]	-0.138*** [0.039]	-0.134*** [0.039]
Log Milk Price	-0.114*** [0.020]	-0.084*** [0.021]	-0.092*** [0.021]	-0.082*** [0.021]	-0.072*** [0.022]	-0.080*** [0.022]
Underemployment Rate		-0.002*** [0.000]	-0.002*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]
Gini Coefficient		-0.219** [0.108]	-0.219** [0.107]		-0.013 [0.106]	-0.007 [0.105]
Poverty Rate		-0.005*** [0.000]	-0.005*** [0.000]		-0.005*** [0.000]	-0.005*** [0.000]
Log Wheat Flour Price X Rural			-0.193*** [0.033]			-0.184*** [0.034]
Observations	20,483	20,483	20,483	20,483	20,483	20,483
R-squared	0.083	0.143	0.147	0.066	0.134	0.138

**Table A2 Continued**

	Measure of Conflict: Incidents					
	Per Capita			Per Square Km		
Log Wheat Flour Price	0.390*** [0.064]	0.259*** [0.064]	0.408*** [0.068]	0.422*** [0.065]	0.264*** [0.064]	0.401*** [0.069]
Log (Wheat Flour Price X Conflict)	-0.481*** [0.068]	-0.388*** [0.067]	-0.364*** [0.066]	-0.540*** [0.071]	-0.416*** [0.068]	-0.396*** [0.067]
Log Conflict	0.416*** [0.069]	0.351*** [0.068]	0.326*** [0.067]	0.532*** [0.072]	0.410*** [0.069]	0.390*** [0.068]
Log Real Value Monthly Housing Per Capita	0.021*** [0.004]	0.014*** [0.004]	0.014*** [0.004]	0.018*** [0.005]	0.012*** [0.004]	0.012*** [0.004]
Log Real Value Monthly Durables Per Capita	0.020*** [0.003]	0.013*** [0.003]	0.013*** [0.003]	0.023*** [0.003]	0.014*** [0.003]	0.014*** [0.003]
Log Real Value Livestock Per Capita	0.003*** [0.001]	0.007*** [0.001]	0.006*** [0.001]	0.002 [0.001]	0.006*** [0.001]	0.006*** [0.001]
Head Age	0.045** [0.022]	0.021 [0.022]	0.022 [0.022]	0.071*** [0.023]	0.032 [0.022]	0.033 [0.022]
Head Married	-0.059*** [0.012]	-0.057*** [0.011]	-0.056*** [0.011]	-0.063*** [0.012]	-0.059*** [0.011]	-0.059*** [0.011]
Head Literate	0.005 [0.007]	-0.015** [0.006]	-0.016** [0.006]	0.004 [0.007]	-0.017*** [0.006]	-0.019*** [0.006]
Rural	0.033** [0.014]	0.036*** [0.013]	0.645*** [0.108]	-0.001 [0.014]	0.023* [0.013]	0.579*** [0.111]
Plateau	-0.001 [0.011]	0.041*** [0.011]	0.041*** [0.012]	-0.016 [0.012]	0.040*** [0.012]	0.040*** [0.012]
Mountainous	-0.016 [0.011]	0.023** [0.011]	0.023** [0.011]	-0.021* [0.012]	0.024** [0.011]	0.025** [0.011]
Log Kerosene Price	-0.039 [0.039]	-0.027 [0.036]	-0.037 [0.036]	-0.037 [0.040]	-0.023 [0.037]	-0.032 [0.037]
Log Vegetable Oil Price	-0.081** [0.038]	0.003 [0.039]	-0.011 [0.039]	-0.014 [0.039]	0.054 [0.039]	0.044 [0.039]
Log Local Rice Price	-0.068*** [0.025]	-0.088*** [0.026]	-0.089*** [0.026]	-0.133*** [0.027]	-0.121*** [0.028]	-0.123*** [0.028]
Log Lamb Price	0.006 [0.038]	-0.122*** [0.036]	-0.112*** [0.037]	-0.129*** [0.037]	-0.185*** [0.035]	-0.179*** [0.036]
Log Milk Price	-0.090*** [0.020]	-0.084*** [0.021]	-0.093*** [0.021]	-0.065*** [0.021]	-0.076*** [0.021]	-0.083*** [0.021]
Underemployment Rate		-0.002*** [0.000]	-0.002*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]
Gini Coefficient		-0.004 [0.107]	-0.01 [0.107]		0.127 [0.108]	0.127 [0.107]
Poverty Rate		-0.004*** [0.000]	-0.004*** [0.000]		-0.005*** [0.000]	-0.005*** [0.000]
Log Wheat Flour Price X Rural			-0.191*** [0.033]			-0.175*** [0.034]
Observations	20,483	20,483	20,483	20,483	20,483	20,483
R-squared	0.095	0.144	0.148	0.074	0.138	0.141

Note: The measure of conflict used is listed at the top of the column. Dependent variable is the daily per capita calorie intake. Estimates are population weighted. Robust standard errors -in brackets- are clustered by stratum and adjusted for survey design. \*, \*\*, and \*\*\* denote significance at 10%, 5%, and 1%, respectively. Source: NRVA 2007/08.

