

## Small Area Estimation of Poverty, Caloric Intake and Malnutrition in Nepal



**Technical session**  
Ministerial Conference on  
Disaster Risk Reduction  
Delhi, 7-8 November 2007

## Background

### Country

- Nepal is one of the least developed countries with a per capita GDP of USD 311 and rank 136 out of 177 countries in the Human Development Index.
- The country has an immense variety of topography, from lowland plains to the highest mountains in the world, and this variety is reflected in the diversity of weather and climate and risks associated with these.

### Main Risks

- Adverse weather conditions (drought)
- Seasonal flooding / landslides
- Unavailability of food
- Lack or loss of employment
- Civil conflict (loss of livelihood)

### Nepal Policy

- Poverty alleviation is the objective of the Nepal Government's Tenth Plan: 2003-2007 and the long-term Agriculture Perspective Plan.
- The plan's objective is to achieve a sustainable reduction in poverty from 38 percent at the beginning to 30 percent by the end of the plan period, and to reduce poverty to 10 percent in about fifteen years' time.

### WFP

- Linking disaster preparedness and response to longer term development and rehabilitation objectives (infrastructure, peace and integration, nutrition, health and education)
- Essential infrastructure programme, Mother and Child Health Nutrition, Food for Education, Emergency response

## Regional variation

- Poverty and malnutrition in Nepal are characterized by considerable regional and ethnic variation. Factors such as proneness to natural disasters, distribution and quality of land, access to education and health facilities, level of infrastructure development, employment opportunities, and dietary and hygiene practices provide possible explanations for this.



## Small Area Estimates

### Aim:

- Small-area estimates of poverty and malnutrition rely on patterns in this regional variation and the aim has been to produce such estimates (and their standard errors) at district and ilaka levels.

### Method:

- The estimates combine a household income and expenditure survey (NLSS), a demographic health survey (NDHS), and GIS variables with auxiliary data derived from the census and 20% long-form census sample.



### Data Requirements, modelling and accuracy

**Data Requirements:**

- Survey containing target variable (Y), auxiliary variables (X) and regional (district, ilaka, vdc, ward) indicators
- Census containing the same X variables and regional (district, ilaka, vdc, ward) indicators
- Other auxiliary data sources (eg Census means, GIS) linked to regional (eg vdc, ward) indicators.

**Modelling:**

- Use survey data to fit (using survey regression)
- Decompose residual variation in two (or three levels)
- Produce lot of (b=1,...,B) predicted values using census data
- Calculate mean and standard errors

$$Y_{ij} = X_{ij}\beta + u_{ij}$$

$$\hat{Y}_{ij}^b = X_{ij}\beta^b + h_i^b + e_{ij}^b$$

**Accuracy:**

Prevalence at Ilaka	Mean SE (%)
Poverty	3.8
Caloric intake	4.0
Stunting	2.9
Underweight	2.4
Wasting	1.0

### POVERTY

- CBN Approach (Rs 7,696)
- Incidence, gap and severity of poverty
- Clusters of very high incidence of poverty in Hills and Terai of Far and Mid-Western Development Regions and Hills and Mountains of Central and Eastern Development Regions
- Approximately 7.6 million poor (31%)
- Most live in the Terai due to much higher population density.

### Caloric Intake

- Direct Calorie Intake method
- Incidence, gap and severity of poverty
- Threshold at 2709 Kcal (adult eq. ~ 2144 kcal/p/d)
- Lack of food intake most profound in the mountain areas of the Far and Mid Western Development Regions

**Prevalence of Caloric Intake Below the Threshold**

**Differences between two poverty measures:**

- Extent of cash expenditure in household budget
- Choice of and lack of access to food

### Malnutrition

**Nepal Malnutrition Maps**

Map 1: Prevalence of Stunting

Map 2: Prevalence of Wasting

Map 3: Prevalence of Underweight

**Stunting (height-for-age):**

- Measures chronic malnutrition
- Nepal 50.4%
- Mountain and Hill of the Far and Mid-western Dev. Regions

**Wasting (weight-for-height):**

- Measures acute malnutrition
- Nepal 9.6%
- Most common in Terai (high – to very high)
- Mountain and hills (moderate to low)

**Underweight (weight-for-age)**

- Reflects chronic and acute malnutrition
- Nepal 45.2%
- Central Terai, Hills and mountains of Mid and Far-west

## Benefits

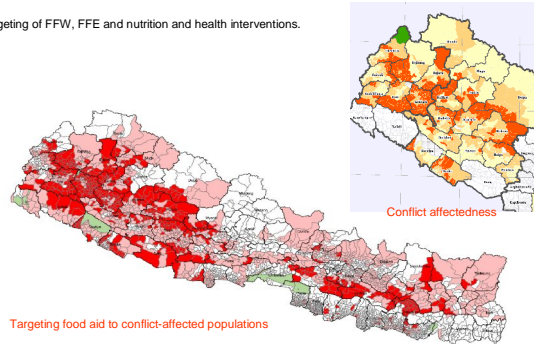
- Improve our understanding in the relationships between different types of poverty and malnutrition
- Provide mechanism for aid allocation
- Provide detailed baseline data for disaster preparedness



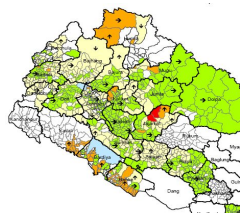
## WFP – Targeting of food aid

Targeting of WFP's Food Assistance for Conflict Affected Populations by overlaying conflict impact map with poverty and malnutrition maps.

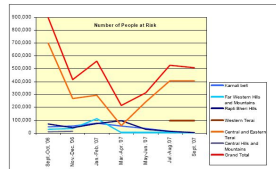
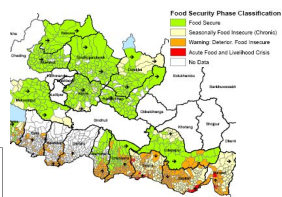
Targeting of FFW, FFE and nutrition and health interventions.



## WFP – Disaster preparedness and response



Food Security Monitoring and Analysis System  
Food Security Phase Classification Maps



Small area estimates of prevalence, gap and severity used to determine the number of people at risk to food insecurity in disaster affected areas.

Questions?

