# RESEARCH INTO THE LONG TERM IMPACT OF DEVELOPMENT INTERVENTIONS IN THE KOSHI HILLS OF NEPAL

## POVERTY ANALYSIS REPORT

## Commissioned by

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# Table of Contents

# Acronyms and Abbreviations

| | | | | |
|---|---|---|---|---|
| ADB | Asian Development Bank | | KII | Key Informant Interviews |
| APP | Agriculture Perspective Plan | | KIS | KHARDEP Impact Studies |
| BNMT | Britain-Nepal Medical Trust | | KOSEVEG | Koshi Seed and Vegetable |
| CBO | Community Based Organisation | | LFP | Livelihoods & Forestry Project |
| CBS | Central Bureau of Statistics | | MLD | Ministry of Local Development |
| CEDA | Centre for Economic Development and Administration | | NDHS | Nepal Demographic and Health Survey |
| CEPREAD | Vegetable Production through Centre for Environment and Agricultural Policy Research Extension and Development (CEPREAD), Seed Sector Support Project (SSSP) | | NGIIP | National Geographic Information Infrastructure Programme |
| CFUG | Community Forest User Groups | | NGO | Non-Government Organisation |
| CPS | Community Support Programme | | NLSS | Nepal Living Standard Survey |
| DANIDA | Danish International Development Agency | | NPC | National Planning Commission |
| DFID | Department for International Development | | NSCA | National Sample Census of Agriculture |
| DHO | District Health Office | | NUKCFP | Nepal-UK Community Forestry Project |
| DHS | Nepal Demographic and Health Survey | | PAC | Pakhribas Agriculture Centre |
| DNPWC | Department of National Park and Wildlife Conservation | | PAF | Poverty Alleviation Fund |
| DoE | Department of Education | | PCRW | Production Credit for Rural Women |
| DoHS | Department of Health Services | | PHCC | Primary Health Care Centre |
| EDG | Effective Development Group | | PGRS | Pakhribas Gurkha Reintegration Service |
| EDR | Eastern Development Region | | PRA | Participatory Rural Appraisal |
| EMIS | Education Management Information System | | PSC | Project Steering Committee |
| FCHV | Female Community Health Volunteer | | RAP | Rural Access Programme |
| FGD | Focus Group Discussions | | RCA | Reality Check Approach |
| FHH | Focal Households | | SHP | Sub-Health Post |
| GIS | Geographic Information Systems | | SMIP | Safe Motherhood Innovative Project |
| GIZ | German International Assistance | | SNV | Netherlands Agency for Development |
| GoN | Government of Nepal | | SSSP | Seed Sector Support Project |
| HHH | Host Households | | TBAs | Traditional Birth Attendants |
| HMGN | His Majesty's Government of Nepal | | TMI | The Mountain Institute |
| HMIS | Health Management Information System | | TOR | Terms of Reference |
| HP | Health Post | | UNDP | United Nations Development Programme |
| ICIMOD | International Centre for Integrated Mountain Development | | UNICEF | United Nations International Children's Emergency Fund |
| IT | Information Technology | | UNIFEM | United Nations Development Fund For Women |
| KHARDEP | Koshi Hill Area Development Project | | VDC | Village Development Committee |
| KHDP | Koshi Hills Development Programme | | WB | World Bank |
| KHST | Koshi Hills Study Team | | WUG | Water User Groups |

# Acknowledgements

# 1. Introduction

## 1.1    Absolute poverty

Absolute poverty reflects a state of subsistence normally below a pre-determined level of per capita income or consumption deemed necessary to achieve an adequate standard of living. The international absolute poverty line currently stands at USD 1.25 per day. The enduring attraction of income poverty measures is that they lend themselves to precise analysis over time and across groups or regions. National statistics in developing countries use absolute poverty indicators to draw their poverty lines. These differ significantly from the international absolute poverty threshold of USD 1.25 per day. National poverty lines are normally considered to be more accurate measures of what it means to be poor in a country.