**Table A3. Impact on Food Consumption**

	Measure of Conflict: Fatalities and Injures					
	Per Capita			Per Square Km		
Log Wheat Flour Price	-0.170*** [0.037]	-0.323*** [0.038]	-0.268*** [0.052]	-0.176*** [0.037]	-0.327*** [0.038]	-0.276*** [0.052]
Log (Wheat Flour Price X Conflict)	-0.120*** [0.015]	-0.059*** [0.014]	-0.058*** [0.014]	-0.111*** [0.016]	-0.048*** [0.015]	-0.047*** [0.015]
Log Conflict	0.100*** [0.017]	0.050*** [0.016]	0.049*** [0.016]	0.097*** [0.018]	0.032* [0.017]	0.032* [0.017]
Log Real Value Monthly Housing Per Capita	0.049*** [0.007]	0.034*** [0.007]	0.034*** [0.007]	0.050*** [0.007]	0.037*** [0.007]	0.037*** [0.007]
Log Real Value Monthly Durables Per Capita	0.098*** [0.005]	0.080*** [0.004]	0.080*** [0.004]	0.097*** [0.005]	0.080*** [0.004]	0.080*** [0.004]
Log Real Value Livestock Per Capita	0.011*** [0.001]	0.015*** [0.001]	0.015*** [0.001]	0.011*** [0.001]	0.015*** [0.001]	0.015*** [0.001]
Head Age	0.02 [0.028]	-0.033 [0.026]	-0.032 [0.026]	0.031 [0.028]	-0.028 [0.026]	-0.027 [0.026]
Head Married	-0.025 [0.016]	-0.024 [0.015]	-0.024 [0.015]	-0.027* [0.016]	-0.024 [0.015]	-0.024 [0.015]
Head Literate	-0.015* [0.009]	-0.048*** [0.008]	-0.048*** [0.008]	-0.018** [0.009]	-0.050*** [0.008]	-0.050*** [0.008]
Rural	0.040** [0.019]	0.016 [0.019]	0.215 [0.144]	0.022 [0.018]	0.005 [0.019]	0.191 [0.144]
Plateau	-0.106*** [0.017]	-0.030* [0.017]	-0.030* [0.017]	-0.109*** [0.017]	-0.029* [0.017]	-0.029* [0.017]
Mountainous	-0.096*** [0.017]	-0.027* [0.015]	-0.026* [0.016]	-0.095*** [0.016]	-0.024 [0.015]	-0.024 [0.015]
Log Kerosene Price	-0.257*** [0.056]	-0.257*** [0.051]	-0.261*** [0.051]	-0.248*** [0.057]	-0.236*** [0.052]	-0.240*** [0.052]
Log Vegetable Oil Price	-0.249*** [0.052]	-0.158*** [0.052]	-0.162*** [0.052]	-0.229*** [0.051]	-0.163*** [0.050]	-0.166*** [0.050]
Log Rice Price	0.105*** [0.037]	0.142*** [0.038]	0.141*** [0.038]	0.067* [0.037]	0.118*** [0.038]	0.117*** [0.038]
Log Lamb Price	0.128** [0.062]	-0.061 [0.056]	-0.058 [0.056]	0.106* [0.060]	-0.021 [0.056]	-0.02 [0.056]
Log Milk Price	-0.122*** [0.030]	-0.036 [0.030]	-0.039 [0.030]	-0.101*** [0.030]	-0.019 [0.031]	-0.021 [0.031]
Underemployment Rate		-0.001** [0.000]	-0.001** [0.000]		-0.001** [0.000]	-0.001*** [0.000]
Gini Coefficient		-0.092 [0.149]	-0.092 [0.149]		-0.127 [0.146]	-0.125 [0.147]
Poverty Rate		-0.008*** [0.000]	-0.008*** [0.000]		-0.008*** [0.000]	-0.008*** [0.000]
Log Wheat Flour Price X Rural			-0.063 [0.044]			-0.058 [0.044]
Observations	20,483	20,483	20,483	20,483	20,483	20,483
R-squared	0.204	0.275	0.275	0.204	0.277	0.277

