Right to Food Assessment
Philippines

THE
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TO
FOOD

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A Profile of Hunger and Analysis of its Causes

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Causes of Hunger
A Profile of Hunger and Analysis of its Causes

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✸ Rationale and Objectives

The Government of the Philippines (GOP), through the National Anti-Poverty Commission is speeding up its efforts to address the issue of hunger and food insecurity in the Philippines. The main avenue to consolidate all efforts against hunger and food insecurity is the Accelerated Hunger Mitigation Program (AHMP). Discussions by FAO with Philippine government officials indicate that there is a need to enhance the AHMP to ensure that interventions are appropriate and that these interventions are geared toward the population groups that need them the most.

The GOP is also a party to the International Covenant on Economic, Social and Cultural Rights (ICESCR) that obligates it to recognize the right of every Filipino to an adequate standard of living including food, clothing and housing. The covenant recognizes the fundamental right of everyone to be free from hunger. This implies enabling individuals to produce or procure adequate quantities and quality of food for an active and healthy life. This is consistent with a human rights-based approach to development that empowers individuals and civil society to participate in decision-making, to claim their rights and to demand recourse, by holding public officials and governments accountable for their programs and policies.

The entirety of Government policies and programs should build an enabling environment that ensures that individuals can feed themselves. A clear and unambiguous legal framework will provide the necessary enabling environment to ensure that legal and institutional mechanisms are in place to support efforts toward the mitigation and eventual eradication of hunger in the country. An assessment of the policy framework will reveal the extent to which policies, strategies and programs are conducive to progressively realizing the right to adequate food and whether the policy framework responds to the underlying and root causes of the non-realization of the right to adequate food.

The FAO has responded to this concern by highlighting the agenda for food security and the right to food. It has initiated efforts to examine the various issues related to food insecurity in the Philippines and to arrive at recommendations grounded on sound policy research and analysis. In line with this, it has commissioned the Asia-Pacific Policy Center to a Right to Food Assessment. The assessment will include an analysis of the anatomy of hunger in the Philippines, including the causes and socio-economic characteristics of the hungry, an assessment of the legal framework on the right to food, and a review of the government's safety nets and social protection policies and programs related to the population's right to adequate food.

Objectives

The general objective of the assessment is to provide analytical support to the Philippine Government in its efforts to mitigate the incidence of hunger in the country and to address the underlying causes of food insecurity in the Philippines.

Specifically, the study will:

1. Identify the socio-economic characteristics of the hungry in the country;

2. Analyze the root causes of food insecurity and hunger in the Philippines;

3. Assess the legal framework on the right to food;

4. Assess the government's safety nets and social protection programs.

Item 1 will enhance the Government's efforts to provide direct assistance to those in need, through better design and targeting of its interventions. Items 2, 3 and 4 will inform policy and institutional reform measures to reduce hunger and improve the prospects of food security in the country.

Component 1: Causes of Hunger

The Voluntary Guidelines on the Progressive Realization of the Right to Adequate Food in the Context of National Food Security (VG) emphasize that the design of policies to achieve the right to food should begin with identifying the hungry and understanding the reasons for their food insecurity.

There are currently many difficulties in identifying the hungry and analyzing the causes of hunger in the Philippines. Sufficient data to identify and characterize food insecure and vulnerable groups may not always be available or, more often, may not be adequately analyzed for this purpose.

Component 1 covers the first two items stated above. In particular,

1. Monitoring the hungry and food insecure. The status of hunger in the country, particularly the incidence of hunger and food insecurity based on various data sources. It will present comparisons between the different measures of hunger.

2. Profiling the hungry and the food insecure. A profile of the hungry and food insecure which include geographic/ locational characteristics, demographic characteristics, and socio-economic characteristics. This will be important in targeting the hungry and food insecure. It is likewise an important input in the conduct of causality analysis on the causes of hunger.

3. Identifying the causes of hunger and food insecurity. The causes of hunger and food insecurity must be clearly understood by those who formulate policies and implement programs. This will be done using the extensive data sets on hunger and other related variables.

The analysis and conclusions drawn from the abovementioned sub-study areas will provide the basis for coming up with specific recommendations on the following:

1. Information and data requirements to properly identify the hungry and food insecure (including a hunger indicators survey)

2. Targeting and enhancement of the Accelerated Hunger Mitigation Program.

1.1 Monitoring Hunger

Going into the New Millennium, we all together vowed to rid the world of hunger. Halfway through that day when we will reckon if we have achieved significant milestones, we find the Philippines' progress to be painfully slow. The following table is an excerpt from an IFPRI document[1] on the Global Hunger Index (GHI). We see here a very slow reduction in the index. At the end of the tally period, 2003, the hunger index in the country is almost at the same level as that of Thailand and Indonesia more than a decade prior.

Table 1.1. Global hunger index of selected ASEAN countries

RANK IN 2003	COUNTRY	1992	1997	2003
47	China	12.6	8.6	8.2
59	Indonesia	18.5	15.6	12.5
40	Malaysia	10.2	7.7	7.2
72	Philippines	21.8	19.6	17.6
58	Thailand	17.8	13.8	12.4
75	Vietnam	25.9	22.4	18.4

Source: Ahmed et al. (2007)

There is now widespread realization that hunger is a social problem—the solution required goes beyond nutrition and medicine. In the Philippines, one of the most serious incidences of widespread hunger, which happened during the late '80s in Negros Occidental, was not inevitable. As we face more global uncertainties concerning the world economy, ecological shocks, and political climate, we need to be more vigilant and, at the very least, be aware of the growing incidence of hunger before it worsens.

Incidence of Hunger in the Philippines

Runs made from the record unit data of the BAS-SHIP, SWS and FIES provide a picture of the incidence of hunger and food insecurity in the Philippines.

Qualitative measures

The SHIP was a special survey conducted by the Bureau of Agriculture Statistics (BAS) in August 2006 to make a quick assessment of hunger in the country. The SHIP question on hunger is almost similar to the SWS question. This was then followed by questions on the reasons for experiencing hunger. Member-specific variables such as demographic characteristics, educational attainment and occupation are also included. The sample consists of 13,400 households in 80 provinces including Metro Manila.

The basic question on hunger was:

During April to June 2006, did it happen even once that your household experienced hunger and have nothing to eat?

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[1]   Ahmed, A. U., R. V. Hill, L. C. Smith, D. M. Wiesmann, and T. Frankenberger. 2007. The world's most deprived: characteristics and causes of extreme poverty and hunger. 2020 Vision Discussion Paper 43. Washington, DC: International Food Policy Research Institute.

The results showed that over-all incidence of hunger in the country was 18.6 percent. The degree of hunger experienced by the respondent households can be deduced from the follow-up question:

If yes (experienced hunger or have nothing to eat), how often?
(a) Once
(b) A few times
(c)Often
(d) Always

Figure 1.1. Hunger incidence, SHIP
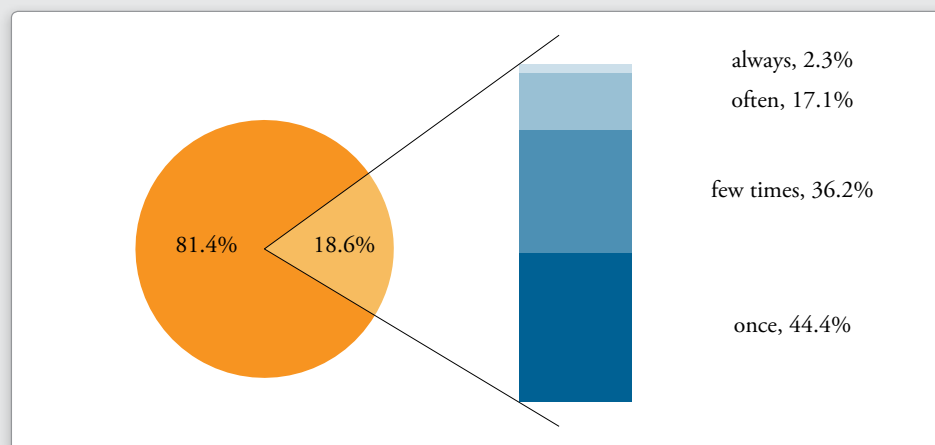
Out of the 18.6 percent of total respondents who reported that they have experienced hunger, 80.6% reported that they experienced hunger or had nothing to eat only once to a few times during the past quarter. The rest (19.4 percent) reported being hungry "often" or "always".

The SWS surveys provide time series data on hunger incidence in the country. The standard question asked of the respondents is:

In the past 3 months, did it happen even once that your family experienced hunger and not have anything to eat?

Respondents are asked to answer with a categorical YES or NO. Similar to the SHIP, question on frequency of hunger experienced follows.

If YES: Did it happen ONLY ONCE, A FEW TIMES, OFTEN, or ALWAYS?

Note that the response to either the SHIP question or SWS question is subject to value endogeneity where each respondent has his own benchmark of hunger. This benchmark may even depend on factors not related to hunger. To illustrate, some respondents might be too proud to admit having experienced hunger whereas others might be more open to expressing their problems. Others may be more longsuffering than others. Such factors cannot be isolated in the estimates computed from this type of survey.

The latest SWS survey conducted in November 2008 shows that 23.7% of households experienced hunger. Of this proportion, 5.2% admit to severe hunger (often or always), while 18.5% say that their experience of hunger is only "once or a few times."

Quantitative measure

The table below (Table 1.2) provides the estimates of hunger incidence in 2006, according to the typology discussed in the research framework. Note that if we consider the groups not belonging to the bottom right, then we come up with a high incidence of hunger, almost 30%. However, this figure goes down to 13.4% if based on adequacy of food consumption (<**Fline** column). Incidence of severe and possibly chronic hunger is 1.9%.

The absolute number of the hungry would be difficult to ascertain. In 2006, the number of families who may have experienced hunger based on less than adequate food spending was 2.2 million. If we assume that only 1 member of the family has experienced hunger, then this translates to 2.2 million individuals. If, however, we say that the food deficit was equally shared among all family members, then the number of hungry individuals would be about 12 million. The true figure would be somewhere in between.

Table 1.2. Typology of Hunger, 2006

		FOOD CONSUMPTION	
		< Fline	≥ Fline
INCOME	Y < Fline	1.9% Severe and chronic hunger	0.1% Moderate to severe hunger
	Fline ≤ Y < Pline	9.7% Moderate hunger	15.4% Slight to moderate hunger
	Y ≥ Pline	1.7% Slight, perhaps transitory hunger	71.2% No incidence of involuntary hunger

Source: Authors' computation base on FIES 2006.

Comparing qualitative and quantitative measures of hunger

Note that there are major differences in the methodologies involved in computing the qualitative and quantitative measures of hunger. The benchmark used in the former is dependent on the respondent, while in the latter, it is defined externally. The former is based only on two questions and the respondent may not have accurately summarized his experience of the past three months. The latter, however, involves an elaborate sequence of questions for which there is much higher chance of respondent fatigue. A major difference, however, is the time reference involved. SWS and SHIP ask about hunger incidence at least once during the "past quarter" while FIES will be able to capture hunger incidence in the "past week." If the incidence of hunger is infrequent, and in particular, did not happen the week prior to the conduct of the survey, this will not be revealed in the FIES. What this also means is that only the incidence figures of severe hunger may be compared. Following are comparisons of the estimates from these different data sources. First, comparing the incidence in 2006 when the surveys were altogether conducted and then second, comparing SWS and FIES for the years, 2000, 2003 and 2006.

Based on FIES, the incidence of severe hunger among households is about two percentage points lower than the figures estimated based on the SHIP and SWS. The figures though from both sources of the qualitative data are similar. Over time, the quantitative measure displays a decreasing trend of severe hunger (though this change is minimal). On the other hand, the trend shown by the SWS estimate is a bit steeper downwards.

