
A sub- regional hunger index for Nepal

Nepal Food
Security
Monitoring
System



(NeKSAP)

WFP Nepal, 2009

A sub-regional hunger index for Nepal

Acknowledgement

This report was prepared by Siemon Hollema and Miriam Bishokarma of the UN World Food Programme in Nepal (WFP). The report was inspired by a similar report prepared by the International Food Policy Research Institute (IFPRI) on the India State Hunger Index.

The authors would like to express their gratitude to Dr Fang Cheng from the United Nations Food and Agricultural Organization (FAO) for calculating the estimates of undernourishment by sub-region. In addition, Mr Abesh KC from the UN World Food Programme provided his assistance in preparing the data and calculating the sub-regional estimates for childhood mortality.

Table of contents

1. Key Findings	4
2. Introduction	4
3. The FAO Undernourishment Estimate	5
4. The IFPRI Global Hunger Index	6
5. Generating a Sub-Regional Hunger Index for Nepal	8
6. Data and Methods	8
7. Results	11
8. Limitations and Data Constraints	14
9. Comparison to Other Countries' Hunger Indices	16
10. Contributing Factors and Examining the Hunger Index in Relation to Other Social and Economic indicators.	17
11. Conclusion and Policy Implications	22

1. Key Findings

- On the global hunger index score (GHI), Nepal ranks 57th out of 88 countries. With a GHI of 20.6 the severity of hunger in Nepal is *alarming*.
- The Nepal sub-regional hunger index (NHI) was constructed in the same way as the GHI to enable comparison between the sub-regions within Nepal, and to compare these sub-regions with the GHI scores and their ranking relative to other countries.
- The highest prevalence of hunger was found in the Far- and Mid-Western Hill and Mountain regions. The NHIs in these parts of the country are close to or above 30, pointing to an *extremely alarming* situation. The majority of the fifteen sub-regions of Nepal fall within the *alarming* category. Not a single sub-region in Nepal falls within the *moderate* or *low hunger*-categories. This underscores the seriousness of the food security situation in Nepal.
- One of the most striking findings is that the Mid-Western Mountain region of Nepal ranks one from the bottom of the 88 countries on the GHI list, just above the Democratic Republic of Congo. The Far-Western Mountain region also does not fare well in comparison, with a ranking similar to Ethiopia's.
- Undernourishment and underweight are the main contributing factors to the hunger index score. Underweight is a more important contributor in the Terai than in the Hills and Mountains where undernourishment (and thus chronic malnutrition) is more prevalent. In the Mountain zone, childhood mortality is extremely high.
- More affluent and economic active sub-regions have a lower NHI. The Mid-Western Mountain region should however do better given its, albeit very low, GDP per capita level.
- Due to dependency of the rural population on agriculture and the subsistence nature of the rural economy, insufficient food production does have a direct relationship with the hunger index score. Crop failure quickly translates into hunger.
- To address the hunger issue in Nepal, a substantive and urgent effort is required to ensure food sufficiency, reduce childhood mortality and improve child nutrition in all sub-regions of the country.

2. Introduction

Food insecurity exists when people live with hunger and fear starvation.¹ It is defined as a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life.² To achieve food security, sufficient and nutritious food needs to be available and accessible. It also needs to be properly utilized. Food availability, access and utilization together form the three pillars determining household food security.

Living without the fear of hunger is a basic human right. This has been incorporated into the Nepal interim constitution where the right to food for all Nepali citizens is assured and food sovereignty of the nation is sought after. The Millennium Development Goals also recognize

¹ FAO series: The State of the Food Insecurity in the World

² World Food Summit, Rome, 1996

the importance of achieving food security by aiming to eradicate extreme poverty and hunger by the year 2015.

Monitoring progress toward the eradication of hunger is vital to sustain the salience of hunger in policy debates and to ensure that appropriate and timely actions are taken to address this important issue. Indicators that inform decision-makers about the state of food insecurity in the country and that can capture progress towards eradication of hunger are therefore needed. The FAO undernourishment estimate and the IFPRI hunger index are two indices that were specifically developed for this purpose. However, both of these indicators are designed to track progress at the national level. Given the large disparities in poverty and food insecurity that can be found in Nepal, this report aims to develop a sub-regional hunger index for Nepal and compare these indices with those of other countries.

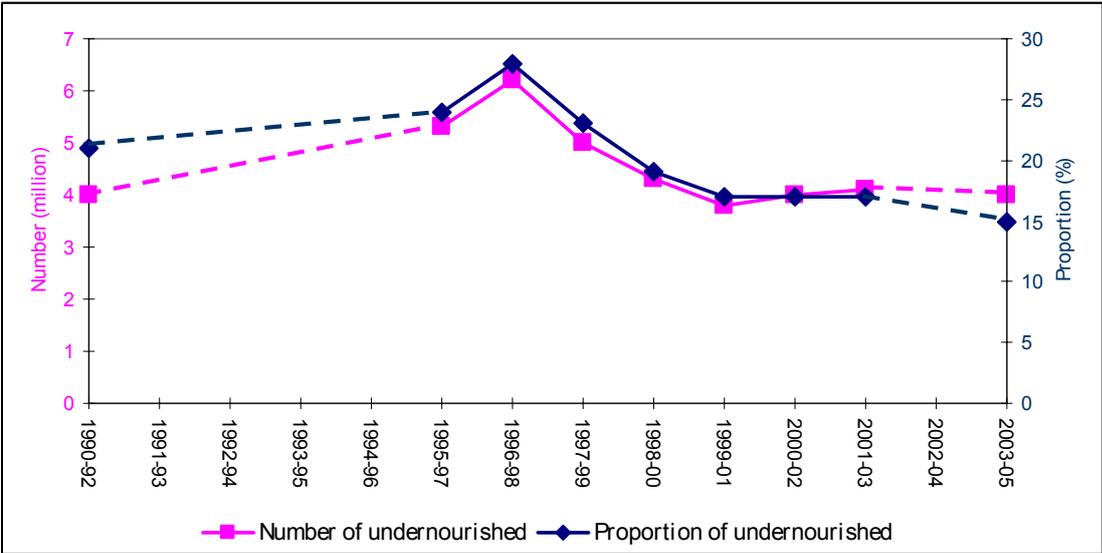
3. The FAO Undernourishment Estimate

FAO, in its series on The State of Food Insecurity in the World, tracks the number of undernourished people as an effort to monitor progress towards the global MDG hunger target. In 2007, FAO estimated the total number of undernourished people in the world at 923 million. This is over 80 million more than estimated for the years 1990-92, the base period for the world food summit hunger reduction target³.

The FAO methodology is based on a comparison of *Dietary Energy Supply (DES)* in kcal/person/day and *Minimum Energy Requirement Norms (DER)*. To calculate the DES, FAO uses Food Balance Sheets (FBS) that are compiled on the basis of data on production, trade and food commodities. The DER is based on different estimates for sex, age and physical activity and it differs by country (see Mernies 2004 for more information). The cut-off-point used by FAO for Nepal is 1810 kcal/person/day. People who consume less than this are considered undernourished.

Figure 1 show the number and prevalence of undernourishment since 1990-92 in Nepal according to the latest estimates provided by FAO.

Figure 1: Number and prevalence of undernourishment (1990-92 until 2003-05)



³ Target is halving the number of undernourished from 840 million in 1990-92 to 420 million by 2015.