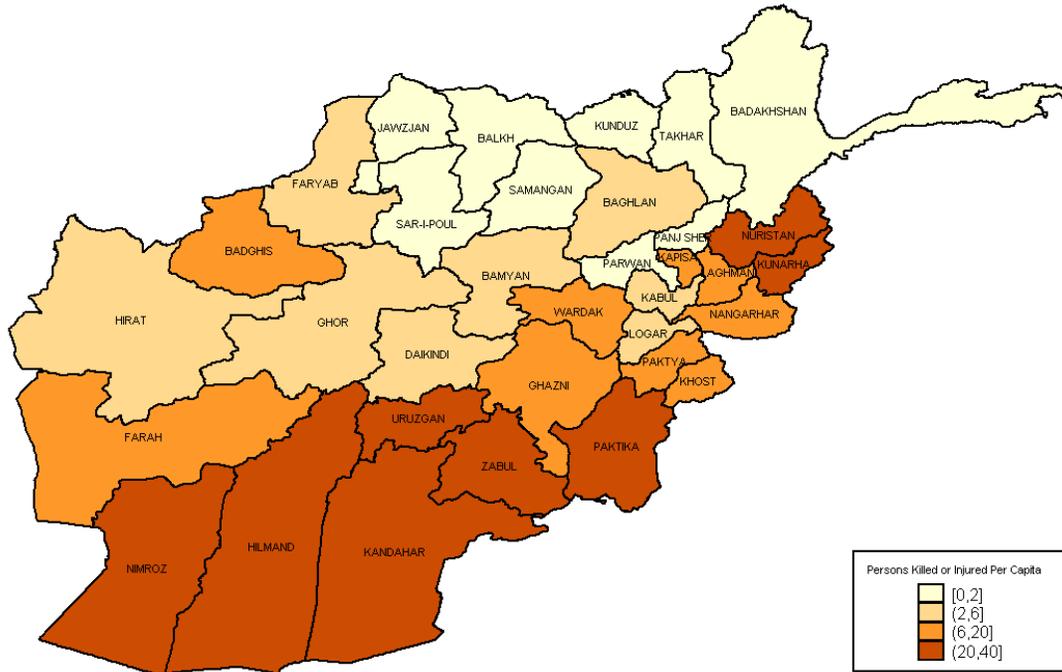
**Table A3 Continued**

	Measure of Conflict: Incidents					
	Per Capita			Per Square Km		
Log Wheat Flour Price	0.505*** [0.088]	0.222** [0.089]	0.264*** [0.094]	0.501*** [0.090]	0.204** [0.089]	0.239** [0.094]
Log (Wheat Flour Price X Conflict)	-0.817*** [0.095]	-0.627*** [0.092]	-0.621*** [0.092]	-0.824*** [0.098]	-0.606*** [0.093]	-0.601*** [0.093]
Log Conflict	0.752*** [0.097]	0.602*** [0.094]	0.595*** [0.094]	0.796*** [0.100]	0.587*** [0.094]	0.582*** [0.094]
Log Real Value Monthly Housing Per Capita	0.048*** [0.007]	0.034*** [0.007]	0.034*** [0.007]	0.048*** [0.007]	0.036*** [0.007]	0.036*** [0.007]
Log Real Value Monthly Durables Per Capita	0.098*** [0.005]	0.083*** [0.004]	0.083*** [0.004]	0.100*** [0.005]	0.083*** [0.004]	0.083*** [0.004]
Log Real Value Livestock Per Capita	0.013*** [0.001]	0.015*** [0.001]	0.015*** [0.001]	0.011*** [0.001]	0.015*** [0.001]	0.015*** [0.001]
Head Age	0.008 [0.027]	-0.033 [0.026]	-0.033 [0.026]	0.038 [0.027]	-0.022 [0.026]	-0.022 [0.026]
Head Married	-0.024 [0.016]	-0.024 [0.015]	-0.024 [0.015]	-0.029* [0.016]	-0.026* [0.015]	-0.026* [0.015]
Head Literate	-0.018** [0.009]	-0.047*** [0.008]	-0.047*** [0.008]	-0.022** [0.009]	-0.050*** [0.008]	-0.051*** [0.008]
Rural	0.045** [0.019]	0.016 [0.019]	0.188 [0.142]	0 [0.018]	-0.001 [0.018]	0.141 [0.140]
Plateau	-0.077*** [0.017]	-0.016 [0.017]	-0.016 [0.017]	-0.089*** [0.017]	-0.016 [0.017]	-0.016 [0.017]
Mountainous	-0.073*** [0.016]	-0.017 [0.015]	-0.017 [0.015]	-0.075*** [0.016]	-0.014 [0.015]	-0.014 [0.015]
Log Kerosene Price	-0.259*** [0.056]	-0.258*** [0.051]	-0.261*** [0.051]	-0.236*** [0.057]	-0.237*** [0.051]	-0.239*** [0.051]
Log Vegetable Oil Price	-0.235*** [0.053]	-0.134** [0.052]	-0.138*** [0.053]	-0.178*** [0.053]	-0.110** [0.052]	-0.113** [0.052]
Log Local Rice Price	0.122*** [0.036]	0.142*** [0.036]	0.141*** [0.036]	0.033 [0.038]	0.095** [0.038]	0.094** [0.038]
Log Lamb Price	0.184*** [0.054]	-0.033 [0.053]	-0.031 [0.053]	0.109** [0.053]	-0.031 [0.052]	-0.03 [0.052]
Log Milk Price	-0.100*** [0.030]	-0.028 [0.030]	-0.03 [0.030]	-0.054* [0.031]	-0.007 [0.030]	-0.009 [0.030]
Underemployment Rate		-0.001** [0.000]	-0.001** [0.000]		-0.001*** [0.000]	-0.001*** [0.000]
Gini Coefficient		-0.03 [0.147]	-0.032 [0.148]		0.009 [0.146]	0.009 [0.146]
Poverty Rate		-0.008*** [0.000]	-0.008*** [0.000]		-0.008*** [0.000]	-0.008*** [0.000]
Log Wheat Flour Price X Rural			-0.054 [0.043]			-0.045 [0.043]
Observations	20,483	20,483	20,483	20,483	20,483	20,483
R-squared	0.227	0.284	0.284	0.22	0.284	0.284