Figure 1.2. Comparison of incidence of severe hunger in the Philippines
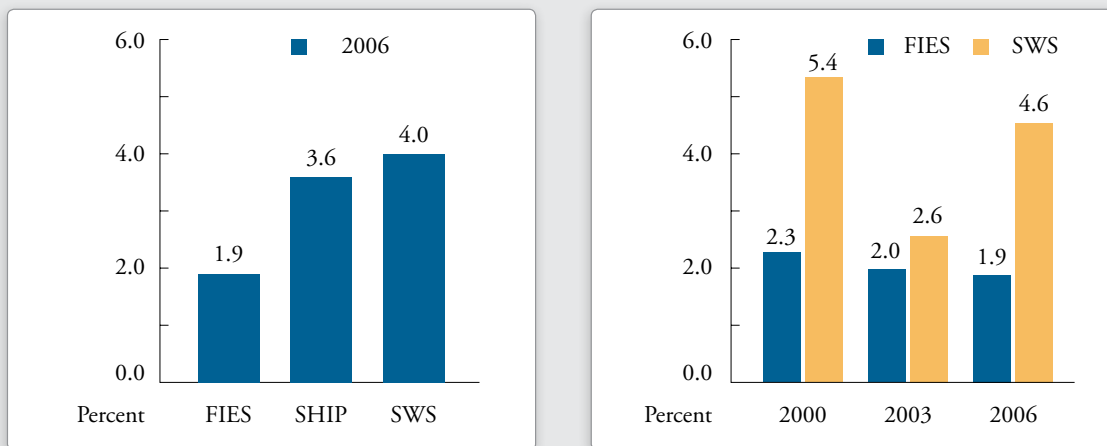
1.2 Profiling Hunger

In this section, we examine the profile of hunger in two dimensions—over time and across space. The FIES and SWS allow analysis across time since both surveys have been conducted regularly for some time now (since 1985 for FIES and since 1998 for SWS). We limit the analysis to the recent decade. For the spatial profiling, hunger incidence is viewed across geographical location, demographic characteristics, and economic characteristics. In this section, the "hunger incidence" referred to in all FIES based estimates are those households with food consumption below the food line (recall the typology defined in the research framework).

Time dimension

The FIES-based measure of hunger incidence is given in the figure below for the years 2000, 2003 and 2006.

Figure 1.2. Trends in hunger incidence
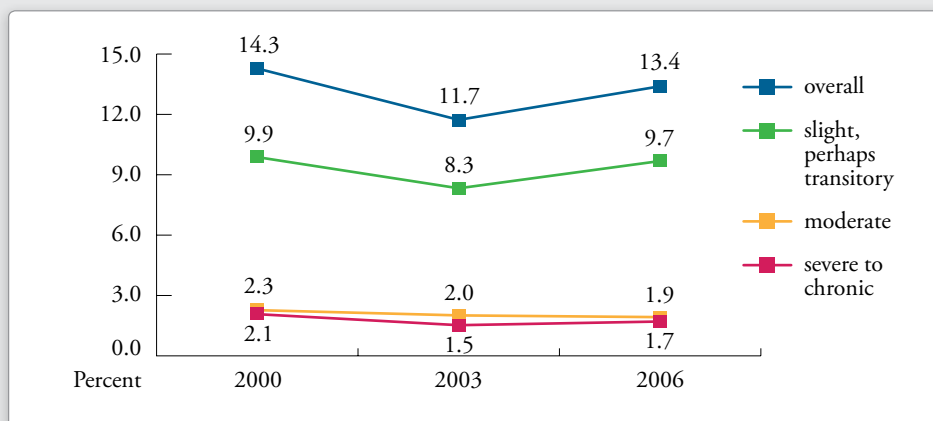
Source: Authors' computations based on various FIES rounds.

In 2000, we estimate that 14% of households experienced hunger ranging from slight, perhaps transitory to severe and chronic hunger. More than 2% of households experienced severe and chronic hunger. The situation improved in 2003, where the hunger incidence decreased to 11.7%; although improvement in severe and chronic hunger incidence was only slight, down to 2%. In 2006, the situation worsened again; hunger incidence increased to 13.4%; moderate hunger, 9.7%. Note that the worsening of the hunger incidence between 2003 and 2006 is not due to an increase in the incidence of severe and chronic hunger. This figure has in fact declining, albeit very slowly. It is actually the incidence of slight, perhaps transitory and moderate hunger that have increased.

The SWS time series data, meanwhile is longer. Following is the graph:

Figure 3. Trends in self-rated hunger
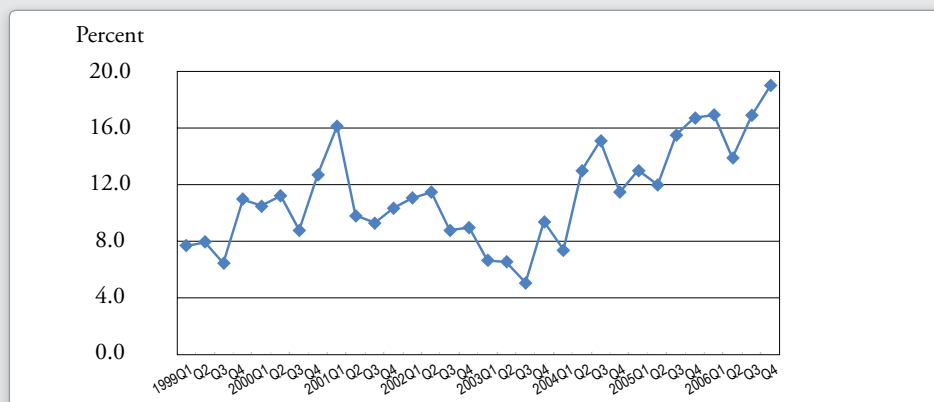
Source: Authors' computations based on various SWS rounds.

Some patterns emerged from plotting the quarterly incidence of hunger using the SWS data. From 1999 to 2002, the general trend shows hunger incidence increasing during the 4th, 1st and 2nd quarters, followed by a correction in the third quarter. The correction however is not adequate to bring back hunger to the same level as the previous year. Thus, the increasing trend observed over time. The pattern shifts in the latter part of 2002, where we see a downward trend over several quarters. Unfortunately we see a reversal of this trend starting 2004. There is an increasing trend of hunger incidence, but this time on a higher level.

Space dimension

The FIES is a very rich source of information. It allows finer disaggregation of hunger incidence to different population sub-groupings that are useful to policy makers particularly in program design and implementation. For this subsection, estimates on hunger are calculated from the most recent FIES survey collected in 2006.

By geographical location

Three Mindanao regions register the highest incidence of hunger—ARMM, Caraga and Western Mindanao. However, if we consider population share, the Visayas regions and Bicol region contribute at least 8% each to overall hunger. ARMM would only come fifth in the list. On the other hand, the National Capital Region and its surrounding regions (Central Luzon and CALABARZON) have the least incidence. The other region with lowest hunger incidence is Cagayan Valley. This is easily expected since these regions are food production centers particularly Central Luzon and Cagayan Valley.

Table 1.3. Hunger incidence by region (%), 2006

REGION	SLIGHT, PERHAPS TRANSITORY	MODERATE	SEVERE TO CHRONIC	OVERALL INCIDENCE	POPULATION SHARE	CONTRIBUTION TO OVERALL HUNGER
NCR	0.7	1.5	0.1	2.2	13.6	2.3
CAR	3.4	11.2	2.4	17.0	1.7	2.2
Ilocos	2.1	8.4	0.7	11.2	5.4	4.5
Cagayan Valley	1.4	5.1	0.4	7.0	3.6	1.9
Central Luzon	0.9	4.5	0.4	5.7	11.0	4.7
CALABARZON	1.0	5.5	0.5	7.0	12.9	6.8
MIMAROPA	2.3	17.7	3.9	23.8	3.1	5.6
Bicol	1.6	15.6	2.8	20.1	5.8	8.7
Western Visayas	1.4	11.5	1.5	14.3	7.9	8.4
Central Visayas	2.6	10.7	3.0	16.2	7.4	9.0
Eastern Visayas	2.8	15.8	3.9	22.4	4.7	7.8
Western Mindanao	2.1	14.8	8.2	25.1	3.6	6.7
Northern Mindanao	2.1	14.8	4.4	21.2	4.5	7.2
Southern Mindanao	1.9	12.3	1.8	16.1	4.8	5.8
Central Mindanao	2.8	12.3	1.9	17.1	4.3	5.5
ARMM	5.0	24.6	2.9	33.5	3.1	7.7
Caraga	2.4	18.8	5.8	27.0	2.6	5.2
Philippines	*1.7*	*9.7*	*1.9*	*13.4*	*100.0*	*100.0*

Source: Authors' computations based on FIES.

Examining further the levels of hunger within these regions, Western Mindanao registers the highest percentage of households who experienced severe to chronic hunger. ARMM on the other hand, tops the list with the highest incidence of moderate hunger as well as slight to perhaps transitory hunger.

For purposes of geographic targeting, a more informative and useful breakdown would be at the provincial level. In the following table, provinces with the highest incidences of hunger are listed.

Table 1.4. Provinces with high hunger incidence (%), 2006

OVERALL		SLIGHT TO PERHAPS TRANSITORY		MODERATE		SEVERE TO CHRONIC	
Tawi-Tawi	47.9	Sulu	10.0	Tawi-Tawi	39.4	Zamboanga del Norte	18.4
Zamboanga del Norte	47.1	Mountain Province	8.8	Camiguin	31.3	Apayao	8.3
Apayao	43.1	Apayao	7.5	Lanao Del Sur	30.5	Agusan Del Sur	7.8
Camiguin	40.0	Camiguin	7.0	Surigao Del Norte	28.4	Masbate	7.5
Surigao del Norte	38.6	Eastern Samar	4.8	Apayao	27.3	Tawi-Tawi	7.0
Lanao del Sur	36.5	Maguindanao	4.4	Zamboanga del Norte	25.4	Surigao del Norte	6.9
Mountain Province	35.4	Negros Oriental	4.4	Maguindanao	24.3	Misamis Occidental	6.2
Maguindanao	32.8	North Cotabato	4.4	Mountain Province	23.7	Eastern Samar	6.2
Misamis Occidental	32.5	Kalinga	4.0	Misamis Occidental	23.4	Abra	6.0
Oriental Mindoro	32.0	Lanao Del Sur	4.0	Oriental Mindoro	22.9	Northern Samar	5.8

Source: Authors' computations based on FIES.

Almost fifty percent of households in Tawi-Tawi and Zamboanga del Norte have experienced hunger in 2006. Hunger is worst in Zamboanga del Norte since about 18% of those are severe to chronic cases while in Tawi-Tawi, most of these incidences are moderate cases of hunger. Other provinces with high incidence are mostly found in Mindanao (Camiguin, Surigao del Norte, Lanao del Sur, Maguindanao and Misamis Occidental). To see the complete picture, a map of the overall hunger incidence is shown in Figure 1.5 as well as a complete listing of the provinces in Annex A.

As shown in the map, provinces with lighter shades have lower incidence of hunger. Note that landlocked provinces (e.g., CAR provinces) as well as provinces located along the typhoon belt (e.g., Bicol and Eastern Visayas provinces) register higher incidence figures. Provinces where major cities are situated have lower incidence. Only one province in Mindanao has less than 12% hunger incidence (with the lightest shade), Davao del Sur.

We make an exception in this subsection by comparing severe hunger between quantitative measure and qualitative measure using the FIES results and SHIP results respectively. The maps comparing the two are seen also in Annex A. Most provinces with high incidence using the quantitative measure do not appear with darker shade in the map showing the qualitative measure. This is true for CAR provinces and most of the Mindanao provinces.