Based on the latest data available (2003-2005), FAO estimates the incidence of undernourishment at 15 percent or about 4 million people, down from 28 percent or 6.2 million people in 1996-98. The FAO measurement of undernourishment is not based on actual consumption intake measures but on available agricultural production figures, the population composition and income distribution in the country.⁴ This poses several questions regarding the reliability of the measure but it is, unfortunately, the only measure available that can be used for comparison purposes between countries. Undernourishment estimates based on consumption intake surveys are believed to be more reliable, however these surveys are not available for every country, data collection methodologies may differ, or data are not collected frequently enough. For Nepal, the FAO did calculate estimates of undernourishment based on consumption intake data from the Nepal Living Standard Survey 2003/04. These estimates will be used for this study.

4. The IFPRI Global Hunger Index

The FAO undernourishment estimate only measures one dimension of hunger, i.e. the lack of food intake. The prevalence of “hunger” is however not easily captured by a single indicator. Hunger has many aspects and consequences, including “loss of energy, apathy, increased susceptibility to disease, shortfalls in nutritional status, disability, and premature death” (Wiesmann 2004), among others. A Global Hunger Index (GHI) developed by IFPRI, tries to take these other aspects into account (Wiesmann 2006). It is based on the understanding that sufficient food intake alone does not translate into proper utilization of food or into meeting the dietary requirements of individuals. The GHI attempts to complement the *insufficient dietary energy availability* (FAO) with nutritional aspects, to track progress on hunger.

The GHI captures three interrelated dimensions of hunger:

1. Insufficient availability of food, measured in *percentage of population undernourished*,
2. Shortfalls in the nutritional status of children, measured in *prevalence of underweight in children under the age of five*, and
3. Child mortality, measured as the *mortality rate of children under the age of five*.

Hunger is most directly caused by inadequate food intake. Over time it manifests itself in stunted and underweight children, especially in combination with low birth weights and high rates of infections. The most extreme manifestation of continued hunger and malnutrition is mortality. The GHI recognizes the interconnectedness of these dimensions.

The index is derived by simply taking the un-weighted average of the three interrelated indicators as outlined in Box 1.

⁴ For a detailed discussion on the FAO measurement of undernourishment and how it is calculated see Measurement and Assessment of Food Deprivation and Undernutrition, International Scientific Symposium, June 2002 (www.fao.org/docrep/005/Y4249E/Y4249E00.htm)

Box 1 – Data sources and calculation of the Global Hunger Index 2008

Source: Grebmer et al. 2008

The Global Hunger Index is calculated as follows:

$$\text{GHI} = (\text{PUN} + \text{CUW} + \text{CM}) / 3$$

PUN = Proportion of the population that is undernourished (%)

CUW = Prevalence of underweight children under five years of age (%)

CM = Proportion of children dying before the age of five (%)

In theory, the index can vary between 0 and 100. A higher index indicates a higher prevalence of hunger. The severity of hunger is determined using the following thresholds:

GHI \leq 4.9	low
GHI 5.0-9.9	moderate
GHI 10.0-19.9	serious
GHI 20.0-29.9	alarming
GHI \geq 30.0	extremely alarming

Countries can be ranked according to the GHI. Interpretation of the GHI findings helps analyzing the drivers of hunger and, in doing so, the index can be a powerful tool for advocacy (Wiesmann 2006).

Nepal ranks 57th out of the 88 developing countries and countries in transition for which the index has been calculated (Grebmer et al. 2008). With a GHI of 20.6 the severity of hunger in Nepal is *alarming*.

Table 1 gives an overview of Nepal's GHI in comparison to other countries' GHI and compares the GHI to a country's per capita Gross National Income (GNI). Although GNI of other South Asian countries, including India and Bangladesh, is much higher, Nepal's GHI ranks lower. It is however above several similar income level countries in sub-Saharan Africa, such as Uganda, Togo and Gambia.

Table 1: Gross National Income per capita in relation to the Global Hunger Index

Country	GHI 2008	GNI 2007 (in US\$)*
Gambia, The	17.3	320
Uganda	17.1	340
Togo	18.2	360
Nepal	20.6	340
Lao PDR	20.6	580
Sudan	20.5	960
India	23.7	950
Bangladesh	25.2	470

Source: Worldbank online: <http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf>

5. Generating a Sub-Regional Hunger Index for Nepal

The study on Small Area Estimation of Poverty, Caloric Intake and Malnutrition in Nepal⁵ finds that there are substantial geographic differences in Nepal with regard to poverty, food intake and malnutrition. This is also evident from food security monitoring data provided by the Nepal Food Security Monitoring System (NeKSAP)⁶. These differences are being ignored in the GHI which provides an aggregate measure for Nepal as a whole.

The aim of this study is therefore to generate a sub-regional Hunger Index. And in doing so, gain insight into the regional differences that exist in the prevalence of hunger across Nepal and explore the underlying factors that cause these differences.

Due to the lack of reliable data at the district level the Hunger Index can, at best, only be calculated at the sub-regional level. Even at this level of aggregation there are a few caveats which will be discussed in the next Section. The index, however, clearly indicates areas of severe deprivation which can not and should not be ignored by policy makers and humanitarian agencies.

6. Data and Methods

The estimation of a sub-regional Hunger Index for Nepal (NHI) is based on two data sources. These are (i) the *Nepal Living Standard Survey (NLSS) 2003/04* for estimates on prevalence of undernourishment, and (ii) the *National Demographic Health Survey (NDHS) 2006* which is used for deriving the child-underweight and child-mortality indicators.

The Hunger Index for Nepal is calculated at the sub-regional level, as it was the smallest spatial unit for which reliable data were available⁷. In order to be able to compare the sub-regional estimates for Nepal with the Global Hunger Index, this study applies in as far as possible the same methodology, thresholds, and data.

Data on the *proportion of undernourished* for the 2008 GHI are based on FAO estimates for the years 2002-2004. During those years, the prevalence of undernourishment was estimated at 17 percent (see Figure 1 above). Sub-regional data on the *proportion of undernourished* are taken from the FAO/WFP Special Report on the Food Security Assessment Mission to Nepal, July 2007. This mission calculated the prevalence of undernourishment for each sub-region based on data from the *National Living Standard Survey (NLSS) 2003/04* using different cut-off points. Table 2 provides an overview of the incidence of undernourishment in Nepal using different thresholds.

⁵ Small Area Estimation of Poverty, Caloric Intake and Malnutrition in Nepal, CBS, WFP and World Bank, 2006

⁶ Please see <http://groups.google.com/groups/NeKSAP?hl=en> for more information on the Nepal Food Security Monitoring system.

⁷ Nepal is divided into three zones (Mountain, Hill, Terai) and five Development Regions (East, Central, West, Mid-west, and Far-west). Fifteen sub-regions can be derived as a combination of zones and development regions. Thus, Eastern Mountain/Hill/Terai, Central Mountain/Hill/Terai, and so forth.

Table 2: Percentage of population undernourished based on different estimates of Minimum Dietary Energy Requirements (DER)

	Undernourishment Incidence (in % of population)		
	DER<1810 kcal/person/day	DER<1910 kcal/person/day	DER<2124 kcal/person/day
Nepal	22.5	28.6	40.7
Urban	22.7	28.8	40.5
Rural	22.4	28.5	40.8

Source: FAO/WFP 2007, based on NLSS 2003/04

The table shows a marked difference in the proportion of undernourished depending on which of the requirement levels is used. If the minimum requirement level of 2124 kcal/person/day is used (the criterion used by the Nepal Central Bureau of Statistics), as many as 40.7 percent of the population in Nepal is undernourished.