One of the weaknesses of absolute poverty lines is that they imply a 'break off point'. Thus those below the line are considered poor and those just above are not poor and somehow have an adequate standard of living. IN light of this it has been argued that it may make sense to define more than one poverty line. Some countries for example have upper and lower poverty lines to distinguish between the poor and the extreme poor. Another approach is to construct a food poverty line which estimates the minimum amount of money required so that a household can purchase a basic needs food bundle. The cost of basic non-food needs can also be estimated in a similar way. The food poverty line together with the non-food line equals the overall poverty line.

## 1.2 Multidimensional poverty

All of the above approaches are essentially monetary based measures of welfare and have been criticised because they to fail capture the full range of deprivations that constitute poverty. A more expanded understanding of absolute poverty was captured by the definition which emerged from the 1995 World Summit on Social Development, stating that  absolute poverty is "a condition characterised by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services." The importance of including different deprivations into a measurement of poverty is that this can paint a very different and more robust picture of what it means to be poor.  Thus it is now increasingly accepted that poverty is multidimensional. So although a lack of income may adversely affect livelihoods, people can still suffer acute deprivations even if they possess adequate incomes. Multidimensional approaches therefore set out to capture a fuller range of deprivations (physical, economic, social, cultural etc) that constitute poverty.

The analyses presented here provide information both on (a) absolute poverty (as measured by the percentage of households falling below the total poverty line, the food poverty line and the non-food poverty line), (b) multidimensional poverty by examining 21 other indicators of poverty and (c) the poverty gap index and squared poverty gap index which measure the extent of poverty. The 24 indicators that have been chosen are commonly used in many developing countries to quantify and qualify the amount and depth of poverty as well as being Nepal specific.

## 1.3 Indicators of Chronic Poverty

The indicators of chronic poverty have been grouped into six dimensions of poverty as follows:

- **Severity**. Five indicators have been used including monetary indicators of household well-being, particularly food and non-food expenditure. These measures are primarily used by economists. Here we propose primarily using the Nepal poverty line (divided into food-poor and non-food poor) based on the cost of basic needs.  Also included in this dimension are remittances and adult illiteracy.
- **Health**.  The health of household members has been examined through two indicators: child mortality and child immunisation.

- **Standard of living and remoteness**. Chronic poverty is associated with lack of amenities and assets. Seven indicators fall within this dimension of which two indicators (safe drinking water and sanitation) also relate to health and well-being
- **Women's empowerment**.  The indicator used under this heading is female headed households
- **Remoteness**. Three remoteness indicators have been used involving the time it takes to reach a health post, road head and a market
- **Vulnerability**. Six indicators were used including caste, dependency ratio and land ownership

## 1.5 Data sources used

The only data sources used were the three NLSS surveys conducted in 1933/4, 2003/4 and 2009/10 as these have information on poverty lines.  In order to maximise comparability between surveys the same 24 indicators have been used across all three surveys.

## 1.6    Methods of analysis

In total 24 indicators have been used of which 18 deal with chronic poverty and 6 with vulnerability.

The analyses have used three approaches:
(a) Ranking where the four 'groups' of districts where ranked from 1 to 4 (0.5 if tied) with 1 being the best ranked district or group of districts and 4 the worst ranked for each of the 24 indicators,

(b) A zero-to-one transformation in which the original four percentages of each indicator were transformed into 4 scores ranging between 0 and 1 (where 0 is the best and 1 is the worst district/group of districts).

(c) Poverty Gap, Poverty Index (PGI) and Squared Poverty Gap Index (SPGI). Using the three NLSS surveys, three PGIs were computed: the overall PGI, the food PGI and non-food PGI, as well as the three squared indices.

**Table 1.1: List of Data Categories and Indicators**

| Chronic Poverty | Headings | Indicator |
|---|---|---|
| | **Severity** | Poverty (cost of basic needs method) Total (%) |
| | | Poverty – food poor (%) |
| | | Poverty – non-food poor (%) |
| | | Adult illiteracy rate (%) |
| | | Remittances – no (%) |
| | **Health** | Child mortality – all (%) |
| | | Child immunisation – no (%) |
| | **Standard of living** | Electricity – no (%) |
| | | Drinking water not MDG (%) |
| | | Sanitation not MDG (%) |
| | | Wall construction – poor (%) |
| | | Roof construction – poor (%) |
| | | Cooking – poor (%) |
| | | Assets – none (%) |
| | **Women's empowerment & gender disparity** | Female head of household (%) |
| | **Remoteness** | Remoteness health post > 60 minutes (%) |
| | | Remoteness road head > 60 minutes (%) |
| | | Remoteness market > 60 minutes (%) |
| **Vulnerability** | | Caste – Dalit (%) |
| | | Rural (%) |
| | | Dependency ratio – over 1 (%) |
| | | Loans – yes (%) |
| | | Migrants – from abroad (%) |
| | | Land owned – no (%) |