Figure 1.5. Hunger incidence by province, 2006
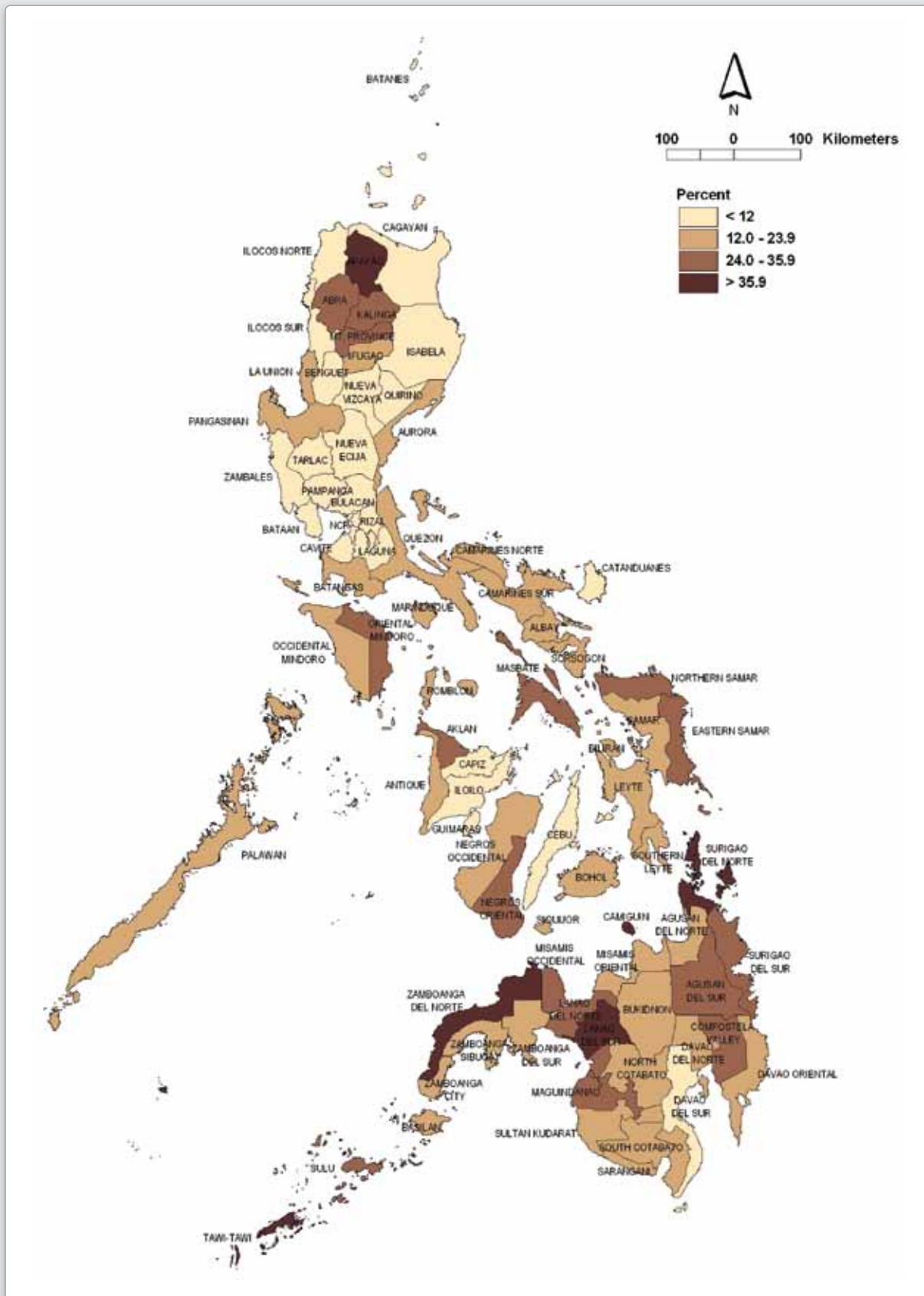
By demographic characteristics

In 2006, an average household would have five members with about 2 young dependents[2]. We examine the incidence of hunger across different household sizes and compositions. As expected, bigger households tend to experience hunger compared to smaller households. The incidence starts to increase sharply between four-member households to five-member households.

Table 1.5. Hunger incidence by household size and composition

NUMBER	OVERALL	SLIGHT TO PERHAPS TRANSITORY	MODERATE	SEVERE TO CHRONIC
Household size				
one to two	3.7	1.2	2.3	0.2
three to four	6.4	1.3	4.5	0.7
five to six	15.3	1.9	11.5	1.9
seven to eight	28.8	2.8	21.2	4.7
nine or more	37.4	3.0	26.2	8.1
Young dependents				
none	5.3	1.6	3.3	0.4
one to two	9.8	1.8	7.1	0.9
three to four	22.3	1.9	17.3	3.2
five to six	45.3	1.8	32.9	10.7
seven or more	56.3	2.5	35.3	18.5

Source: Authors' computations based on FIES.

The same is true when looking at household composition. The more children there are the higher the incidence of hunger. The incidence more than doubles among households with three to four compared to households with at most two children. Hunger incidence reached 56% for households with seven or more children and about 19% of these households experienced severe to chronic hunger.

There is not much difference in overall hunger incidence across age groups of household heads. Incidence is highest at 16% among households with household heads aged 36-50. Male headed households have higher incidence by about 6% compared to female headed households.

In terms of educational attainment, better educated household heads have lower incidence of hunger amongst them (one out of one hundred households for college graduates). In fact, a significant drop is observed between groups. The difference between households with heads not completing any grade level and households with heads finishing at least elementary is about 14.5 percentage points. Differences are even higher as each level of schooling is completed, 25 percentage points if compared to households with heads finishing high school and 31 percentage points if compared to those with heads finishing college.

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2   Defined here as household members aged 18 and below.

Table 1.6. Hunger incidence by characteristics of household head, 2006

CHARACTERISTIC	OVERALL	SLIGHT TO PERHAPS TRANSITORY	MODERATE	SEVERE TO CHRONIC
Age				
15-24	7.6	0.6	5.9	1.1
25-35	11.5	0.7	9.0	1.8
36-50	16.4	1.8	11.9	2.7
51-65	12.8	2.4	8.9	1.5
65 and above	10.2	2.1	7.1	1.0
Gender				
Male	14.6	1.7	10.7	2.2
Female	9.0	2.1	6.0	0.9
Educational attainment				
No grade completed	32.5	2.8	22.3	7.5
Elementary Undergraduate	23.8	2.6	16.9	4.3
Elementary Graduate	18.0	2.1	13.6	2.3
High School Undergraduate	13.6	1.8	10.4	1.3
High School Graduate	7.6	1.4	5.5	0.7
College Undergraduate	4.0	1.2	2.7	0.2
College Graduate	1.1	0.7	0.4	0.0

Source: Authors' computations based on FIES.

By economic characteristics

Ironically, incidence of hunger is highest among households drawing their incomes mainly from agriculture. This is close to the empirical findings that most of the poor are employed in agriculture. Other sectors posting double digit incidences are those employed in construction and mining. Note that these sectors are also vulnerable to shocks and are affected by boom-bust cycles and seasonality.

Incidence is highest among those who are self-employed. One out of five households with self-employed household heads experiences hunger. Government employees appear to be better off with only six percent of hunger incidence.

Among households who experienced hunger, seventy-seven percent actually have permanent status in their jobs. Most of these are minimum wage earners.

About thirty-five percent of households belonging to the poorest quintile experienced hunger compared to less than one percent incidence in the richest quintile. Note though that incidence of transitory hunger is highest at the middle income quintile.

Among households who experienced hunger, fifty-three percent belong to the bottom quintile. If the bottom forty percent households are considered, they account for about 82.7% of the total hunger incidence and 99.8% of sever to chronic hunger incidence.

Table 1.7. Hunger incidence by economic characteristics, 2006

CHARACTERISTIC	OVERALL	SLIGHT TO PERHAPS TRANSITORY	MODERATE	SEVERE TO CHRONIC
Sector of employment				
Agriculture	24.6	2.3	17.9	4.5
Mining & Quarrying	22.2	1.8	13.8	6.6
Manufacturing	7.5	1.0	6.0	0.6
Electricity, Gas and Water	1.8	0.3	1.4	0.0
Construction	12.1	1.5	9.7	1.0
Wholesale & Retail Trade	7.4	1.8	5.0	0.6
Transportation & Telecommunications	7.7	1.2	6.0	0.5
Finance	2.4	1.0	1.3	0.0
Services	6.8	1.6	4.7	0.5
Class of worker				
Works for Private Household	12.8	2.6	9.3	0.9
Works for Private Establishments	12.2	1.3	9.4	1.5
Works for Gov't/Gov't Corporation	5.8	1.6	3.8	0.4
Self Employed	19.6	2.2	13.9	3.5
Employer	10.5	1.6	7.9	1.0
With Pay (family operated)	13.3	2.8	10.5	0.0
Without Pay (family operated)	10.7	1.5	7.4	1.8
Income quintile				
1st - poorest	34.9	1.2	24.9	8.8
2nd	20.3	2.1	17.6	0.6
3rd	8.7	3.1	5.5	0.0
4th	2.4	1.7	0.7	0.0
5th - richest	0.6	0.5	0.0	0.0

Source: Authors' computations based on FIES.

1.3 Underlying Causes of Hunger

In this section, we investigate the underlying causes of hunger. We begin with an analytical framework and then the model. Following this, we discuss the results of the estimation. We conclude the section with a synthesis of the results.

Analytical Framework

The official definition of the hungry compares the food consumption against the food threshold. This seems to be similar to the definition of the subsistence poor, but a closer examination would reveal noteworthy differences.

Following is a chart depicting the minimum utility level that an individual must attain in order to be considered as nonpoor. The utility curve is drawn along the food-nonfood space and let us denote the benchmark utility level as U_0.

Figure 1.6.
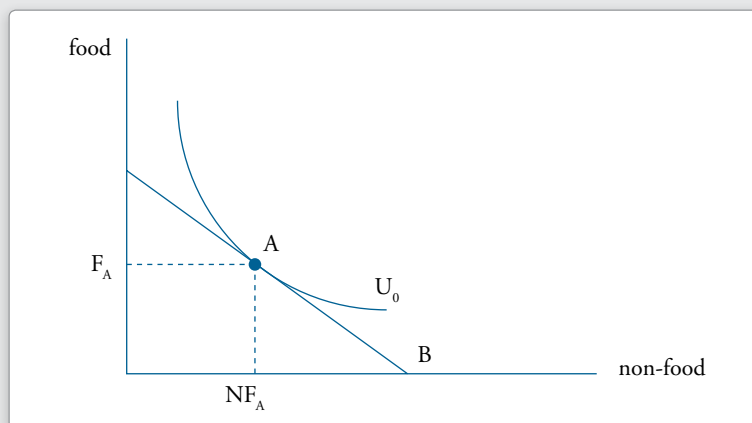
The point, labeled A, represents a consumption basket consisting of F_A amount of food and NF_A amount of nonfood. This corresponds to the minimum basic needs that an individual must have in order to live decent lives.

The line labeled B is the budget line. It contains the point A and all points along B represent a consumption basket that is just as affordable as A.

An individual is deemed poor if his income[3], drawn as his actual budget line, falls below B. This means that he is unable to afford A, and similarly, any consumption basket along B. On the other hand, a person is deemed hungry if his food consumption falls below F_A.

We now revisit the diagram, but this time, differentiating among the "types" of hungry and non-hungry. We do this by delineating areas in the graph marked by the horizontal line F_A and the budget line B.

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3   Strictly speaking, we should consider his consumption expenditure. The reader is encouraged to read Balisacan 2002 to be familiar with the conceptual and operational issues on the debate.

Figure 1.7.
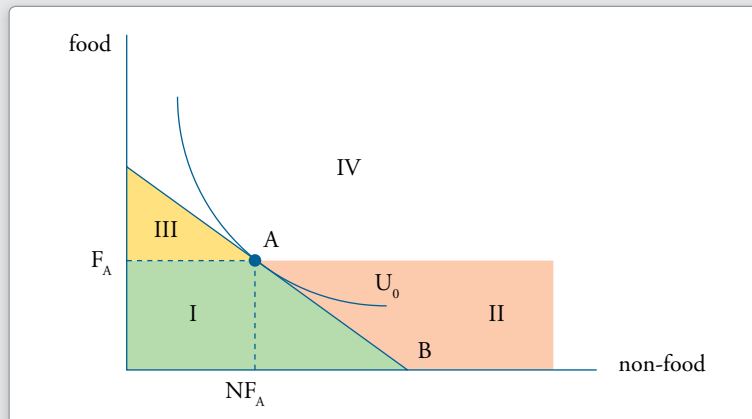
Those in areas labeled **I** go hungry primarily because their income cannot afford them F_A amount of food. They could either be earning a very low income, or they face much higher prices of food or both. Note that if their incomes fall below L, their consumption of food will surely fall below F_A (see Figure 1.8).