To calculate the NHI, the requirement level of 1810 kcal/person/day is used to allow comparison with the GHI. Using household consumption intake data as per the *NLSS 2003/04*, instead of the regular FAO estimates, raises the prevalence of undernourishment from 17 percent to 22.5 percent using a threshold value of 1810 kcal/person/day. If we would recalculate the GHI using this new estimate, Nepal would rank 63 with a GHI numerical value of 22.4.

The main drawback of using data from the *NLSS 2003/04* is that the household survey was not designed to provide comparable estimates at the sub-regional level. The FAO/WFP estimates were therefore cross-checked with other available data, such as the results from the Small Area Estimation Report⁸. For this reason, a single estimate was calculated for the Far-western Hill and Mountain sub-regions (see Section 8).

Data on the *percentage of underweight in children under the age of five* used for calculating the GHI 2008 were based on the World Health Organization (WHO) Child Growth Standards 2006. According to the WHO, 38.8 percent of children under the age of five were underweight in Nepal in 2006. This number is consistent with the data from the *NDHS 2006*, which estimates the percentage of underweight children below the age of five at 38.6 percent. The *NDHS 2006* provides underweight estimates by sub-region which were used to calculate the NHI. However, due to the small sample size in the Mountains of the Far-Western, Mid-Western and Western regions, one estimate was calculated for these sub-regions. Consequently, the same incidence of underweight was assigned to the three sub-regions in the calculation of the NHI.

Data on *childhood mortality* used in calculating the GHI 2008 were taken from UNICEF. According to UNICEF in 2006, 5.9 percent of children in Nepal died before reaching the age of five. This number differs slightly from the *NHDS'* child mortality estimate of 61 per 1,000 live births for the 10 year period prior to the survey. From the *NHDS* dataset the under-five mortality rate was calculated for each sub-region. However, due to data limitation, as was the case for underweight, the Far-western, Mid-western and Western Mountains were considered as a single region. Consequently the same mortality rate was attributed to each of these sub-regions. Childhood mortality rates were calculated considering a 10 year period by taking an average of the value for the 0 to 4 year and the 5 to 9 year periods preceding

⁸ Idem footnote 5.

the survey. Some of the missing data for the 0 to 4 year period were approximated by taking into account the overall improvement in childhood mortality (36.4%).

Table 3 and Annex I provide an overview of estimates used for *undernourishment*, *underweight* and *childhood mortality* by sub-region.

Table 3: The Hunger-Index for Nepal (NHI) for development regions, zones and sub-regions, and estimates used for calculation (the numbers in brackets are the values used for the GHI-calculation)

	Population undernourished (below 1810 kcal/person/day) (%) ¹	Underweight in children under 5 (%) ²	Child mortality (%) ²	NHI	Ranking ³
Nepal	22.50 (17)	38.6 (38.8)	6.1 (5.9)	22.40 (20.6)	
Urban	22.7	23.1	4.7	16.83	1
Rural	22.4	40.7	8.4	23.83	2
<i>Development Region</i>					
East	22.3	32.9	6	20.40	1
West	17.3	38.5	7.3	21.03	2
Central	22.1	38.2	6.8	22.37	3
Far-West	23.5	43.7	10	25.73	4
Mid-West	29	43.4	12.2	28.20	5
<i>Zone</i>					
Hill	25.1	33.2	6.2	21.50	1
Terai	18.5	42.3	8.5	23.10	2
Mountain	28.5	42.4	12.8	27.90	3
<i>Sub-Region</i>					
Central hill	24.87	21.7	4.00	16.86	1
Western hill	14.21	34.4	4.70	17.77	2
Eastern terai	20.06	32.3	6.10	19.49	3
Eastern mountain	22.45	35.6	7.60	21.88	4
Far-western terai	18.25	41.1	8.50	22.62	5
Eastern hill	29.64	33.3	5.20	22.71	6
Mid-western terai	23.76	37.9	9.20	23.62	7
Central mountain	25.50	33.1	14.20	24.27	8
Western terai	21.66	44.6	11.50	25.92	9
Central terai	20.15	50.2	8.30	26.22	10
Far-western hill	26.40	44.4	9.40	26.73	11
Mid-western hill	25.25	45.7	12.00	27.65	12
Western mountain	17.39	48.4	18.00	27.93	13
Far-western mountain	26.40	48.4	18.00	30.93	14
Mid-western mountain	54.11	48.4	18.00	40.17	15

Sources:

¹ FAO/WFP 2007, based on NLSS 2003/04

² NDHS 2006; data for Western, Mid-Western and Far-Western Mountain are same

³ A lower rank indicates better food security conditions

7. Results

The results are presented in Table 3 and 4, Figure 2 and Map 1. It demonstrates that the prevalence of hunger varies substantially across the fifteen sub-regions of Nepal. The highest prevalence of hunger can be found in the Far-and Mid-Western Hill and Mountain regions. The NHIs in these parts of the country are close to or above 30, pointing to an *extremely alarming* situation. The majority of the fifteen sub-regions of Nepal fall within the *alarming* category with NHIs ranging between 20.0 and 29.9. Three sub-regions (Central Hills, Western Hills and Eastern Terai) have NHIs between 10.0 and 19.9 indicating a *serious* food insecurity situation. Note that there is not a single sub-region in Nepal that falls within the *moderate* or *low hunger*-categories. This underscores the seriousness of the food security situation in Nepal.

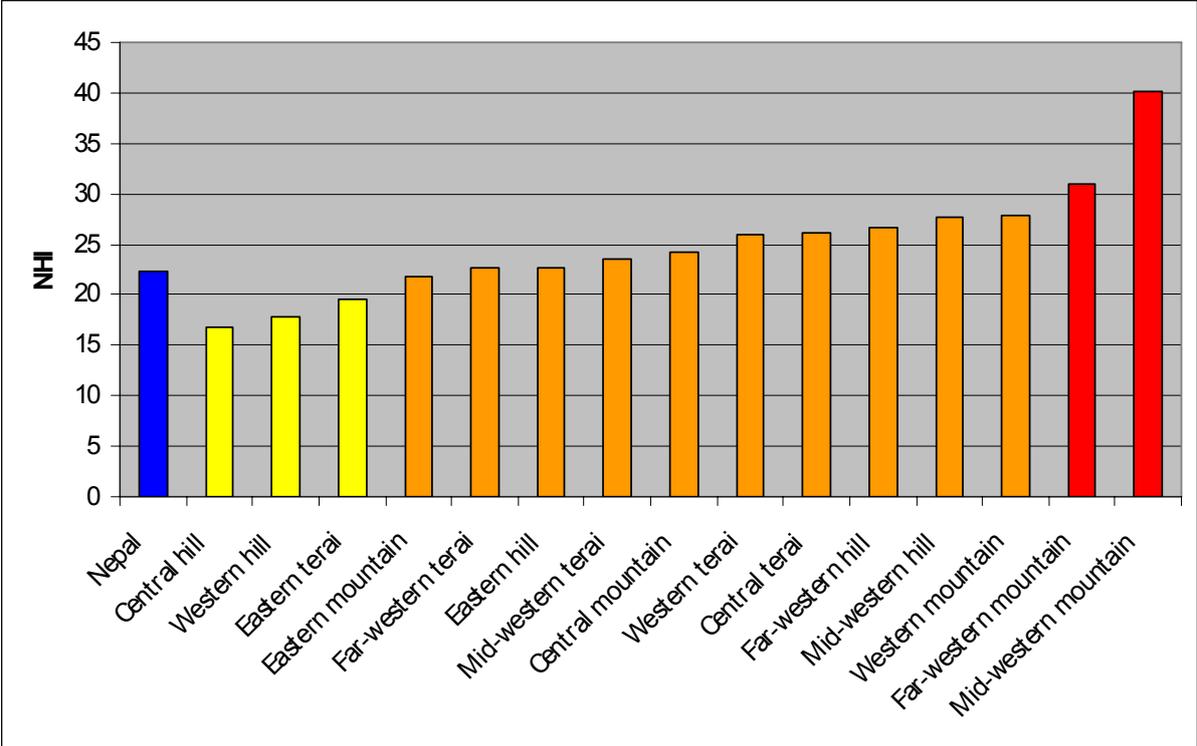
Table 3 aggregates the results by Development Regions and Ecological Zones, Urban and Rural and provides details on the values of the sub-regional indicators used to derive the NHIs. The GHI for Nepal has been revised upwards from 20.6 to 22.4 to reflect the updated undernourishment data based on the FAO/WFP mission findings. The NHI for urban areas (NHI = 16.83) is substantially lower than for rural areas (NHI = 23.83) but the situation in urban areas in Nepal remains serious.