See Notes for Table A2.

# Fatalities and Injuries Per Capita by Province

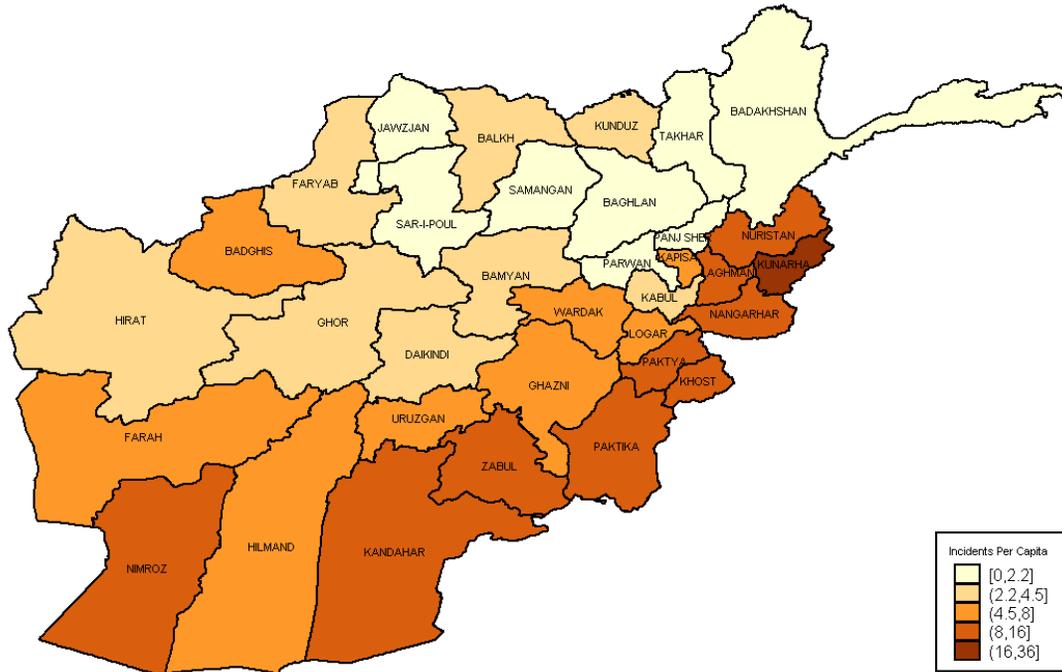
(No of People Killed or Injured Per Capita, August '07 - September '08)