Those in areas labeled **II** go hungry, not because they earn low income. In fact, they can afford F_A. We refer back to the theory of revealed preference to understand this phenomenon. This theory explains this as the case where the individual prefers bundle C to bundle A. In effect, this means that the individual faces a different utility curve, one that prefers more NF than F goods. For instance, some families may decide to scrimp on food expenditure in order to send children to good schools. Or, an ailing family member may require more spending on medical care such that spending on food had to be cut back.

Figure 1.8.
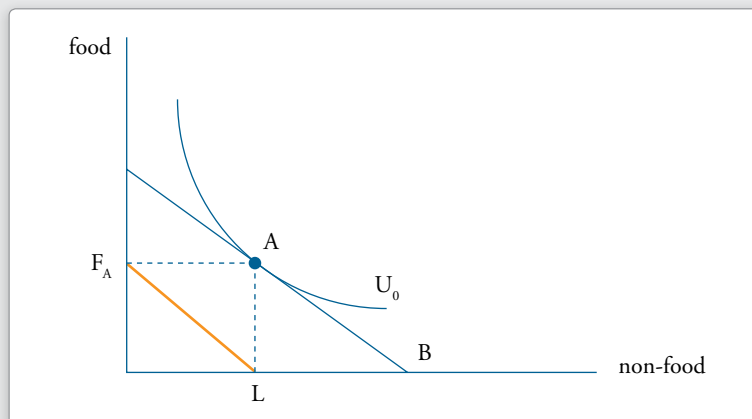
Those in areas labeled **III** are not hungry, even though they are poor. They face a lower budget line and hence enjoy a utility less than the benchmark utility U_0, but their consumption of food is at least F_A. If they face the same relative price of food to nonfood, it must be the case that they prefer food rather than nonfood items. If however, we assume that their preferences are the same as the average Filipino, then, it may be that they face a more favorable price of food, relative to nonfood.

Those in areas labeled **IV** are not hungry and are not poor. Note that even if NF is much preferred to F, a very high income will still ensure food consumption that is at least F_A.[4] Similarly, the impact of high prices on going hungry becomes muted when incomes are high enough.

Finally, it must be said that preferences and budget lines are not constant over time. However, over the short term when there is not much change in household characteristics, income status, etc., preferences are expected to hold. Budget lines, on the other hand, will always move either due to changes in relative prices or incomes. Negative changes could result in hunger. Hence, there should be some consideration of vulnerability—the likelihood of shocks and ability of the family to cope with the shock.

The Model

Guided by the above framework, we now develop a model that includes indicators of income, relative prices, preferences and vulnerability. The model should be relevant and useful to policy makers and program implementers.

Following are the variables that are included in the analysis. Some of these are inherent characteristics of the family; some are structural/economic while others are structural/sectoral.

Family Characteristics

Some family characteristics may reveal income-earning capability, e.g., age and educational attainment of parents. Age of parents may also indicate the likelihood of a shock. Other characteristics may reflect preferences or lifestyle choices.

Employment Characteristics

Tenure of employment can be used as proxy for stability of income streams. The class of worker can indicate access to social protection schemes—SSS, GSIS, ECC, etc. The industry affiliation of working members is also important, as some sectors are prone to boom-bust cycles or seasonality (e.g., agriculture, construction, etc. See Section 1.2 for more discussion.)

Price Volatility

Variability in prices, particularly of cereals, increases the vulnerability of some households. The recent rice price shock, for instance, has resulted in more individuals sliding to poverty[5] and becoming hungry[6]. Unfortunately, the data used in this study covers only the years 2003 and 2006[7]. Hence, the magnitude of price increase was nowhere near the inflation experienced in 2008.

Another variable of interest is the share of cereal consumption that is purchased. A high share implies increased vulnerability to price shocks, if incomes are not high enough. On the other hand, a low share could mean that the family is a subsistence farming household.

Structural Factors

Location of residence of the household can indicate vulnerability to price shocks.

Having a rich neighboring province produces pecuniary benefits. As capacities in the rich province are breached, opportunities for development are created for the less rich province. These can be in the form of more employment opportunities, tenants for residences or even potential homeowners.

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4   We are excluding here the extreme case where an individual really chooses to starve.

5   Asian Development Bank (2008). Soaring Food Prices: Response to the Crisis. May 2008. Downloaded from http://www.adb.org/Documents/Papers/soaring-food-prices/ soaring-food-prices.pdf

6   Social Weather Stations (2009). Fourth Quarter 2008 Social Weather Survey: Self-Rated Poverty stays at 52%. 12 January 2009. Downloaded from http://www.sws.org.ph/pr090112.htm

7   These datasets are the latest as of time of writing. The FIES is scheduled to be conducted in July 2009 and January 2010 which may not capture the price inflation experienced in 2008. See the section on research framework for a discussion of datasets that can be used to analyze the phenomenon of hunger in the Philippines.

A rich province or a neighboring rich province also attracts trade. This implies the presence of extensive trade and market infrastructure. In addition, there could be increased competition resulting in competitive prices.

The impact of having a high proportion of agricultural households can go either way. Provinces with a high proportion of agricultural households have a thin market for agricultural produce. If the neighboring provinces are also mainly agricultural, then higher transportation and transaction costs are incurred in order to expand the market. On the other hand, agricultural provinces have the benefit of abundant supply of food and the ability to safeguard food consumption against demand shocks. Of course, the implicit assumption is that agricultural provinces produce food crops. One only needs to remember the Negros Island famine to realize that the descriptor agricultural needs to be further clarified.

The table following lists the variables included in the model. Note that household income is not explicitly included. For sure, this is a significant variable. However, its inclusion would introduce multicollinearity to the model. This would render as insignificant the other variables that could proxy for income and are more relevant for program design since they could be easily measured and verified.

Table 1.8. Variable Listing

VARIABLE	DEFINITION
Geographical factors (Dummy variables, Region 12 as control)	
REG1	Region 1
REG2	Region 2
REG3	Region 3
REG41	CALABARZON
REG42	MIMAROPA
REG5	Region 5
REG6	Region 6
REG7	Region 7
REG8	Region 8
REG9	Region 9
REG10	Region 10
REG11	Region 11
NCR	National Capital Region
CAR	Cordillera Administrative Region
ARMM	Autonomous Region of Muslim Mindanao
CARAGA	Caraga
Household characteristics	
HD_LES_ELEM	Educational attainment of household head, at least some elementary
HD_ELEM	Educational attainment of household head, at least elementary graduate
HD_LES_HS	Educational attainment of household head, at least some high school
HD_HS	Educational attainment of household head, at least high school graduate
HD_LES_COL	Educational attainment of household head, at least college undergraduate
HD_COL	Educational attainment of household head, at least college graduate
SP_LES_ELEM	Educational attainment of spouse, at least some elementary

Table 1.8. Variable Listing (cont.)

VARIABLE	DEFINITION
Household characteristics	
SP_ELEM	Educational attainment of spouse, at least elementary graduate
SP_LES_HS	Educational attainment of spouse, at least some high school
SP_HS	Educational attainment of spouse, at least high school graduate
SP_LES_COL	Educational attainment of spouse, at least college undergraduate
SP_COL	Educational attainment of spouse, at least college graduate
HDAGE	Age of household head
HDAGE2	Age of household head squared
SPAGE	Age of spouse
SPAGE2	Age of spouse squared
FSIZE	Family size
YDEP_R	Dependency ratio (young dependents only)
Price volatility	
GEN_INF	Inflation, all commodities
RICEVAR	Coefficient of variation of the monthly price of rice
RICE_INF	Inflation, average over 3 years
BUYRICE	Proportion of cereal consumption that is purchased
Employment characteristics	
HD_PRIVHH	Household head works for a private household
HD_PRIVEST	Household head works for a private establishment
HD_SE_NONE	Household head self-employed w/o employees
HD_SE_WID	Household head self-employed w/ employees
HD_FAM_WID	Household head works for family business w/ pay
HD_FAM_NONE	Household head works for family business w/o pay
SP_PRIVHH	Spouse works for a private household
SP_PRIVEST	Spouse works for a private establishment
SP_SE_NONE	Spouse self-employed w/o employees
SP_SE_WID	Spouse self-employed w/ employees
SP_FAM_WID	Spouse works for family business w/ pay
SP_FAM_NONE	Spouse works for family business w/o pay
HDTEN1	Head of household holds a permanent job (at least one year term)
HDTEN2	Head of household holds a short-term job (less than one year)
SPTEN1	Spouse holds a permanent job (at least one year term)
SPTEN2	Spouse holds a short-term job (less than one year)

Table 1.8. Variable Listing (cont.)

VARIABLE	DEFINITION
Employment characteristics	
AGRI	Number of family members employed in agriculture
MNG	Number of family members employed in mining
MFG	Number of family members employed in manufacturing
EGW	Number of family members employed in utilities
CONST	Number of family members employed in construction
TRADE	Number of family members employed in trade
TELCOM	Number of family members employed in transportation and communication
FIN	Number of family members employed in finance
SERV	Number of family members employed in services
Structural factors	
YGINI_00	Income gini, 2000
YGINI_00SQ	Income gini, 2000 (squared)
LN_NEIGHY	Average income of province and neighboring provinces
NEIGH_AGRI	Proportion of agricultural households in province and neighboring provinces
YR06	Year dummy

The model is specified as follows:

$$\mathrm{Prob}_{hjk}(\mathbf{h}unger) = f\left(\mathrm{Dchars}_{hjk}, \mathrm{Echars}_{hjk}, P_j, C_{jk} * \mathrm{Structure}_j\right)$$

where

$\mathrm{Prob}_{hjk}(\mathbf{h}unger)$	is the likelihood that household **h** living in province **j** with neighboring province **k** suffers from hunger
Dchars_{hjk}	is a set of variables representing demographic characteristics of household **h** living in province **j** with neighboring province **k**
Echars_{hjk}	is a set of variables representing employment characteristics of household **h** living in province **j** with neighboring province **k**
P_j	is a set of price characteristics confronting province **j**
C_{jk}	is a contiguity matrix with cell entries equal to 1 if province **j** is accessible from province **k**, 0 otherwise. Note that $C_{jj} = 1$
$\mathrm{Structure}_j$	is a set of structural variables for each province **j**

Comparing the Hungry vs. Non-Hungry

This model simply differentiates the hungry from the non-hungry. Since income is clearly a factor in the incidence of hunger, we expect income variables to be significant.