By ecological zones the Mountain zone ranks the worst in terms of hunger (NHI = 27.9) followed by the Terai (NHI = 23.1) and Hills (NHI = 21.5). By Development Region, the NHI is highest in the Far- and Mid-West (NHI = 25.7 and 28.2 respectively). Other Development Regions fare somewhat better but are still in the category *alarming*.

Table 4: Severity of NHI by sub-region

< 4.9 low		5.0-9.9 moderate		10.0-19.9 serious		20.0-29.9 alarming		≥30.0 extremely alarming	
Region NHI	Region NHI	Region	NHI	Region	NHI	Region	NHI	Region	NHI
None	None	Central hill	16.86	Eastern mountain	21.88	Far-western mountain	30.93		
		Western hill	17.77	Far-western terai	22.62	Mid-western mountain	40.17		
		Eastern terai	19.49	Eastern hill	22.71				
				Mid-western terai	23.62				
				Central mountain	24.27				
				Western terai	25.92				
				Central terai	26.22				
				Far-western hill	26.73				
				Mid-western hill	27.65				
				Western mountain	27.93				

Figure 2: Ranking of sub-regions within Nepal from lowest to highest Hunger Index*



*The Index for Nepal as a whole is 22.4 based on the revised prevalence of 22.5% undernourishment among the Nepali population

8. Limitations and Data Constraints

The results are consistent with the finding of the Nepal Food Security Monitoring System, which consistently reports severe food insecurity problems in the Far- and Mid-Western Hills and Mountains. Data limitations do however pose several problems. No separate estimates for the incidence of underweight children under the age of five and the childhood mortality rate were available for the Far-Western, Mid-Western and Western sub-regions. Instead the *NDHS* provided a single estimate for the Mountains in the Western part of Nepal as a whole. Available small area estimates for underweight (see Table 5), show that the incidence of underweight is generally less severe in the Western Mountains. It is therefore most likely that the NHI for the Far-and Mid-Western Mountains would have been slightly higher and the NHI for the Western Mountains would have been slightly lower, if separate estimates would have been provided by the *NDHS*.

A key problem is the FAO/WFP mission estimates for undernourishment. As mentioned before, the *NLSS* was not designed to provide separate estimates by sub-region. Figure 3 replicates the estimates calculated by the mission using different thresholds values. Comparing these estimates to the available small area estimates (CBS, WFP, WB, 2006) indicate a significant discrepancy for the estimate calculated for the Far-Western Mountain sub-region.

Figure 3: Proportion of population with different levels of per capita dietary energy consumption

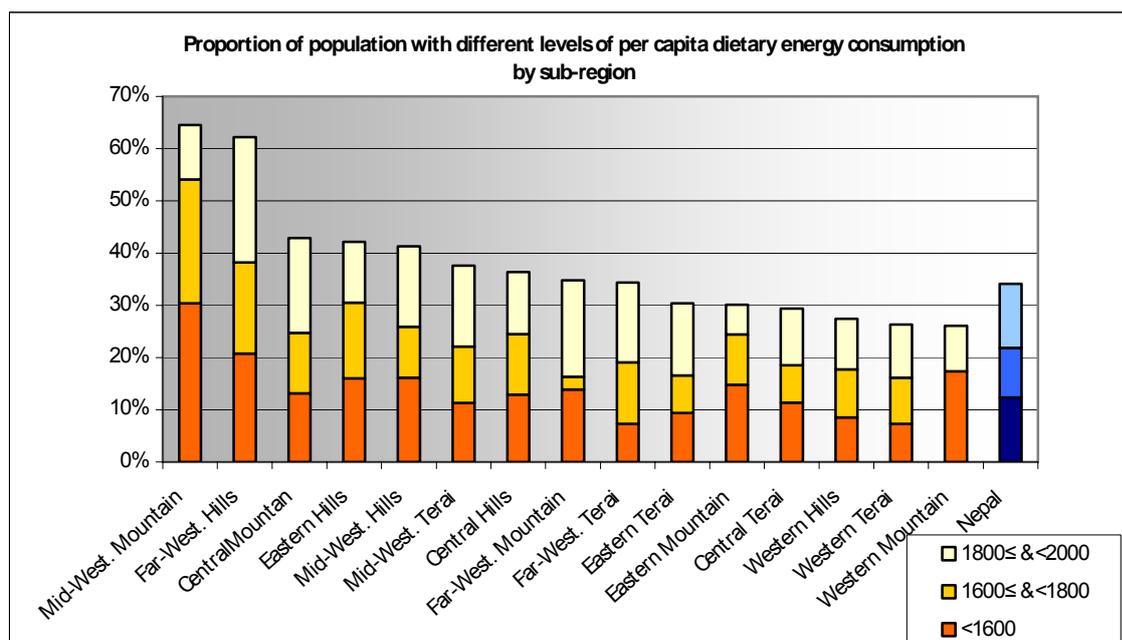


Table 5 shows the district-level results of the CBS/WFP/WB (2006) small area estimation study for undernourishment and underweight. From this, it can be seen that the incidence of undernourishment and underweight is broadly similar for districts in the Far-Western Hills and Mountains, with undernourishment levels generally slightly higher in the Mountain areas of the Far-West. This being the case, it was decided to merge the data available for these two sub-regions and calculate a single estimate for the Far-Western Hills and Mountains.