## 1.6 Limitations of the analyses

The number of households surveyed in some of the Koshi Hills districts in the NLSS surveys was small; thus the results presented here consider all four Koshi Hill districts together and compare them with Ilam and Khotang separately as well as with the two Koshi Tarai districts (Morang and Sunsari) together.

The three appendices present more detailed analyses for each survey separately as well as between Koshi Hill districts. It should be noted that the number of indicators used varied. Appendix 1 deals only with data collected by NLSS I and so reflects the situation in 1993/4, appendix II uses data from 10 different databases from the early to mid 2000s, including the Nepal Demographic Health survey, while Appendix III is based entirely on NLSS III and covers the period 2009/10.

## 2. Results

### 2.1 Introduction

Information on all 24 indicators is presented in Tables 2.1 to 2.3 for the four Koshi Hill districts combined (Bhojpur, Dhankuta, Sankhuwasabha and Tehrathum) as well the two Koshi Tarai districts combined (Morang and Sunsari) and the two neighbouring districts, Ilam and Khotang, separately for NLSS I, II and III.  All of the indicators were recorded in percentages where a higher percentage indicates a worse status.

**Table 2.1: Variation in the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS I**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
|---|---|---|---|---|---|
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 18.50 | 12.50 | 20.80 | 41.10 |
| | Poverty – food poor (%) | 24.10 | 16.70 | 29.20 | 48.80 |
| | Poverty – non-food poor (%) | 27.80 | 37.50 | 29.20 | 42.90 |
| | Adult illiteracy rate (%) | 73.60 | 80.90 | 91.70 | 79.30 |
| | Remittances – no (%) | 93.50 | 97.90 | 83.30 | 86.90 |
| **Health** | Child mortality – all (%) | 39.60 | 22.20 | 13.00 | 22.20 |
| | Child immunisation – no (%) | 16.10 | 4.80 | .0 | 14.40 |
| **Standard of living** | Electricity – no (%) | 88.90 | 100.00 | 100.00 | 81.50 |
| | Drinking water not MDG (%) | 63.90 | 43.80 | 29.20 | 2.40 |
| | Sanitation not MDG (%) | 91.70 | 100.00 | 100.00 | 81.50 |
| | Wall construction – poor (%) | 85.20 | 85.40 | 100.00 | 31.50 |
| | Roof construction – poor (%) | 81.50 | 85.40 | 95.80 | 75.60 |
| | Cooking – poor (%) | 93.50 | 100.00 | 100.00 | 92.90 |
| | Assets – none (%) | 51.90 | 62.50 | 79.20 | 44.60 |
| **Women's empowerment & gender disparity** | Female headed (%) | 10.20 | 8.30 | 20.80 | 9.50 |
| **Remoteness** | Remoteness health post >60 mins (%) | 26.90 | 52.10 | 4.20 | 10.10 |
| | Remoteness road head >60 mins (%) | 71.30 | 45.80 | 100.00 | 3.00 |
| | Remoteness market >60 mins (%) | 77.60 | 77.10 | 100.00 | 31.50 |
| **Vulnerability** | Caste – Dalit (%) | 6.90 | 6.50 | 4.20 | 2.40 |
| | Rural (%) | 88.90 | 75.00 | 100.00 | 85.70 |
| | Dependency ratio (%) | 34.30 | 29.20 | 50.00 | 32.10 |
| | Loans – yes (%) | 30.60 | 31.30 | 20.80 | 46.40 |
| | Migrants – from abroad (%) | .0 | .0 | .0 | .0 |
| | Land owned - no (%) | 7.40 | 12.50 | 4.20 | 50.60 |