Table 1.9. Model Comparing the Hungry and Not Hungry

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
Intercept	11.2648	2.1943	26.3558	<.0001	***			
YR06	-0.0285	0.0490	0.3372	0.5614		0.972	0.883	1.070
REG1	0.2138	0.0923	5.3601	0.0206	**	1.238	1.033	1.484
REG2	-0.4365	0.1056	17.0985	<.0001	***	0.646	0.526	0.795
REG3	-0.3400	0.1153	8.6918	0.0032	***	0.712	0.568	0.892
REG41	0.1613	0.1153	1.9557	0.162		1.175	0.937	1.473
REG42	0.5242	0.0799	43.0338	<.0001	***	1.689	1.444	1.975
REG5	0.0384	0.0878	0.1914	0.6618		1.039	0.875	1.234
REG6	-0.0450	0.0787	0.3273	0.5672		0.956	0.819	1.115
REG7	-0.4125	0.0899	21.0295	<.0001	***	0.662	0.555	0.790
REG8	-0.0930	0.0789	1.3869	0.2389		0.911	0.781	1.064
REG9	0.4504	0.0775	33.7551	<.0001	***	1.569	1.348	1.826
REG10	0.4659	0.0784	35.2800	<.0001	***	1.593	1.366	1.858
REG11	0.0460	0.0778	0.3496	0.5543		1.047	0.899	1.220
NCR	-0.7941	0.1529	26.9564	<.0001	***	0.452	0.335	0.610
CAR	0.3535	0.0927	14.5390	0.0001	***	1.424	1.187	1.708
ARMM	0.6528	0.0981	44.2963	<.0001	***	1.921	1.585	2.328
CARAGA	0.7500	0.0843	79.2414	<.0001	***	2.117	1.795	2.497
HD_LES_ELEM	-0.3034	0.0673	20.3565	<.0001	***	0.738	0.647	0.842
HD_ELEM	-0.1750	0.0365	23.0492	<.0001	***	0.839	0.782	0.902
HD_LES_HS	-0.2055	0.0446	21.2710	<.0001	***	0.814	0.746	0.889
HD_HS	-0.1827	0.0503	13.2247	0.0003	***	0.833	0.755	0.919
HD_LES_COL	-0.4334	0.0729	35.3624	<.0001	***	0.648	0.562	0.748

Table 1.9. Model Comparing the Hungry and Not Hungry (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
HD_COL	-0.7764	0.1403	30.6192	<.0001	***	0.460	0.349	0.606
SP_LES_ELEM	-0.2568	0.0693	13.7464	0.0002	***	0.773	0.675	0.886
SP_ELEM	-0.2306	0.0376	37.7104	<.0001	***	0.794	0.738	0.855
SP_LES_HS	-0.2063	0.0418	24.3222	<.0001	***	0.814	0.750	0.883
SP_HS	-0.1307	0.0474	7.6170	0.0058	***	0.877	0.800	0.963
SP_LES_COL	-0.2971	0.0703	17.8675	<.0001	***	0.743	0.647	0.853
SP_COL	-0.5252	0.1119	22.0097	<.0001	***	0.591	0.475	0.737
HD_PRIVHH	0.5173	0.1801	8.2522	0.0041	***	1.677	1.179	2.387
HD_PRIVEST	0.1471	0.0620	5.6222	0.0177	**	1.158	1.026	1.308
HD_SE_NONE	0.3211	0.0636	25.4588	<.0001	***	1.379	1.217	1.562
HD_SE_WID	-0.1876	0.0785	5.7113	0.0169	**	0.829	0.711	0.967
HD_FAM_WID	-0.1476	0.3875	0.1450	0.7034		0.863	0.404	1.844
HD_FAM_NONE	0.0008	0.2215	0.0000	0.9972		1.001	0.648	1.545
SP_PRIVHH	0.4846	0.0925	27.4190	<.0001	***	1.624	1.354	1.946
SP_PRIVEST	0.1824	0.0706	6.6791	0.0098	***	1.200	1.045	1.378
SP_SE_NONE	0.0263	0.0731	0.1298	0.7186		1.027	0.890	1.185
SP_SE_WID	-0.1683	0.1653	1.0375	0.3084		0.845	0.611	1.168
SP_FAM_WID	0.7705	0.4938	2.4350	0.1187		2.161	0.821	5.688
SP_FAM_NONE	0.0817	0.0769	1.1287	0.2880		1.085	0.933	1.262
HDTEN1	-0.3789	0.0557	46.1941	<.0001	***	0.685	0.614	0.764
HDTEN2	-0.1775	0.0615	8.3355	0.0039	***	0.837	0.742	0.945
SPTEN1	-0.1064	0.0671	2.5151	0.1128		0.899	0.788	1.025
SPTEN2	-0.1120	0.0728	2.3694	0.1237		0.894	0.775	1.031
HDAGE	0.0009	0.0110	0.0067	0.9346		1.001	0.979	1.023
HDAGE2	0.0000	0.0001	0.0412	0.8392		1.000	1.000	1.000

Table 1.9. Model Comparing the Hungry and Not Hungry (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
SPAGE	0.0254	0.0108	5.4881	0.0191	**	1.026	1.004	1.048
SPAGE2	-0.0003	0.0001	7.5285	0.0061	***	1.000	0.999	1.000
FSIZE	0.3551	0.0088	1620.4946	<.0001	***	1.426	1.402	1.451
YDEP_R	1.2756	0.0880	209.9546	<.0001	***	3.581	3.013	4.255
BUYRICE	-0.2041	0.0579	12.4181	0.0004	***	0.815	0.728	0.913
AGRI	0.1583	0.0155	103.7913	<.0001	***	1.172	1.136	1.208
MNG	0.1081	0.0776	1.9428	0.1634		1.114	0.957	1.297
MFG	-0.1723	0.0325	28.1611	<.0001	***	0.842	0.790	0.897
EGW	-0.7323	0.2636	7.7192	0.0055	***	0.481	0.287	0.806
CONST	-0.1778	0.0437	16.5226	<.0001	***	0.837	0.768	0.912
TRADE	-0.3051	0.0273	125.3063	<.0001	***	0.737	0.699	0.777
TELCOM	-0.3210	0.0414	60.1659	<.0001	***	0.725	0.669	0.787
FIN	-0.8163	0.1127	52.4901	<.0001	***	0.442	0.354	0.551
SERV	-0.1802	0.0307	34.3511	<.0001	***	0.835	0.786	0.887
GEN_INF	9.1218	0.8696	110.0209	<.0001	***	>999.999	>999.999	>999.999
RICEVAR	-1.7159	0.7482	5.2595	0.0218	**	0.180	0.041	0.779
RICE_INF	-4.3497	0.6296	47.7252	<.0001	***	0.013	0.004	0.044
YGINI_00	3.8834	2.7800	1.9514	0.1624		48.588	0.209	>999.999
YGINI_00SQ	-0.2524	3.1688	0.0063	0.9365		0.777	0.002	386.959
LN_NEIGHY	-1.5586	0.1983	61.7942	<.0001	***	0.210	0.143	0.310
NEIGH_AGRI	-1.2361	0.3315	13.9019	0.0002	***	0.291	0.152	0.556

Association of Predicted Probabilities and Observed Responses	
Percent Concordant	85.7
Percent Discordant	14.1
Percent Tied	0.2
C	0.858

Household characteristics

Large families and those with high dependency ratios are more likely to go hungry. The age of the spouse is also a significant variable, but not the age of the household head. The impact of age of the spouse is nonlinear in that the probability of being hungry increases with age until age 42, then decreases thereafter. This could be indicative of the wealth of the household which is expected to build up after a number of years of productive employment.

Other things remaining the same, families with educated parents have less probability of being hungry. Additional education will reduce the probability even more.

Employment characteristics

A family whose head has been working for different employers over a period of 3 months is more likely to go hungry. A contractual worker, even if less than one year, is 15% less likely to hungry. If the household head works under a longer-term contract (at least one year), the likelihood is reduced by 33%.

Sector of employment affects the likelihood of going hungry. The more members there are in the family working in agriculture, the higher this likelihood. Workers in agriculture are paid low returns for their labor. In addition, they are subject to many and varied shocks—geoclimatic, pests, shocks in the price of inputs, etc. On the other hand, we find that households with the most number of workers in the finance sector are the least likely to go hungry.

Price Volatility

High levels of overall inflation increase the likelihood of going hungry. Interestingly, high levels of inflation and volatility in the price of rice reduces the likelihood of going hungry. Of course, this result has to be taken ceteris paribus. Given two provinces, say P1 and P2 with the same level of general inflation, the province with lower food inflation, say P1, will host the higher incidence of the hungry. Note that the price situation is such that inflation of nonfood prices in P1 is higher. A number of these items are regular expenditures like tuition fees, house rental, utilities; hence the family will absorb the higher price and probably scrimp on food consumption if there is no savings. In contrast, in P2, it may be the case that the higher food price has translated into higher returns for the producers of food—agriculture workers. This then leads to lower incidence of hunger.

The above result should be taken with a grain of salt. Recall that the data on which this is based only covers the years 2003 and 2006, when there was no incident of hyperinflation in food. It may very well be the case that the impact of relative prices on the incidence of hunger is nonlinear, where it becomes positive at very high levels of food inflation, given a high level of general inflation.

Structural Factors

Residing in a rich province or having a rich neighboring province reduces the probability of suffering from hunger. Provinces with a high proportion of agricultural households, other factors remaining the same, also have lower incidence of hunger. These findings, taken together, support our earlier discussion where the province could be enjoying extensive trade and market infrastructure. Being adjacent to food supply further reduces transport and marketing costs.

Some regions also exhibit higher probability of being hungry (compared against Region 12): Ilocos, MIMAROPA, Western and Northern Mindanao, CAR, ARMM and CARAGA. On the other hand, we observe lower probability in the following regions: Cagayan Valley, Central Luzon, Central Visayas and NCR.

Comparing the Hungry Poor vs. Non-Hungry Poor

In the following, we consider only the poor and try to determine the factors that differentiate the hungry poor from the non-hungry poor. We expect these variables to reflect differences in preferences, relative prices and vulnerability to shocks.

Family Characteristics

The hungry poor has a bigger family size, although there is no significant difference with respect to dependency ratio compared against the non-hungry poor. The spouse is also much younger than 46 years old. Most probably, the parents

have not received any formal education at all since even a few years in elementary would have reduced significantly the probability of going hungry.

Table 1.10. Model Comparing the Hungry Poor and Non-Hungry Poor

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
Intercept	1.4941	2.7782	0.2892	0.5907				
YR06	-0.0437	0.0588	0.5540	0.4567		0.957	0.853	1.074
REG1	-0.0388	0.1130	0.1178	0.7314		0.962	0.771	1.200
REG2	-0.4870	0.1307	13.8751	0.0002	***	0.614	0.476	0.794
REG3	-0.3844	0.1371	7.8585	0.0051	***	0.681	0.520	0.891
REG41	-0.0684	0.1359	0.2532	0.6148		0.934	0.715	1.219
REG42	0.4187	0.0946	19.5948	<.0001	***	1.520	1.263	1.830
REG5	-0.0282	0.1047	0.0727	0.7874		0.972	0.792	1.194
REG6	-0.0244	0.0942	0.0669	0.7959		0.976	0.811	1.174
REG7	-0.1237	0.1113	1.2352	0.2664		0.884	0.710	1.099
REG8	-0.0489	0.0940	0.2702	0.6032		0.952	0.792	1.145
REG9	0.5618	0.0948	35.0929	<.0001	***	1.754	1.456	2.112
REG10	0.4200	0.0940	19.9455	<.0001	***	1.522	1.266	1.830
REG11	0.1917	0.0939	4.1685	0.0412	**	1.211	1.008	1.456
NCR	-0.7823	0.1941	16.2418	<.0001	***	0.457	0.313	0.669
CAR	0.1062	0.1158	0.8414	0.3590		1.112	0.886	1.395
ARMM	0.5685	0.1134	25.1396	<.0001	***	1.766	1.414	2.205
CARAGA	0.5900	0.1014	33.8815	<.0001	***	1.804	1.479	2.201
HD_LES_ELEM	-0.2409	0.0762	9.9898	0.0016	***	0.786	0.677	0.913
HD_ELEM	-0.0668	0.0431	2.4041	0.1210		0.935	0.860	1.018
HD_LES_HS	-0.1531	0.0535	8.1785	0.0042	***	0.858	0.773	0.953
HD_HS	-0.0213	0.0617	0.1192	0.7299		0.979	0.867	1.105