Table 5: District-level small area estimates for caloric intake and underweight

	Population undernourished (below 2144 kcal/person/day) (%) ¹	Underweight in children under 5 (%)		Population undernourished (below 2144 kcal/person/day) (%) ¹	Underweight in children under 5 (%)
Far-Western Mountains			Far-Western Hills		
Darchula	49.0	50.5	Bataidi	47.3	53.5
Bajhang	48.6	53.1	Dadeldhura	44.4	47.2
Bajura	49.6	54.0	Doti	44.9	53.5
			Achham	42.3	54.0
Mid-Western Mountains			Mid-Western Hills		
Humla	59.3	53.7	Dailekh	48.9	54.6
Mugu	64.8	54.7	Jajarkot	46.6	56.7
Jumla	53.3	49.5	Rukum	50.2	54.7
Kailkot	50.5	55.1	Surkhet	43.1	44.7
Dolpa	58.6	47.7	Salyan	43.7	48.8
			Rolpa	49.5	51.0
			Puythan	36.7	49.7
Western Mountains			Western Hills		
Mustang	51.1	28.6	Myagdi	38.1	43.9
Manang	55.2	24.0	Kaski	28.8	32.4
			Lamjung	39.4	38.9
			Gorkha	40.1	40.3
			Baglung	35.6	47.1
			Parbat	35.7	41.7
			Gulmi	31.1	46.0
			Syangja	32.1	39.0
			Tanahu	36.2	37.3
			Arghakhanchi	35.7	45.3
			Palpa	38.3	41.0

Source: Small Area Estimation of Poverty, Caloric Intake and Malnutrition in Nepal, CBS, WFP and World Bank, 2006

¹ Threshold value for insufficient calorie intake used for the small area estimation is equivalent to 2144 kcal/person/day.

9. Comparison to Other Countries' Hunger Indices

Table 6 shows the ranking of the fifteen Nepali sub-regions relative to the other 88 countries for which the Global Hunger Index 2008 was calculated.

According to this ranking, the Nepali sub-regions rank from position 44 to 87 on the GHI. The most striking finding is that the Mid-western Mountains ranks one but last among the 88 countries, just above the Dem. Rep. of Congo. This demonstrates the seriousness of the hunger situation in this part of the country. The Far-Western Mountains also does not fare well in comparison, with a ranking similar to Ethiopia's.

Most sub-regions rank between 60 and 75; below countries such as Pakistan and Malawi but better off than some African countries including Central African Republic and Madagascar. In terms of hunger, these sub-regions are comparable to countries including India, Zimbabwe, Tanzania, Haiti, Bangladesh and Mali.

The best performing sub-regions, Central and Western Hills and Eastern Mountains, still rank below Myanmar, Cote d'Ivoire and Senegal.

The rankings of sub-regions, ranging from somewhere in the middle to all the way to the bottom of the list of countries, indicate the wide disparity of food insecurity and hunger in the country. Why then, are there such differences between the fifteen sub-regions of Nepal and what are the contributing factors that drive hunger in these areas? These questions are the topic of the next section.

Table 6: Nepal's sub-regions in comparison to other countries' Hunger Index

GHI Rank	Country	Hunger Index	Category	
39	Myanmar	15.00	serious	
40	Sri Lanka	15.02		
41	Benin	15.07		
42	Cote d'Ivoire	15.30		
43	Senegal	15.37		
	Central Hill	16.86		
44	Uganda	17.13		
45	Gambia, The	17.27		
46	Mauritania	17.63		
47	Swaziland	17.70		
	Western hill	17.77		
48	Botswana	17.90		
49	Togo	18.17		
50	Timor-Leste	18.37		
51	Nigeria	18.43		
52	Cameroon	18.67		
53	Korea, Dem. Rep.	18.77		
54	Congo, Rep.	19.13		
	Eastern terai	19.49		
55	Kenya	19.87		
56	Sudan	20.52		alarming
57	Nepal	20.57		
58	Lao PDR	20.63		
59	Djibouti	20.87		
60	Guinea	20.87		
61	Pakistan	21.67		
62	Malawi	21.80		
	Eastern mountain	21.88		
63	Rwanda	22.33		

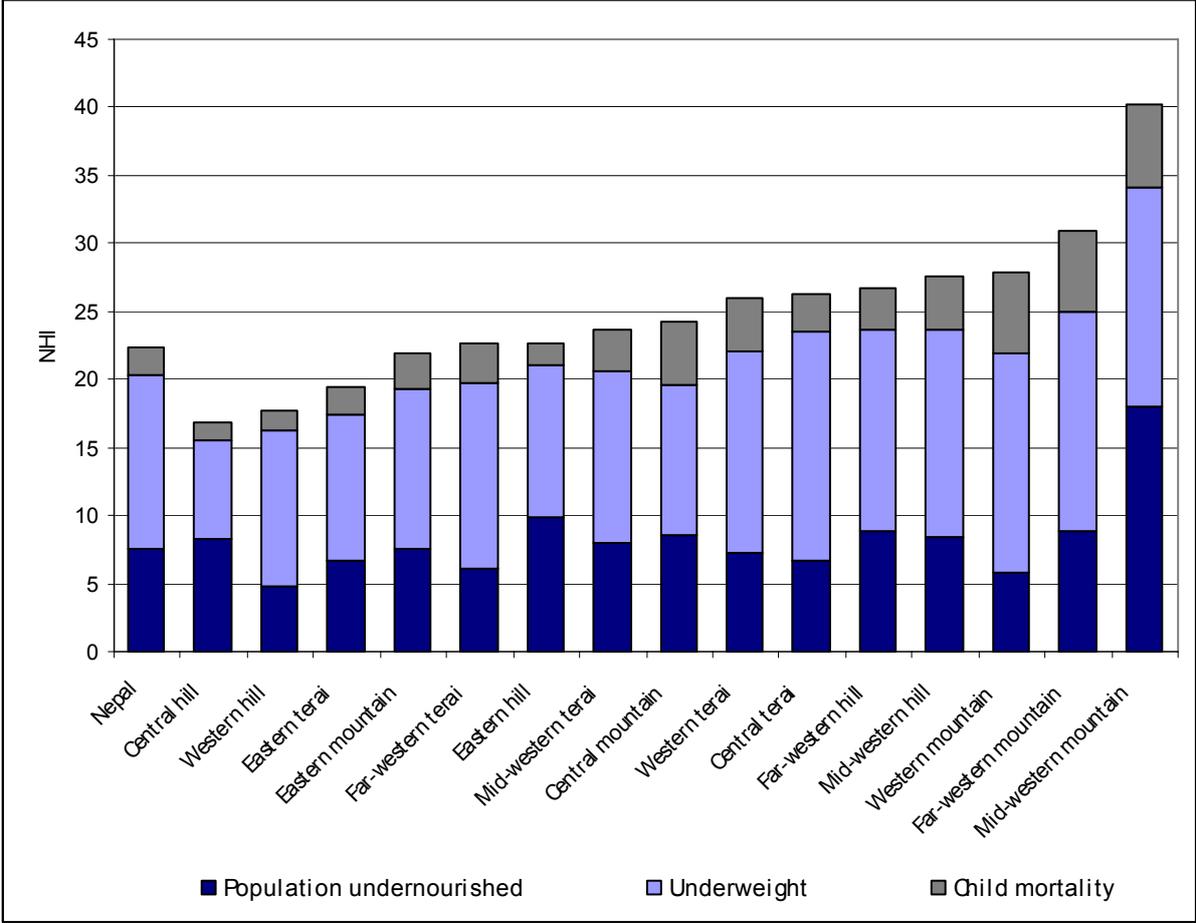
	<i>Nepal (revised)</i>	<i>22.40</i>	extremely alarming
	Far-western terai	22.62	
	Eastern hill	22.71	
64	Cambodia	23.20	
65	Burkina Faso	23.53	
	Mid-western terai	23.62	
66	India	23.70	
67	Zimbabwe	23.83	
68	Tanzania	24.17	
	Central mountain	24.27	
69	Haiti	24.30	
70	Bangladesh	25.23	
71	Tajikistan	25.89	
	Western terai	25.92	
	Central terai	26.22	
72	Mozambique	26.33	
	Far-western hill	26.73	
73	Mali	26.93	
74	Guinea-Bissau	27.45	
	Mid-western hill	27.65	
	Western mountain	27.93	
75	Central African Republic	28.05	
76	Madagascar	28.77	
77	Comores	29.07	
78	Zambia	29.17	
79	Angola	29.50	
80	Yemen, Rep.	29.77	
81	Chad	29.93	
	Far-western mountain	30.93	
82	Ethiopia	30.97	
83	Liberia	31.80	
84	Sierra Leone	32.19	
85	Niger	32.40	
86	Burundi	38.26	
87	Eritrea	38.97	
	Mid-western mountain	40.17	
88	Democratic Republic of Congo.	42.70	