**Table 2.2: Variation in the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS II**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
| | | | Ilam | Khotang | |
|---|---|---|---|---|---|
| **Severity** | Poverty (CBN) Total (%) | 40.20 | 12.50 | 37.50 | 13.50 |
| | Poverty – food poor (%) | 32.60 | 10.40 | 33.30 | 18.30 |
| | Poverty – non-food poor (%) | 57.60 | 22.90 | 66.70 | 18.70 |
| | Adult illiteracy rate (%) | 43.90 | 54.20 | 29.20 | 53.20 |
| | Remittances – no (%) | 85.60 | 72.90 | 83.30 | 84.50 |
| **Health** | Child mortality – all (%) | 14.40 | 7.90 | 5.30 | 13.30 |
| | Child immunisation – no (%) | 45.00 | 33.30 | 56.30 | 37.10 |
| **Standard of living** | Electricity – no (%) | 86.40 | 54.90 | 100.00 | 48.00 |
| | Drinking water not MDG (%) | 34.80 | 27.10 | 45.80 | 4.40 |
| | Sanitation not MDG (%) | 44.70 | 22.90 | 75.00 | 51.20 |
| | Wall construction – poor (%) | 79.50 | 12.50 | 91.70 | 7.90 |
| | Roof construction – poor (%) | 84.10 | 31.30 | 100.00 | 27.00 |
| | Cooking – poor (%) | 97.70 | 85.10 | 100.00 | 78.80 |
| | Assets – none (%) | 35.60 | 31.30 | 41.70 | 19.80 |
| **Women's empowerment & gender disparity** | Female headed (%) | 21.20 | 20.80 | 12.50 | 15.50 |
| **Remoteness** | Remoteness health post >60 mins (%) | 31.80 | 27.10 | 12.50 | 7.90 |
| | Remoteness road head >60 mins (%) | 78.00 | 4.20 | 100.00 | 7.10 |
| | Remoteness market >60 mins (%) | 75.80 | 41.70 | 100.00 | 25.80 |
| **Vulnerability** | Caste – Dalit (%) | 11.40 | 6.30 | 25.00 | 7.00 |
| | Rural (%) | 98.50 | 95.70 | 100.00 | 87.60 |
| | Dependency ratio (%) | 51.50 | 35.40 | 58.30 | 41.70 |
| | Loans – yes (%) | 23.50 | 25.00 | 37.50 | 31.30 |
| | Migrants – from abroad (%) | 1.50 | 10.40 | .0 | 18.30 |
| | Land owned - no (%) | 6.80 | 33.30 | .0 | 44.00 |

**Table 2.3: Variation in the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS III**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
|---|---|---|---|---|---|
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 14.20 | 10.70 | 13.30 | 11.80 |
| | Poverty – food poor (%) | 12.30 | 13.10 | 13.30 | 10.20 |
| | Poverty – non-food poor (%) | 23.00 | 11.90 | 21.70 | 21.80 |
| | Adult illiteracy rate (%) | 50.50 | 69.00 | 48.30 | 58.90 |
| | Remittances – no (%) | 65.20 | 79.80 | 93.30 | 53.00 |
| **Health** | Child mortality – all (%) | 9.60 | 13.60 | 14.90 | 13.60 |
| | Child immunisation – no (%) | 38.30 | 50.00 | 81.00 | 46.50 |
| **Standard of living** | Electricity – no (%) | 42.60 | 33.30 | 46.70 | 11.30 |
| | Drinking water not MDG (%) | 37.70 | 10.70 | 100.00 | 1.30 |
| | Sanitation not MDG (%) | 83.30 | 69.00 | 86.70 | 58.10 |
| | Wall construction – poor (%) | 96.60 | 86.90 | 96.70 | 59.10 |
| | Roof construction – poor (%) | 64.20 | 6.00 | 78.30 | 14.00 |
| | Cooking – poor (%) | 93.60 | 96.40 | 100.00 | 67.50 |
| | Assets – none (%) | 19.10 | 15.50 | 40.00 | 7.00 |
| **Women's empowerment & gender disparity** | Female headed (%) | 24.50 | 13.10 | 18.30 | 26.30 |
| **Remoteness** | Remoteness health post >60 mins (%) | 27.90 | 22.60 | 16.70 | 4.80 |
| | Remoteness road head >60 mins (%) | 31.40 | 1.20 | 66.70 | .0 |
| | Remoteness market >60 mins (%) | 67.60 | 34.50 | 98.30 | 8.60 |
| **Vulnerability** | Caste – Dalit (%) | 7.40 | 1.20 | 23.30 | 13.10 |
| | Rural (%) | 76.50 | 85.70 | 100.00 | 54.80 |
| | Dependency ratio (%) | 29.90 | 17.90 | 33.30 | 24.70 |
| | Loans – yes (%) | 27.50 | 23.80 | 23.30 | 36.30 |
| | Migrants – from abroad (%) | 1.50 | 3.60 | .0 | 7.80 |
| | Land owned - no (%) | 5.90 | 4.80 | 1.70 | 52.40 |