Table 1.10. Model Comparing the Hungry Poor and Non-Hungry Poor (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
HD_LES_COL	-0.0507	0.0964	0.2769	0.5987		0.951	0.787	1.148
HD_COL	-0.4623	0.2416	3.6612	0.0557	*	0.630	0.392	1.011
SP_LES_ELEM	-0.1713	0.0787	4.7429	0.0294	**	0.843	0.722	0.983
SP_ELEM	-0.1994	0.0442	20.3554	<.0001	***	0.819	0.751	0.893
SP_LES_HS	-0.1161	0.0498	5.4285	0.0198	**	0.890	0.808	0.982
SP_HS	-0.0551	0.0573	0.9226	0.3368		0.946	0.846	1.059
SP_LES_COL	-0.0596	0.0926	0.4141	0.5199		0.942	0.786	1.130
SP_COL	0.0424	0.1691	0.0628	0.8022		1.043	0.749	1.453
HD_PRIVHH	0.4959	0.2646	3.5132	0.0609	*	1.642	0.978	2.758
HD_PRIVEST	-0.0607	0.0795	0.5828	0.4452		0.941	0.805	1.100
HD_SE_NONE	0.1218	0.0824	2.1846	0.1394		1.130	0.961	1.327
HD_SE_WID	-0.1854	0.0999	3.4425	0.0635	*	0.831	0.683	1.011
HD_FAM_WID	-0.4718	0.4374	1.1635	0.2807		0.624	0.265	1.470
HD_FAM_NONE	-0.1318	0.2780	0.2248	0.6354		0.877	0.508	1.512
SP_PRIVHH	0.1733	0.1175	2.1769	0.1401		1.189	0.945	1.497
SP_PRIVEST	0.1550	0.0887	3.0540	0.0805	*	1.168	0.981	1.389
SP_SE_NONE	-0.0093	0.0940	0.0097	0.9215		0.991	0.824	1.191
SP_SE_WID	0.1788	0.2331	0.5885	0.4430		1.196	0.757	1.888
SP_FAM_WID	1.1129	0.6841	2.6461	0.1038		3.043	0.796	11.632
SP_FAM_NONE	-0.0151	0.0970	0.0242	0.8763		0.985	0.814	1.191
HDTEN1	-0.3189	0.0681	21.9371	<.0001	***	0.727	0.636	0.831
HDTEN2	-0.1843	0.0733	6.3278	0.0119	**	0.832	0.720	0.960
SPTEN1	-0.1166	0.0867	1.8077	0.1788		0.890	0.751	1.055
SPTEN2	-0.2016	0.0912	4.8909	0.0270	**	0.817	0.684	0.977
HDAGE	0.0104	0.0129	0.6490	0.4205		1.010	0.985	1.036

Table 1.10. Model Comparing the Hungry Poor and Non-Hungry Poor (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
HDAGE2	-0.0001	0.0001	0.3531	0.5524		1.000	1.000	1.000
SPAGE	0.0276	0.0127	4.7150	0.0299	**	1.028	1.003	1.054
SPAGE2	-0.0003	0.0001	4.2319	0.0397	**	1.000	0.999	1.000
FSIZE	0.2740	0.0114	577.6767	<.0001	***	1.315	1.286	1.345
YDEP_R	0.0275	0.1119	0.0604	0.8058		1.028	0.825	1.280
BUYRICE	-0.1216	0.0695	3.0638	0.0801	*	0.885	0.773	1.015
AGRI	0.1199	0.0190	39.8981	<.0001	***	1.127	1.086	1.170
MNG	0.1755	0.0980	3.2073	0.0733	*	1.192	0.984	1.444
MFG	0.0363	0.0424	0.7355	0.3911		1.037	0.954	1.127
EGW	-0.1909	0.4737	0.1624	0.6869		0.826	0.327	2.091
CONST	-0.0285	0.0574	0.2461	0.6199		0.972	0.868	1.088
TRADE	-0.0786	0.0354	4.9443	0.0262	**	0.924	0.863	0.991
TELCOM	-0.0687	0.0554	1.5382	0.2149		0.934	0.838	1.041
FIN	-0.3055	0.1817	2.8262	0.0927	*	0.737	0.516	1.052
SERV	0.1094	0.0455	5.7764	0.0162	**	1.116	1.020	1.220
GEN_INF	6.0151	1.0647	31.9190	<.0001	***	409.573	50.825	>999.999
RICEVAR	-2.4202	0.8926	7.3525	0.0067	***	0.089	0.015	0.511
RICE_INF	-4.1526	0.7413	31.3811	<.0001	***	0.016	0.004	0.067
YGINI_00	7.4457	3.3308	4.9970	0.0254	**	>999.999	2.503	>999.999
YGINI_00SQ	-4.9686	3.7947	1.7144	0.1904		0.007	<0.001	11.808
LN_NEIGHY	-0.5681	0.2506	5.1386	0.0234	**	0.567	0.347	0.926
NEIGH_AGRI	-0.4242	0.4226	1.0077	0.3154		0.654	0.286	1.498

Association of Predicted Probabilities and Observed Responses	
Percent Concordant	71.5
Percent Discordant	28.2
Percent Tied	0.3
C	0.717

Employment Characteristics

Families who are more likely to go hungry are those with many members engaged in agriculture, mining and services. Note that the latter sectors do not appear in the previous model. Since the subsample is only the poor, workers in these sectors are probably informal workers.

If the head of household is employed in a private household and the spouse is employed in a private establishment, the higher the likelihood of going hungry.

On the other hand, having a permanent job or being employed by a single employer reduces the probability of being hungry.

Price Volatility

The family with the higher proportion of bought rice is less likely to be hungry. Other things remaining the same, this variable could be capturing the extent of market participation of the household. Even if the household is agricultural, it could be that they do not plant rice for subsistence.

The impact of relative price movements is the same as above—higher general inflation increases the likelihood of going hungry, while higher inflation in the price of rice and higher variability reduces this likelihood.

Structural Factors

A province with high income inequality is more likely to have more of the hungry poor. Although being in a rich province or adjacent to one reduces this probability. This means that the advantages of a good trade and marketing infrastructure remain, but the poor is bound to be marginalized even more if there is severe inequality in the province.

Some regions appear to host a higher proportion of the hungry poor (compared to region 12): MIMAROPA, Western and Northern Mindanao, Davao region, ARMM and CARAGA. In contrast, a lower proportion of the hungry poor is observed in Cagayan Valley, Central Luzon and NCR.

Comparing the Hungry Nonpoor vs. Non-Hungry Nonpoor

Among the nonpoor, there are the hungry and non-hungry. In the following model, we seek to explain the distinction. Perhaps there is some level of income that makes the household still vulnerable, despite being able to earn above the poverty line. We then expect factors that reflect differences in coping ability towards shocks and even differences in preferences to figure prominently in the model.

Family Characteristics

The nonpoor with a bigger family size is more likely to go hungry, ceteris paribus. The other characteristics do not significantly differ—dependency ratio, age of household head and spouse.

Education of parents does matter. The family whose parents have some college education is less likely to go hungry.

Employment Characteristics

A nonpoor family whose head is employed in a private household is more likely to go hungry. In contrast, someone who is self-employed but with at least one employee is less likely to go hungry. Note that the latter category implies that the family business is able to generate surplus enough to employ others.

Tenure of employment cannot discriminate between the two groups, but sector of employment does. Agricultural and mining households are more likely to go hungry, although they are nonpoor. Note that these households are nonpoor, hence they earn decent returns for their labor. The feature that could be increasing their likelihood of going hungry is their vulnerability to shocks—higher probability of occurrence and less ability to cope with the shock. In contrast, a family with more members working in the financial sector is less likely to go hungry.

Table 1.11. Model Comparing the Hungry Non-Poor and Non-Hungry Non-Poor

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
Intercept	1.9511	4.6958	0.1726	0.6778				
YR06	0.0051	0.1158	0.0020	0.9647		1.005	0.801	1.261
REG1	0.2744	0.2014	1.8562	0.1731		1.316	0.887	1.952
REG2	-0.4716	0.2231	4.4659	0.0346	**	0.624	0.403	0.966
REG3	-1.0819	0.2842	14.4911	0.0001	***	0.339	0.194	0.592
REG41	-0.3684	0.2768	1.7713	0.1832		0.692	0.402	1.190
REG42	0.3214	0.1921	2.7997	0.0943	*	1.379	0.946	2.010
REG5	-0.0817	0.2148	0.1447	0.7036		0.922	0.605	1.404
REG6	-0.4832	0.1972	6.0024	0.0143	**	0.617	0.419	0.908
REG7	-0.3141	0.2029	2.3970	0.1216		0.730	0.491	1.087
REG8	0.0606	0.1836	0.1088	0.7415		1.062	0.741	1.523
REG9	-0.3696	0.2101	3.0929	0.0786	*	0.691	0.458	1.043
REG10	-0.0624	0.1935	0.1042	0.7469		0.939	0.643	1.373
REG11	-0.3587	0.1920	3.4897	0.0618	*	0.699	0.479	1.018
NCR	-1.0086	0.3194	9.9710	0.0016	***	0.365	0.195	0.682
CAR	0.4435	0.1980	5.0147	0.0251	**	1.558	1.057	2.297
ARMM	0.5655	0.2421	5.4580	0.0195	**	1.760	1.095	2.829
CARAGA	0.5222	0.2015	6.7161	0.0096	***	1.686	1.136	2.502
HD_LES_ELEM	-0.0056	0.1804	0.0010	0.9754		0.994	0.698	1.416
HD_ELEM	-0.1642	0.0926	3.1427	0.0763	*	0.849	0.708	1.017
HD_LES_HS	-0.2084	0.1096	3.6124	0.0573	*	0.812	0.655	1.007
HD_HS	-0.1392	0.1171	1.4127	0.2346		0.870	0.692	1.095
HD_LES_COL	-0.4624	0.1483	9.7280	0.0018	***	0.630	0.471	0.842
HD_COL	-0.2704	0.2085	1.6817	0.1947		0.763	0.507	1.148
SP_LES_ELEM	-0.2735	0.1778	2.3662	0.1240		0.761	0.537	1.078
SP_ELEM	0.1009	0.0987	1.0451	0.3066		1.106	0.912	1.342

Table 1.11. Model Comparing the Hungry Non-Poor and Non-Hungry Non-Poor (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
SP_LES_HS	-0.1898	0.1046	3.2961	0.0694	*	0.827	0.674	1.015
SP_HS	0.0598	0.1130	0.2804	0.5964		1.062	0.851	1.325
SP_LES_COL	-0.2358	0.1403	2.8253	0.0928	*	0.790	0.600	1.040
SP_COL	-0.4441	0.1885	5.5522	0.0185	**	0.641	0.443	0.928
HD_PRIVHH	0.6999	0.3243	4.6571	0.0309	**	2.014	1.066	3.802
HD_PRIVEST	-0.0831	0.1348	0.3801	0.5376		0.920	0.707	1.198
HD_SE_NONE	0.0087	0.1339	0.0043	0.9480		1.009	0.776	1.312
HD_SE_WID	-0.4880	0.1725	8.0038	0.0047	***	0.614	0.438	0.861
HD_FAM_WID	-0.3851	1.0817	0.1268	0.7218		0.680	0.082	5.669
HD_FAM_NONE	-0.2250	0.4396	0.2619	0.6088		0.799	0.337	1.890
SP_PRIVHH	0.0201	0.2263	0.0079	0.9293		1.020	0.655	1.590
SP_PRIVEST	-0.0053	0.1579	0.0011	0.9730		0.995	0.730	1.355
SP_SE_NONE	-0.0894	0.1525	0.3439	0.5576		0.914	0.678	1.233
SP_SE_WID	-0.3973	0.3311	1.4395	0.2302		0.672	0.351	1.286
SP_FAM_WID	0.2758	1.0710	0.0663	0.7968		1.318	0.161	10.749
SP_FAM_NONE	-0.1044	0.1711	0.3724	0.5417		0.901	0.644	1.260
HDTEN1	-0.1348	0.1320	1.0430	0.3071		0.874	0.675	1.132
HDTEN2	-0.2894	0.1586	3.3297	0.0680	*	0.749	0.549	1.022
SPTEN1	0.1242	0.1423	0.7610	0.3830		1.132	0.857	1.497
SPTEN2	0.2300	0.1631	1.9888	0.1585		1.259	0.914	1.733
HDAGE	0.0189	0.0296	0.4088	0.5226		1.019	0.962	1.080
HDAGE2	-0.0002	0.0003	0.2870	0.5921		1.000	0.999	1.000
SPAGE	0.0408	0.0290	1.9810	0.1593		1.042	0.984	1.102
SPAGE2	-0.0004	0.0003	1.7258	0.1890		1.000	0.999	1.000
FSIZE	0.2736	0.0190	206.5655	<.0001	***	1.315	1.267	1.365