Source: Grebmer et al.2008

10. Contributing Factors and Examining the Hunger Index in Relation to Other Social and Economic indicators.

The NHI is derived from taking the un-weighted average of three inter-related indicators: the prevalence of undernourishment, percentage of underweight children and childhood mortality. Figure 4 shows how each of these indicators contributes to the overall NHI scores for each sub-region. The differences in NHI scores between sub-regions are particularly driven by the differences in prevalence of undernourishment and underweight. Although most of the sub-regions in the *alarming* category differ only slightly in their overall NHI score the contributing factors differ substantially with underweight being a more important contributor in the Terai than in the Hills and Mountains where undernourishment (and thus chronic malnutrition) is more prevalent. In the Mountain zone, childhood mortality is extremely high.

Figure 4: Contribution of underlying components of the Nepal Hunger Index to overall scores*

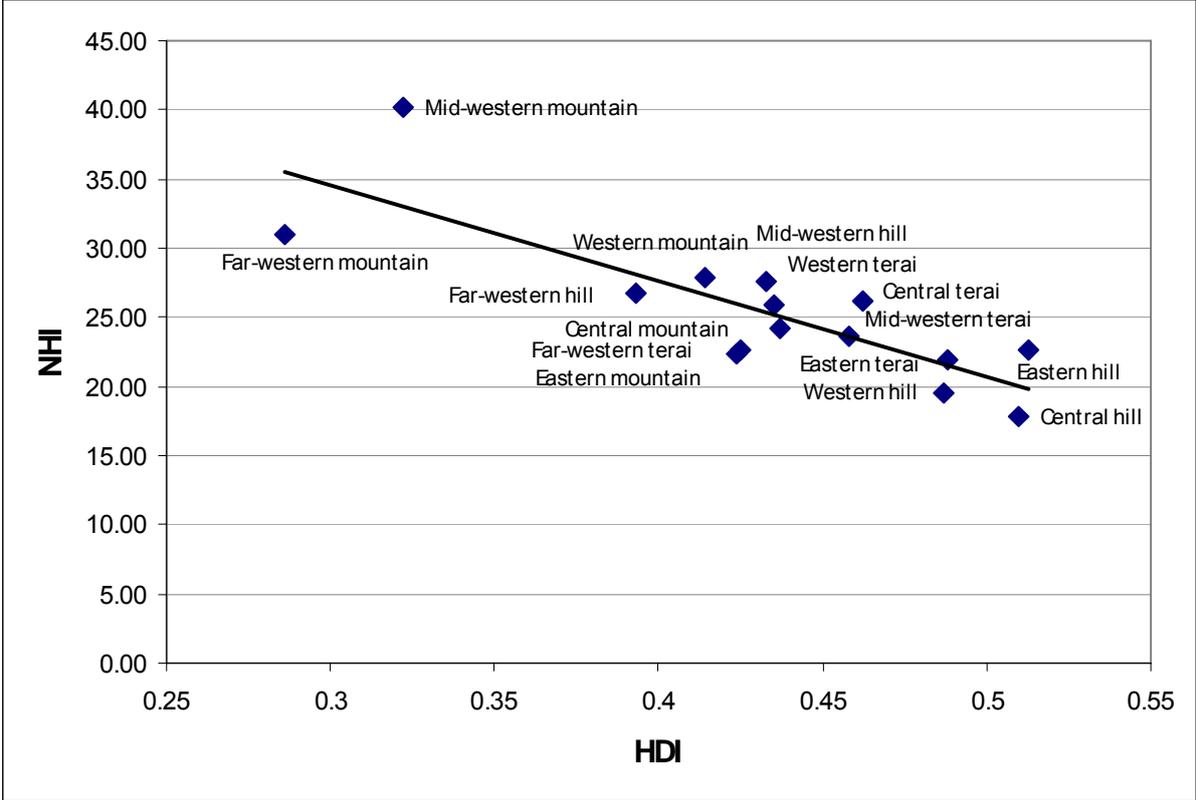


*the Index for Nepal is 22.4 as calculated on 22.5% of population undernourished

It is interesting to see how the sub-regional NHIs compare to other socio-economic indicators. For this purpose three indicators were selected. These are, (i) the Human Development Index (HDI), (ii) the Gross National Product per capita (GNI) and, as food security in Nepal is often referred to as a condition of sufficient food supply, (iii) the per-capita cereal production. Values for each socio-economic indicator by sub-region are provided in Annex I.

The *Human Development Index* (HDI) is composed of four indicators: life expectancy at birth, adult literacy rate, mean years of schooling and GNI. These indicators are inter-related with the indicators that compose the NHI and we would therefore expect a high correlation between the HDI and the NHI. Figure 5 shows the relation between the HDI and the NHI. The correlation coefficient between the two indices is -0.82 indicating a strong negative linear correlation. Areas with low human development therefore can be expected to suffer from food insecurity and hunger.