## 2.2 Ranking among the Koshi Hills (combined), Koshi Tarai (combined) and the two neighbouring districts (separate)

The ranked data are presented in Tables 2.4 to 2.6 for NLSS I, II and III respectively. There was some consistency across the three surveys in terms of chronic poverty, with Khotang being the worst district throughout and the Koshi Tarai being the best in all three surveys. The Koshi Hills were ranked as the second/third worst district group across the 3 surveys. Khotang was the worst district in particular in terms of standard of living, remoteness linked with more households living in rural areas and a higher dependency ratio whereas the Koshi Tarai districts had higher standards of living and was less remote.

Vulnerability was more variable, with the Koshi Hills being worst in NLSS I, Koshi Tarai in NLSS II and Khotang in NLSS III. Overall when chronic poverty and vulnerability were combined, Khotang was the worst across all three surveys while the Koshi Tarai was the first or second best. Statistical analyses revealed that in NLSS I there was no significant difference between the four means. In NLSS II and III highly significant differences ($p < 0.001$) in means were found with the Koshi Hills and Khotang the worst two districts/groups of districts and Ilam and the Koshi Tarai forming another (better) group.

**Table 2.4: Ranking of the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS I**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
|---|---|---|---|---|---|
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 2.0 | 1.0 | 3.0 | 4.0 |
| | Poverty – food poor (%) | 2.0 | 1.0 | 3.0 | 4.0 |
| | Poverty – non-food poor (%) | 1.0 | 3.0 | 2.0 | 4.0 |
| | Adult illiteracy rate (%) | 1.0 | 3.0 | 4.0 | 2.0 |
| | Remittances – no (%) | 3.0 | 4.0 | 1.0 | 2.0 |
| **Health** | Child mortality – all (%) | 4.0 | 2.5 | 1.0 | 2.5 |
| | Child immunisation – no (%) | 4.0 | 2.0 | 1.0 | 3.0 |
| **Standard of living** | Electricity – no (%) | 2.0 | 3.5 | 3.5 | 1.0 |
| | Drinking water not MDG (%) | 4.0 | 3.0 | 2.0 | 1.0 |
| | Sanitation not MDG (%) | 2.0 | 3.5 | 3.5 | 1.0 |
| | Wall construction – poor (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| | Roof construction – poor (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| | Cooking – poor (%) | 2.0 | 3.5 | 3.5 | 1.0 |
| | Assets – none (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| **Women's empowerment & gender disparity** | Female headed (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| **Remoteness** | Remoteness health post >60 mins (%) | 3.0 | 4.0 | 1.0 | 2.0 |
| | Remoteness road head >60 mins (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Remoteness market >60 mins (%) | 2.5 | 2.5 | 4.0 | 1.0 |
| **TOTAL CHRONIC POVERTY SUM AND MEAN** | | **44.5 (2.5)** | **48.5 (2.7)** | **52.5 (2.9)** | **34.5 (1.9)** |
| **Vulnerability** | Caste – Dalit (%) | 4.0 | 3.0 | 2.0 | 1.0 |
| | Rural (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Dependency ratio (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Loans – yes (%) | 2.0 | 3.0 | 1.0 | 4.0 |
| | Migrants – from abroad (%) | 4.0 | 4.0 | 4.0 | 4.0 |
| | Land owned - no (%) | 2.0 | 3.0 | 1.0 | 1.0 |
| **TOTAL VULNERABILITY SUM AND MEAN** | | **18.0 (3.0)** | **15.0 (2.5)** | **16.0 (2.7)** | **14.0 (2.3)** |
| **TOTAL SUM AND MEAN** | | **62.5 (2.60)** | **63.5 (2.65)** | **68.5 (2.85)** | **48.5 (2.02)** |