Source: UN Department of Safety and Security

# Incidents Per Capita by Province

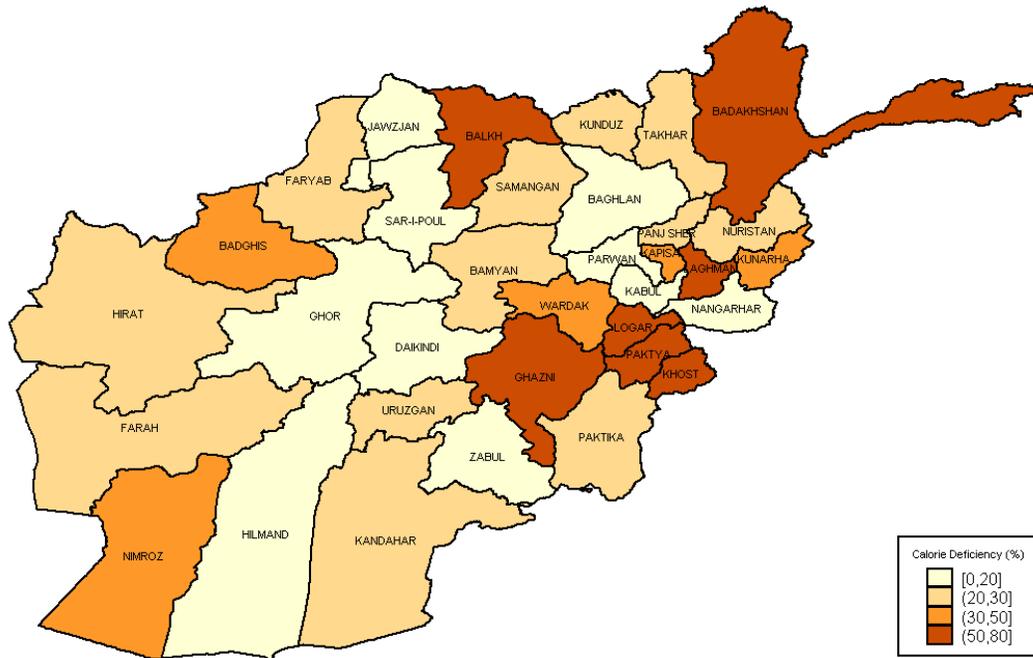
(Incidents Per Capita, August'07\_September'08)



Source: UN Department of Safety and Security

# Calorie Deficiency by Province

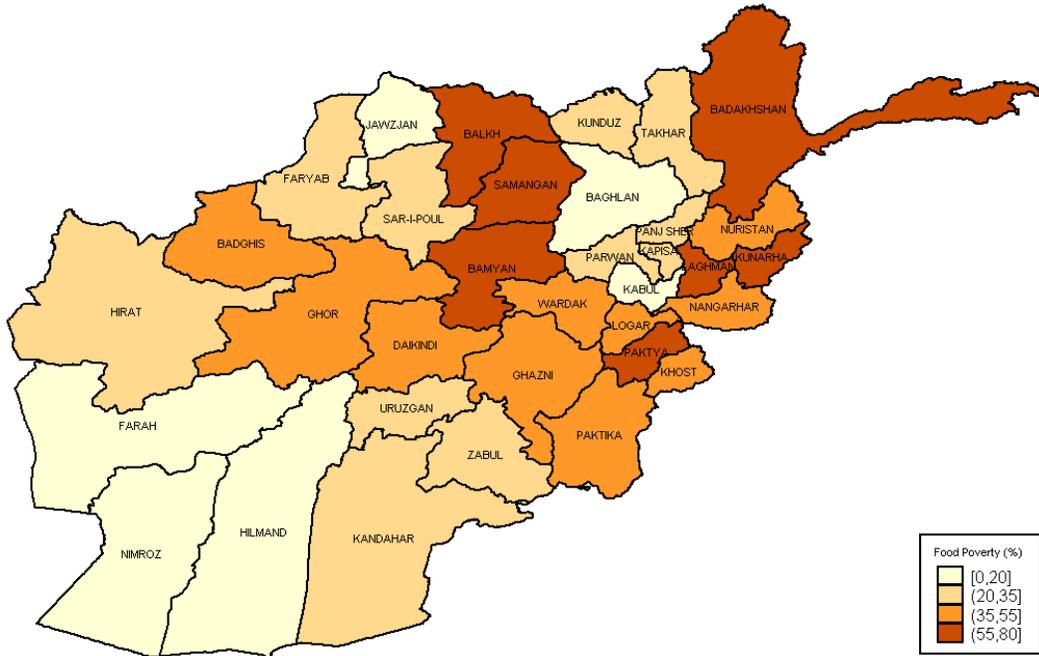
(Percent of Population with Calorie Intake Less than 2100)



Source: NRVA 2007/08  
Notes: Estimates based on population weights

## Food Poverty Rate by Province

(Percent of Population with Food Consumption Less than Basic Needs)



Source: NRVA 2007/08  
 Notes: Estimates based on population weights