Figure 5: Relationship between Nepal Hunger Index and Human Development Index

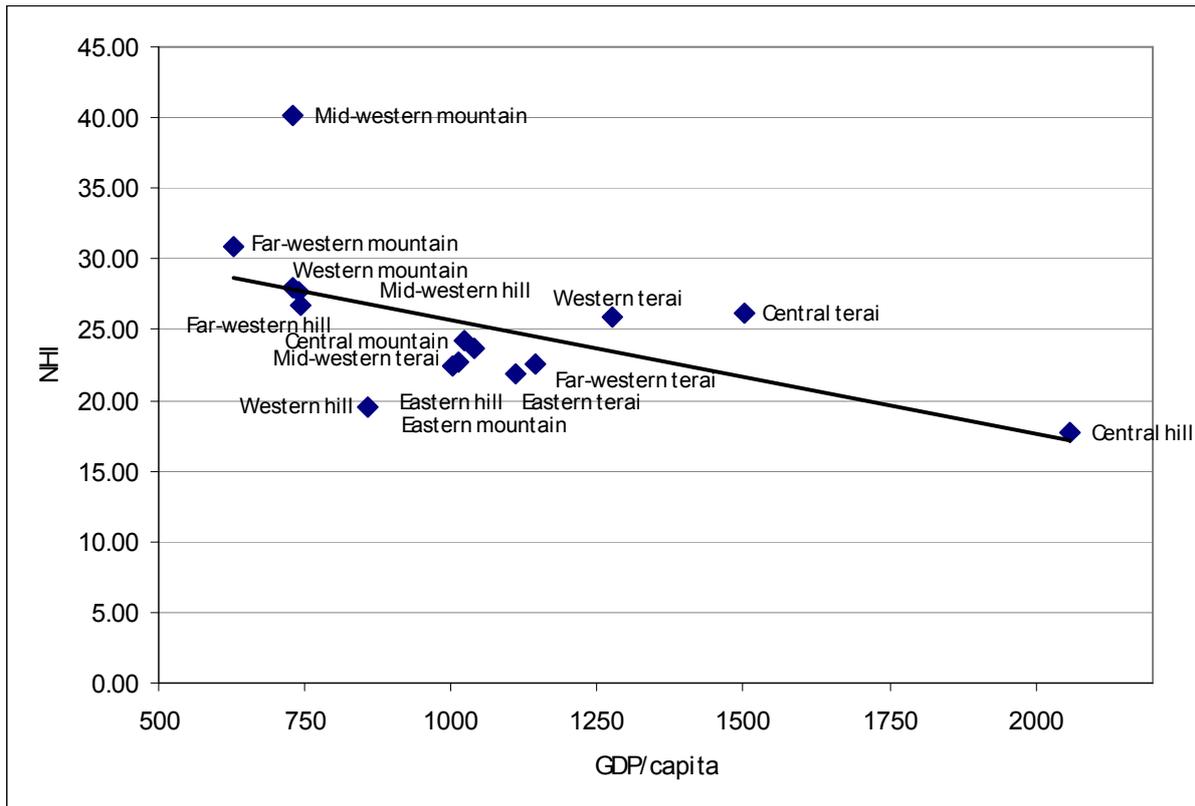


Source: UNDP 2004, National Human Development Report Nepal, data values based on Population Census 2001

Economic activity as measured by the *Gross Domestic Product* (GDP) would be expected to have an influence on the NHI. Figure 6 plots the NHI against the GDP per capita. More affluent and economic active sub-regions have indeed a lower NHI. The Mid-Western Mountain region should however do better given its, albeit very low, GDP per capita level. In contrast, a couple of sub-regions, Eastern Terai and Western Hills, have better NHIs than their GDP per capita level would suggest.

Insufficient food production is often blamed for high levels of food insecurity and hunger in many parts of Nepal. Figure 7 plots the relationship between average per capita cereal production during the period 2001/02 and 2005/06 and the NHI. A negative correlation (-0.54), i.e. the higher the per capita production, the lower the NHI, can indeed be observed. This is very much due to the subsistence nature of the rural economy and dependency of the rural population on agriculture. Crop failure is quickly translated into hunger. This relationship is more pronounced in severely food insufficient areas such as the Mid-Western Mountains and cease to exist in more economically advanced areas including the Central Hills which includes the Kathmandu Valley.

Figure 6: Relationship between Nepal Hunger Index and GDP per Capita.



Source: UNDP 2004, National Human Development Report Nepal, data values based on Population Census 2001

Figure 7: Relationship between Nepal Hunger Index and per Capita Cereal Production.

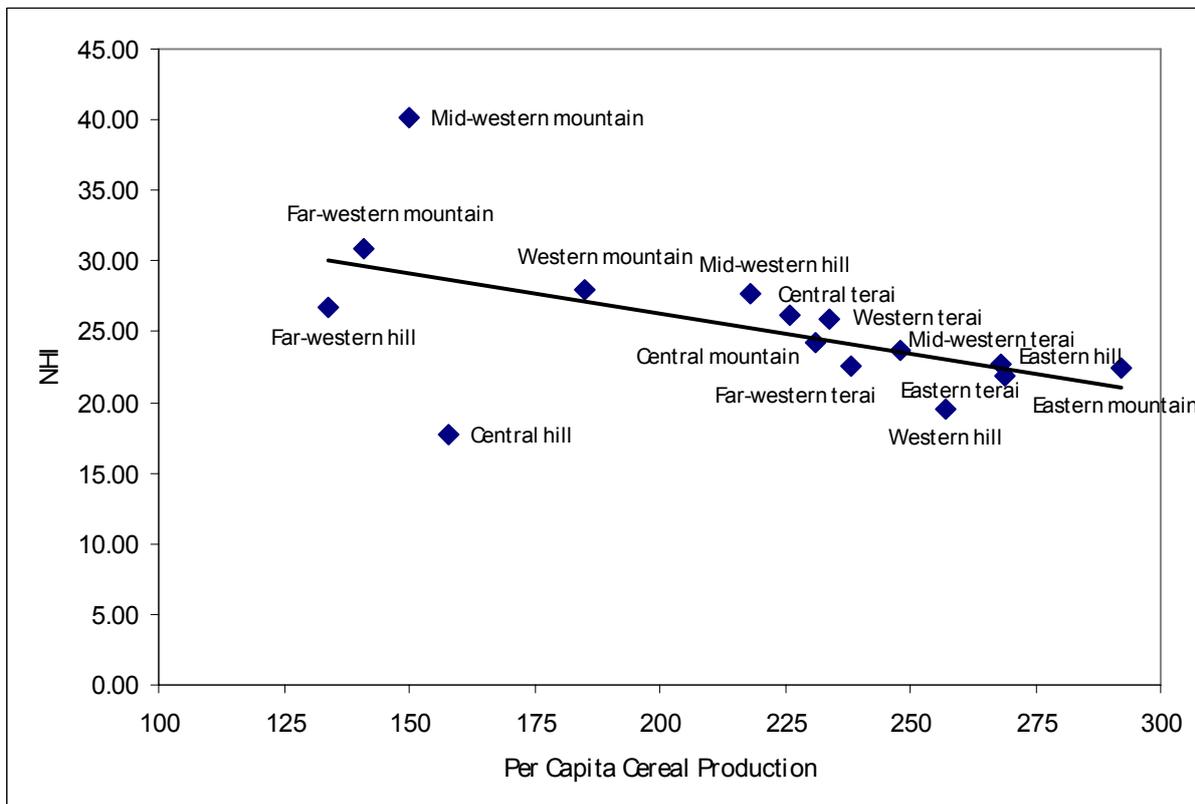


Table 7 shows the correlation coefficients between the NHI and alternative socio-economic indicators.

Table 7: Correlations between socio-economic factors and Nepal Hunger Index*

Human Development Index (value 2000)	GDP/capita (value 1999)	Per capita food production
-0.82	-0.55	-0.54

*the correlations were calculated for the sub-regions of Nepal.

Box 2 – The Mid-Western Mountain Sub-Region

The Mid-Western Mountains – known as the *Karnali* - includes the districts Humla, Mugu, Kalikot, Jumla and Dolpa. These *Karnali* districts are characterized by extreme remoteness, low agricultural productivity, and limited access to basic services such as health care, agricultural extension services, sanitation, safe drinking water, etc.

The Nepal Food Security Monitoring System (NekSAP) consistently reports most of the *Karnali* as being chronic food insecure with food insecurity intensifying to high and severe levels during the lean periods or following harvest failures. In the past, severe famines have been recorded in this part of the country with the last one occurring in 1996⁹.