Table 1.11. Model Comparing the Hungry Non-Poor and Non-Hungry Non-Poor (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
YDEP_R	0.1902	0.2011	0.8944	0.3443		1.209	0.816	1.794
BUYRICE	-0.0684	0.1460	0.2191	0.6397		0.934	0.701	1.243
AGRI	0.1984	0.0353	31.5645	<.0001	***	1.219	1.138	1.307
MNG	0.2806	0.1666	2.8374	0.0921	*	1.324	0.955	1.835
MFG	-0.0917	0.0724	1.6051	0.2052		0.912	0.792	1.051
EGW	-0.0098	0.3524	0.0008	0.9779		0.990	0.496	1.976
CONST	0.1392	0.0862	2.6094	0.1062		1.149	0.971	1.361
TRADE	-0.0512	0.0518	0.9796	0.3223		0.950	0.858	1.052
TELCOM	0.0439	0.0763	0.3307	0.5653		1.045	0.900	1.213
FIN	-0.2928	0.1631	3.2237	0.0726	*	0.746	0.542	1.027
SERV	0.0028	0.0568	0.0024	0.9611		1.003	0.897	1.121
GEN_INF	6.3380	2.0282	9.7654	0.0018	***	565.662	10.621	>999.999
RICEVAR	0.4462	1.7505	0.0650	0.7988		1.562	0.051	48.285
RICE_INF	-3.1983	1.5128	4.4696	0.0345	**	0.041	0.002	0.792
YGINI_00	-19.8842	6.7371	8.7109	0.0032	***	<0.001	<0.001	0.001
YGINI_00SQ	23.9746	7.7753	9.5075	0.0020	***	>999.999	>999.999	>999.999
LN_NEIGHY	-0.3816	0.4280	0.7951	0.3726		0.683	0.295	1.580
NEIGH_AGRI	0.5212	0.7081	0.5417	0.4617		1.684	0.420	6.747

Association of Predicted Probabilities and Observed Responses	
Percent Concordant	80.4
Percent Discordant	17.9
Percent Tied	1.6
C	0.812

Price Volatility

Similar to previous results, high overall inflation increases probability of being hungry. However, given two households residing in two provinces with the same inflation rate, but with different rice price inflation rates, the one living in the province with the higher rice price inflation rate is less likely to go hungry. This demonstrates the more adverse effect of nonfood

inflation especially among the nonpoor households where a lot of these expenditures cannot be immediately reduced.

The impact of inequality is different from the previous results. It is nonlinear, where a higher level of inequality reduces the probability that a nonpoor household would go hungry; but at very high levels of inequality (representing about 2/3 of provinces) the probability then increases. It could mean that in low-inequality provinces, the threshold income in order not to go hungry is much lower. In contrast, in high-inequality provinces, this threshold income is much higher. The figures below illustrate this.

Figure 1.9 represents two provinces with low-level inequality. Province L_A has much lower level inequality than province L_B. If the threshold income is YT, then clearly this corresponds to a much lower probability for province L_A.

Figure 1.9.
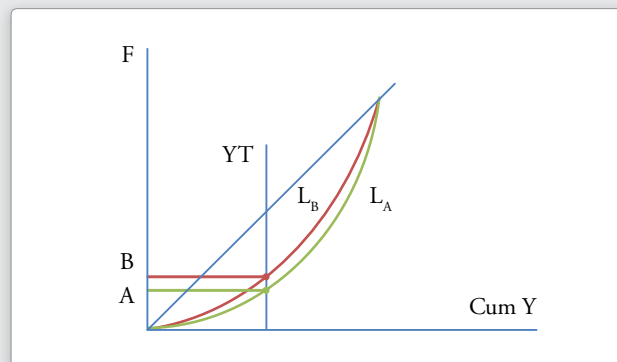
Figure 1.10 represents two provinces with high-level inequality. Province HA has much higher level inequality that province HB. This means that curve of the cumulative income distribution of HA intersects that of HB after a point. If the threshold income occurs after this point of intersection, then the probability that a nonpoor in HA will go hungry is much higher than in HB.

While the above discussion gives plausible explanations, it does not say why the threshold income would be pushed to higher levels in high-inequality provinces. Perhaps the standard of living is much higher to the extent that spending on convenience items becomes "necessary" (the norm, perhaps?).

Figure 1.10.
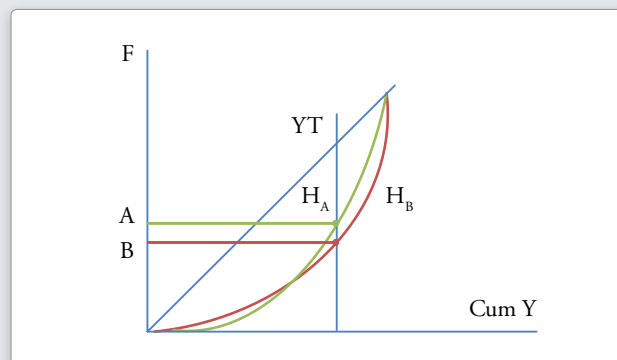
Comparing the Hungry Poor vs. Hungry Non-Poor

For completeness, we also compare the hungry poor against the hungry non-poor. Note that the difference is really their incomes. In this case, we are more interested in commonalities rather than differences.

Table 1.12. Model Comparing the Hungry Poor and Hungry Non-Poor

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
Intercept	-7.9552	6.0053	1.7549	0.1853				
YR06	-0.1008	0.1313	0.5893	0.4427		0.904	0.699	1.169
REG1	-0.0441	0.2454	0.0323	0.8573		0.957	0.591	1.548
REG2	0.5535	0.2689	4.2389	0.0395	**	1.739	1.027	2.946
REG3	-1.1654	0.3209	13.1876	0.0003	***	0.312	0.166	0.585
REG41	-0.7725	0.3006	6.6032	0.0102	**	0.462	0.256	0.833
REG42	-0.3975	0.2158	3.3943	0.0654	*	0.672	0.440	1.026
REG5	-0.4118	0.2498	2.7168	0.0993	*	0.662	0.406	1.081
REG6	-0.6122	0.2248	7.4160	0.0065	***	0.542	0.349	0.842
REG7	0.2516	0.2467	1.0401	0.3078		1.286	0.793	2.086
REG8	0.1251	0.2073	0.3639	0.5463		1.133	0.755	1.701
REG9	-0.9706	0.2414	16.1663	<.0001	***	0.379	0.236	0.608
REG10	-0.7929	0.2164	13.4298	0.0002	***	0.453	0.296	0.692
REG11	-0.3058	0.2164	1.9967	0.1576		0.737	0.482	1.126
NCR	-0.2727	0.3869	0.4969	0.4809		0.761	0.357	1.625
CAR	0.1278	0.2476	0.2667	0.6056		1.136	0.700	1.846
ARMM	-0.3970	0.2625	2.2875	0.1304		0.672	0.402	1.125
CARAGA	-0.6097	0.2347	6.7485	0.0094	***	0.543	0.343	0.861
HD_LES_ELEM	0.1761	0.1765	0.9951	0.3185		1.193	0.844	1.685
HD_ELEM	0.2126	0.1030	4.2611	0.0390	**	1.237	1.011	1.514
HD_LES_HS	0.0251	0.1253	0.0402	0.8411		1.025	0.802	1.311
HD_HS	0.2426	0.1359	3.1901	0.0741	*	1.275	0.977	1.663
HD_LES_COL	0.0802	0.1841	0.1897	0.6632		1.083	0.755	1.554

Table 1.12. Model Comparing the Hungry Poor and Hungry Non-Poor (cont.)

| Variables | PARAMETER ESTIMATES | | | | | ODDS RATIO ESTIMATES | | |
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
HD_COL	1.1498	0.3284	12.2568	0.0005	***	3.158	1.659	6.011
SP_LES_ELEM	-0.1759	0.1720	1.0452	0.3066		0.839	0.599	1.175
SP_ELEM	0.5398	0.1082	24.8886	<.0001	***	1.716	1.388	2.121
SP_LES_HS	0.0045	0.1182	0.0015	0.9693		1.005	0.797	1.267
SP_HS	0.2489	0.1288	3.7350	0.0533	*	1.283	0.996	1.651
SP_LES_COL	0.1332	0.1756	0.5754	0.4481		1.143	0.810	1.612
SP_COL	0.6552	0.2605	6.3258	0.0119	**	1.926	1.156	3.209
HD_PRIVHH	0.0667	0.4086	0.0267	0.8703		1.069	0.480	2.381
HD_PRIVEST	-0.3591	0.1570	5.2276	0.0222	**	0.698	0.513	0.950
HD_SE_NONE	-0.5005	0.1569	10.1794	0.0014	***	0.606	0.446	0.824
HD_SE_WID	-0.1569	0.2038	0.5929	0.4413		0.855	0.573	1.274
HD_FAM_WID	-0.4080	1.1028	0.1369	0.7114		0.665	0.077	5.774
HD_FAM_NONE	-0.9390	0.5970	2.4739	0.1158		0.391	0.121	1.260
SP_PRIVHH	-1.0231	0.2544	16.1683	<.0001	***	0.359	0.218	0.592
SP_PRIVEST	-0.5407	0.1870	8.3579	0.0038	***	0.582	0.404	0.840
SP_SE_NONE	-0.3328	0.1812	3.3724	0.0663	*	0.717	0.503	1.023
SP_SE_WID	-0.0533	0.4070	0.0171	0.8958		0.948	0.427	2.105
SP_FAM_WID	-0.6405	1.2141	0.2783	0.5978		0.527	0.049	5.693
SP_FAM_NONE	-0.4634	0.1977	5.4939	0.0191	**	0.629	0.427	0.927
HDTEN1	0.3270	0.1518	4.6424	0.0312	**	1.387	1.030	1.867
HDTEN2	-0.2867	0.1762	2.6481	0.1037		0.751	0.532	1.060
SPTEN1	0.4460	0.1697	6.9033	0.0086	***	1.562	1.120	2.179
SPTEN2	0.4295	0.1908	5.0675	0.0244	**	1.537	1.057	2.233
HDAGE	0.0288	0.0323	0.7926	0.3733		1.029	0.966	1.097
HDAGE2	-0.0003	0.0003	1.1553	0.2824		1.000	0.999	1.000

Table 1.12. Model Comparing the Hungry Poor and Hungry Non-Poor (cont.)

Variables	PARAMETER ESTIMATES					ODDS RATIO ESTIMATES		
	β estimate	Standard error	Chi-Square	Pr > ChiSq		Point estimate	95% Wald Confidence limits	
SPAGE	0.0283	0.0320	0.7828	0.3763		1.029	0.966	1.095
SPAGE2	-0.0001	0.0003	0.0875	0.7674		1.000	0.999	1.001
FSIZE	-0.2054	0.0246	69.4197	<.0001	***	0.814	0.776	0.855
YDEP_R	-2.5489	0.2313	121.4043	<.0001	***	0.078	0.050	0.123
BUYRICE	0.2717	0.1640	2.7446	0.0976	*	1.312	0.951	1.809
AGRI	0.0242	0.0380	0.4072	0.5234		1.025	0.951	1.104
MNG	0.2024	0.1714	1.3950	0.2376		1.224	0.875	1.713
MFG	0.2973	0.0812	13.4110	0.0003	***	1.346	1.148	1.578
EGW	1.8081	0.5399	11.2151	0.0008	***	6.099	2.117	17.571
CONST	0.6600	0.1043	40.0226	<.0001	***	1.935	1.577	2.374
TRADE	0.4950	0.0606	66.7123	<.0001	***	1.641	1.457	1.847
TELCOM	0.7584	0.0930	66.5719	<.0001	***	2.135	1.779	2.561
FIN	1.2681	0.2471	26.3315	<.0001	***	3.554	2.190	5.769
SERV	0.5917	0.0728	65.9884	<.0001	***	1.807	1.567	2.084
GEN_INF	-3.8725	2.3709	2.6678	0.1024		0.021	<0.001	2.169
RICEVAR	4.5513	1.8760	5.8859	0.0153	**	94.754	2.397	>999.999
RICE_INF	1.9698	1.6698	1.3916	0.2381		7.169	0.272	189.167
YGINI_00	-37.1968	7.3482	25.6239	<.0001	***	<0.001	<0.001	<0.001
YGINI_00SQ	37.3885	8.4581	19.5401	<.0001	***	>999.999	>999.999	>999.999
LN_NEIGHY	1.3912	0.5471	6.4654	0.0110	**	4.020	1.376	11.747
NEIGH_AGRI	1.2410	0.9555	1.6870	0.1940		3.459	0.532	22.506

Association of Predicted Probabilities and Observed Responses	
Percent Concordant	82.2
Percent Discordant	17.4
Percent Tied	0.4
C	0.824

The model, in a way, supports earlier findings. We find that both types of families have the same age profile of parents. They would also have either very low education or have reached college but did not finish. Both families would have many working members engaged in agriculture or mining. They also face the same levels of general and rice price inflation. They also reside in provinces with almost the same proportion of agricultural households.