These high levels of food insecurity are reflected in the stunting¹⁰ estimates available for children under the age of five. For example, a recent ACF nutrition survey which covered 18 VDCs in Mugu district found that 79.5 percent of children under the age of five are stunted and almost half of them are severely stunted¹¹.

The area is drought-prone and agricultural yields are extremely low. At higher altitudes only one crop a year is possible. Land use is constrained due to steep slopes and rocky soils and irrigation is, except for Jumla district, almost non-existent. Consequently, food production is sufficient for 4 to 6 months of the year only.

Crop and livestock farming, collection of non-timber forest products and trade with Tibet are the main livelihoods. Seasonal migration, mainly to India, is the key survival strategy for a large share of the population. During the months of May/June the annual collection of *Yarsagumba* (a fungus turned caterpillar used for medicinal purposes or taken as a stimulus) which can be found at high altitudes in some parts of the *Karnali* provides a key income source for some communities.

Food prices in the *Karnali* are generally 2 to 3 times more than in the Terai due to high transportation cost usually involving airlifts, mule caravans, or carried on the back of porters. Market and road infrastructure are very limited or non-existent and it can take many days walking to reach a market. The price of food grains is largely determined by the sale of rice at subsidized prices through the Nepal Food Corporation (NFC) due to very limited private trade. In recent years, food assistance to the *Karnali* has increased substantially through food-for-work programmes implemented by the World Food Programme.

⁹ Food Crisis in Karnali, Jagannath Adhikari, 2009
¹⁰ Stunting, or low height-for-age, is an impact measure resulting from prolonged deficiency in food intake.
¹¹ Nutritional Anthropometric Survey, Children from 6 to 59 Months Covering 18 VDC of Mugu District, Nepal, ACF, 2008

11. Conclusion and Policy Implications

The aim of this study was to derive a sub-regional hunger index for Nepal, comparable to IFPRI's Global Hunger Index. The hunger index for Nepal clearly shows that hunger is a substantive and urgent issue in Nepal that needs to be addressed. The situation is *extremely alarming* in the Far- and Mid-Western Mountains. The latter sub-region ranks one but last on the global hunger index scale. The food security situation in most of Nepal's sub-regions is *alarming* and only 3 sub-regions are considered seriously food insecure. Not a single sub-region in Nepal can be classified as moderate or low in terms of their hunger index scores.

The analysis shows that there are substantive differences in food insecurity from one area to the next. Poverty, economic activity, agricultural productivity, access to basic services like health facilities and food markets all play a role.

The analysis points out that increased economic growth in many of the remote sub-regions is urgently required to combat poverty, which is a key underlying factor to the hunger problem in Nepal. Economic growth, preferably through increased investments in a much neglected agricultural sector, is however not enough, and there is an urgent need to invest solidly in direct nutrition interventions to address the huge issue of child malnutrition. This includes investing in the health sector, increasing nutritional awareness, improving behavioural practices such as hand washing, breast feeding and water treatment, and providing access to proper sanitation facilities to rural populations. In addition, sufficient access to food will need to be ensured to the most vulnerable, including the landless, disadvantaged ethnic groups, female headed households, elderly and handicapped, through targeted social protection programmes.

Therefore, to address the hunger issue in Nepal, a substantive and urgent effort is required to increase agricultural production, improve market infrastructure and ensure access to food by all population groups. Most importantly, the huge challenge of malnutrition in the country needs to be addressed to give children, regardless where they are born in Nepal, a chance to a healthy and active life.

References

ACF (June 2008): Nutritional Anthropometric Survey, Children from 6 to 59 Months Covering 18 VDC of Mugu District, Nepal.

Adhikari, Jagannath (2009), Food Crisis in Karnali, A Historical and Politico-economic Perspective, Nepal

FAO (2008): State of Food Security in the World – High Food Prices and Food Security, Threats and Opportunities. Rome, Italy.

FAO/WFP (2007): Special Report – FAO/WFP Food Security Assessment Mission to Nepal, 25 July 2007. Rome.

Grebmer, K., Fritschel, H., Nestorova, B., Olofinbiyi, T., Pandya-Lorch, R., Y. Yohannes (2008): The Global Hunger Index – The Challenge of Hunger 2008. Bonn, Washington D.C., Dublin.

Mernies, J. (2004): Measurement of Food Deprivation. Paper presented at the MEXSAI, Third International Conference on Agricultural Statistics, Nov 2-4, 2004.

UNDP (2001): Nepal Human Development Report 2001 – Poverty Reduction and Governance. Kathmandu, Nepal.

UNDP (2004): Nepal Human Development Report 2004 – Empowerment and Poverty Reduction. Kathmandu, Nepal.

Wiesmann, D. (2004): An international Nutrition Index: Concept and Analyses at Country Levels. Peter Land, Frankfurt, Germany.

Wiesmann, D. (2006): A global Hunger Index – Measurement Concept, Ranking of Countries, and Trends. FCND Discussion Paper 212, IFPRI, Washington D.C., USA.

Annex I – Indicators

	Population undernourished (below 1810 kcal/person/day) (%)	Underweight in children under 5 (%)	Child mortality (%)	NHI	Human Development Index	GDP/Capita	Per Capita Cereal Production
Nepal	22.50 (17)	38.6 (38.8)	6.1 (5.9)	22.40 (20.6)	0.466	1,237	226
Urban	22.7	23.1	4.7	16.83	0.616	2,133	-
Rural	22.4	40.7	8.4	23.83	0.446	1,094	-
<i>Development Region</i>							
East	22.3	32.9	6	20.40	0.484	1,073	271
Central	22.1	38.2	6.8	22.37	0.493	1,713	196
West	17.3	38.5	7.3	21.03	0.479	1,022	247
Mid-West	29	43.4	12.2	28.20	0.402	861	223
Far-West	23.5	43.7	10	25.73	0.385	899	186
<i>Zone</i>							
Mountain	28.5	42.4	12.8	27.90	0.378	898	-
Hill	25.1	33.2	6.2	21.50	0.510	1,262	-
Terai	18.5	42.3	8.5	23.10	0.474	1,267	-
<i>Sub- Region</i>							
Eastern mountain	22.45	35.6	7.60	21.88	0.424	1,003	292
Central mountain	25.50	33.1	14.20	24.27	0.437	1,023	231
Western mountain	17.39	48.4	18.00	27.93	0.414	731	185
Mid-western mountain	54.11	48.4	18.00	40.17	0.322	731	150
Far-western mountain	26.40	48.4	18.00	30.93	0.286	629	141
Eastern hill	29.64	33.3	5.20	22.71	0.513	1,012	268
Central hill	24.87	21.7	4.00	16.86	0.510	2,059	158
Western hill	14.21	34.4	4.70	17.77	0.487	858	257
Mid-western hill	25.25	45.7	12.00	27.65	0.433	741	218
Far-western hill	26.40	44.4	9.40	26.73	0.393	744	134
Eastern terai	20.06	32.3	6.10	19.49	0.488	1,109	269
Central terai	20.15	50.2	8.30	26.22	0.462	1,502	226
Western terai	21.66	44.6	11.50	25.92	0.435	1,276	234
Mid-western terai	23.76	37.9	9.20	23.62	0.458	1,040	248
Far-western terai	18.25	41.1	8.50	22.62	0.425	1,144	238

Source: FAO/WFP Food Security Assessment Mission to Nepal, Special Report, July 2007
 Demographic and Health Survey, Nepal 2006
 Nepal Human Development Report, 2001