1.4 Concluding Remarks

We conclude this component by synthesizing the findings and what it means for policy.

There are some regions that make for a higher probability of being hungry, ceteris paribus. Among the poor, those in Mindanao are more likely to go hungry. While among the nonpoor, those residing in ARMM, CARAGA and CAR are more likely to go hungry. The Mindanao regions are less likely to suffer from geoclimatic shocks, but most likely from man-made shocks, especially armed conflict. Trade and market infrastructure is also limited. In CAR, the latter would be the more plausible reason for the higher vulnerability.

Residing in a rich province or near one reduces the probability of going hungry. If there is a neighboring agricultural province, then so much the better. This should guide the development of regional urban centers that is strategically linked to the periphery. The objective is to stimulate trade and market linkages.

High inflation increases the vulnerability of households to hunger. In particular, high price of nonfood items relative to food implies that the terms of trade is against the producers of food. This means a lower return to agricultural labor; at the same time they will need to shell out more money to meet their nonfood needs. This is true even among the nonpoor, perhaps because a number of these nonfood spending have become "necessary conveniences."

Households with parents who are younger and are less educated are also more likely to go hungry. Perhaps this reflects the low level of wealth build-up of these households, and therefore, their inability to cope with shocks. This supports the cash for work programs of government. In addition, saving should be encouraged.

Again, we should not forget that hyperinflation in food could also produce disastrous results. If the agricultural sector is not able to respond to the high prices by producing more, perhaps due to high input costs, then both agriculture and non-agriculture sectors suffer. What this means that agricultural productivity programs should still be pursued.

The objective is not to enable each household to produce its own food, but for the agriculture sector to produce surplus enough to trade with the domestic market and even the rest of the world.

If the working members of the household are employed in agriculture, mining, and certain types of trade activities, then the more likely that the household will go hungry. These sectors are confronted with volatility in output. Moreover, many of these are informal sector workers and therefore have poor access to social protection mechanisms. If the working member is employed by a single employer either for the long term or under a short term contract, then the likelihood of going hungry is reduced.

Anti-hunger programs should improve access to social protection mechanisms. Component 3 of this study explores the issue further.

Large households are more likely to go hungry. The likelihood increases if, in addition, the dependency ratio is high. Therefore, population management programs should be paramount in addressing the problem of hunger.

✸ **Annex A** – Hunger Incidence by Province, 2006

PROVINCE	OVERALL, %	SLIGHT TO PERHAPS TRANSITORY, %	MODERATE, %	SEVERE TO CHRONIC, %
Tawi-Tawi	47.9	1.5	39.4	7.0
Zamboanga Del Norte	47.1	3.4	25.4	18.4
Apayao	43.1	7.5	27.3	8.3
Camiguin	40.0	7.0	31.3	1.8
Surigao Del Norte	38.6	3.3	28.4	6.9
Lanao Del Sur	36.5	4.0	30.5	1.9
Mountain Province	35.4	8.8	23.7	2.9
Maguindanao	32.8	4.4	24.3	4.1
Misamis Occidental	32.5	2.9	23.4	6.2
Oriental Mindoro	32.0	3.6	22.9	5.5
Masbate	30.7	1.5	21.7	7.5
Eastern Samar	30.4	4.8	19.5	6.2
Abra	29.4	3.0	20.4	6.0
Northern Samar	29.3	1.7	21.8	5.8
Negros Oriental	29.2	4.4	21.0	3.8
Agusan Del Sur	27.6	1.9	17.9	7.8
Sulu	27.3	10.0	16.5	0.8
Surigao Del Sur	26.5	2.3	19.1	5.0
Aklan	25.4	2.2	22.2	1.0
Kalinga	25.1	4.0	15.5	5.6
Lanao Del Norte	25.0	2.4	18.5	4.1
Davao Oriental	23.3	2.7	17.5	3.0
Samar (Western Samar)	23.2	2.6	16.0	4.6
Bohol	22.1	3.3	14.4	4.4
Romblon	21.7	2.2	18.0	1.5
Camarines Sur	21.5	2.2	16.9	2.4
Palawan	21.3	2.3	14.6	4.4
Davao	21.2	1.9	17.1	2.3
Leyte	21.1	2.9	14.9	3.3
Occidental Mindoro	20.7	1.2	16.5	3.0
Cotabato (North Cotabato)	20.0	4.4	13.3	2.3
Antique	19.9	2.1	13.9	3.9
Quezon	18.7	1.4	15.8	1.5
Misamis Oriental	18.6	1.1	13.2	4.3
Basilan	17.9	3.8	13.8	0.4
Albay	17.8	2.0	14.1	1.7
Saranggani	16.9	1.4	13.8	1.8
Agusan Del Norte	16.3	2.0	10.9	3.3
Marinduque	16.2	0.0	14.3	1.9

PROVINCE	OVERALL, %	SLIGHT TO PERHAPS TRANSITORY, %	MODERATE, %	SEVERE TO CHRONIC, %
Sultan Kudarat	15.5	2.1	12.6	0.9
Zamboanga Del Sur	15.4	1.5	10.2	3.7
Camarines Norte	15.4	0.9	12.7	1.9
South Cotabato	15.4	2.3	10.9	2.2
Sorsogon	15.3	0.5	12.7	2.2
Bukidnon	14.9	2.2	8.7	4.0
Negros Occidental	14.8	1.0	12.2	1.7
Biliran	14.4	0.0	13.5	1.0
La Union	14.2	3.1	10.8	0.3
Siquijor	13.7	1.7	12.0	0.0
Batangas	13.6	3.6	9.2	0.8
Ifugao	13.5	3.9	9.5	0.0
Aurora	12.5	0.0	10.8	1.7
Southern Leyte	12.5	3.1	8.5	1.0
Pangasinan	12.3	2.4	9.0	1.0
Iloilo	11.9	1.9	8.9	1.2
Davao Del Sur	11.0	1.8	7.9	1.3
Nueva Ecija	10.8	1.3	9.1	0.4
Guimaras	10.6	1.5	9.1	0.0
Cebu	10.3	1.8	6.2	2.3
Catanduanes	10.1	0.8	9.3	0.0
Zambales	10.0	0.5	7.4	2.1
Tarlac	9.0	1.0	7.7	0.3
Isabela	8.5	1.4	6.5	0.7
Capiz	8.4	0.3	7.7	0.3
Ilocos Sur	8.1	1.3	6.5	0.3
Cagayan	6.6	2.1	4.2	0.3
Quirino	5.9	1.7	4.1	0.0
Ilocos Norte	5.3	0.7	4.6	0.0
Nueva Vizcaya	3.3	0.0	3.3	0.0
Benguet	3.2	1.3	1.9	0.0
Bataan	3.0	1.1	1.9	0.0
Bulacan	2.9	0.7	2.1	0.1
Laguna	2.5	0.0	2.5	0.0
Metro Manila	2.2	0.7	1.5	0.1
Cavite	2.0	0.4	1.6	0.0
Pampanga	1.5	0.8	0.7	0.0
Rizal	1.2	0.0	0.9	0.3
Batanes	0.0	0.0	0.0	0.0

Source: Authors' computations based on FIES.

Severe to chronic hunger incidence by province, FIES 2006
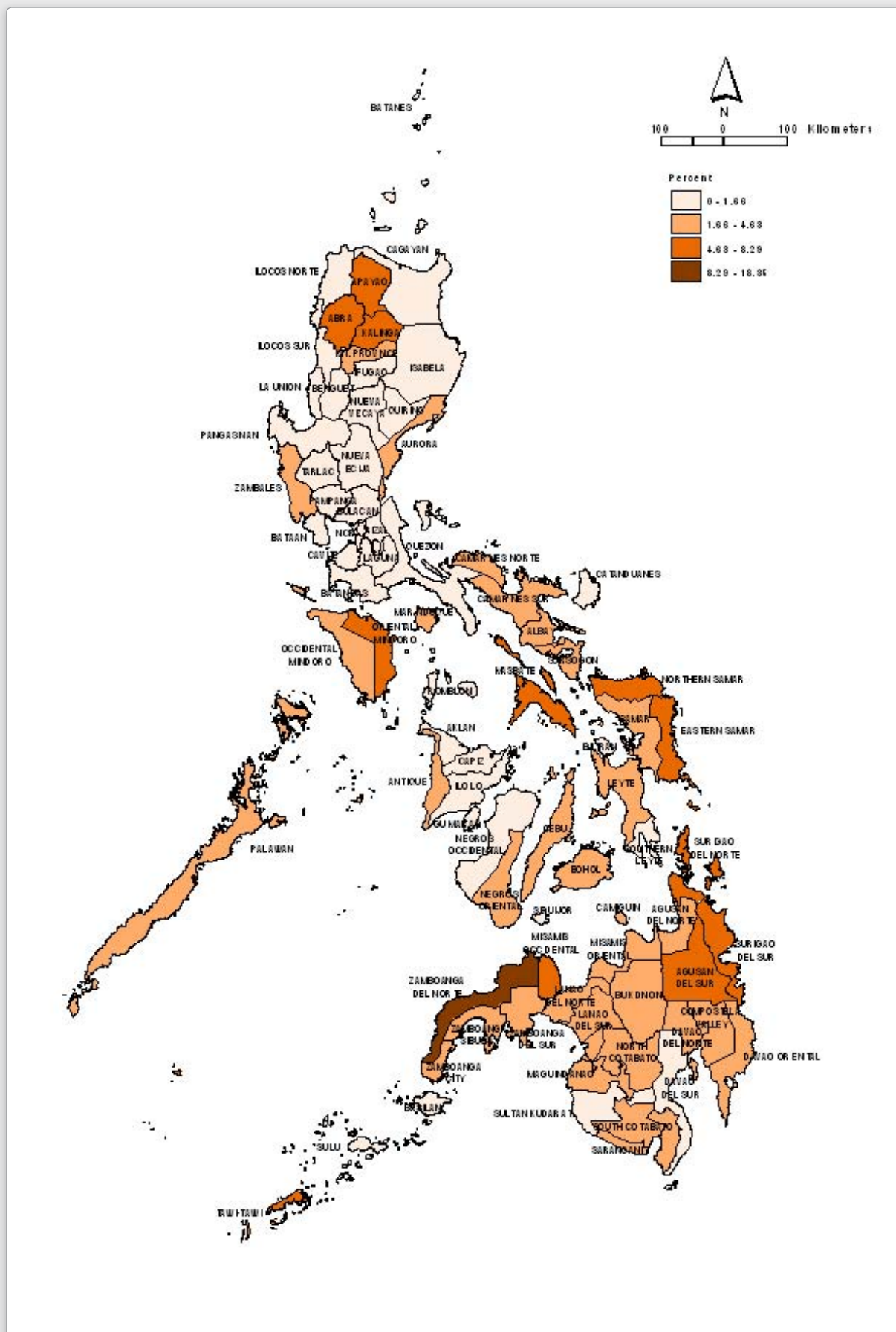
Severe to chronic hunger incidence by province, SHIP 2006