**Table 2.5: Ranking of the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS II**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 4.0 | 1.0 | 3.0 | 2.0 |
| | Poverty – food poor (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Poverty – non-food poor (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Adult illiteracy rate (%) | 2.0 | 4.0 | 1.0 | 3.0 |
| | Remittances – no (%) | 4.0 | 1.0 | 2.0 | 3.0 |
| **Health** | Child mortality – all (%) | 4.0 | 2.0 | 1.0 | 3.0 |
| | Child immunisation – no (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| **Standard of living** | Electricity – no (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Drinking water not MDG (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Sanitation not MDG (%) | 2.0 | 1.0 | 4.0 | 3.0 |
| | Wall construction – poor (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Roof construction – poor (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Cooking – poor (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Assets – none (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| **Women's empowerment & gender disparity** | Female headed (%) | 4.0 | 3.0 | 1.0 | 2.0 |
| **Remoteness** | Remoteness health post >60 mins (%) | 4.0 | 3.0 | 2.0 | 1.0 |
| | Remoteness road head >60 mins (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Remoteness market >60 mins (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| **TOTAL CHRONIC POVERTY SUM AND MEAN** | | **14.0 (2.3)** | **12.0 (2.0)** | **18.0 (3.0)** | **16.0 (2.7)** |
| **Vulnerability** | Caste – Dalit (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Rural (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Dependency ratio (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Loans – yes (%) | 1.0 | 2.0 | 4.0 | 3.0 |
| | Migrants – from abroad (%) | 2.0 | 3.0 | 1.0 | 4.0 |
| | Land owned - no (%) | 2.0 | 3.0 | 1.0 | 4.0 |
| **TOTAL VULNERABILITY SUM AND MEAN** | | **57.0 (3.2)** | **34.0 (1.9)** | **58.0 (3.2)** | **31.0 (1.7)** |
| **TOTAL SUM AND MEAN** | | **71.0 (2.96)** | **46.0 (1.92)** | **76.0 (3.17)** | **47.0 (1.96)** |

**Table 2.6: Ranking of the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS III**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
|---|---|---|---|---|---|
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 4.0 | 1.0 | 3.0 | 2.0 |
| | Poverty – food poor (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| | Poverty – non-food poor (%) | 4.0 | 1.0 | 2.0 | 3.0 |
| | Adult illiteracy rate (%) | 2.0 | 4.0 | 1.0 | 3.0 |
| | Remittances – no (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| **Health** | Child mortality – all (%) | 1.0 | 2.5 | 4.0 | 2.5 |
| | Child immunisation – no (%) | 1.0 | 3.0 | 4.0 | 2.0 |
| **Standard of living** | Electricity – no (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Drinking water not MDG (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Sanitation not MDG (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Wall construction – poor (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Roof construction – poor (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Cooking – poor (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| | Assets – none (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| **Women's empowerment & gender disparity** | Female headed (%) | 3.0 | 1.0 | 2.0 | 1.0 |
| **Remoteness** | Remoteness health post >60 mins (%) | 4.0 | 3.0 | 2.0 | 1.0 |
| | Remoteness road head >60 mins (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| | Remoteness market >60 mins (%) | 3.0 | 2.0 | 4.0 | 1.0 |
| **TOTAL CHRONIC POVERTY SUM AND MEAN** | | **49.0 (2.7)** | **39.5 (2.2)** | **62.0 (3.4)** | **26.5 (1.5)** |
| **Vulnerability** | Caste – Dalit (%) | 2.0 | 1.0 | 4.0 | 3.0 |
| | Rural (%) | 2.0 | 3.0 | 4.0 | 1.0 |
| | Dependency ratio (%) | 3.0 | 1.0 | 4.0 | 2.0 |
| | Loans – yes (%) | 3.0 | 2.0 | 1.0 | 4.0 |
| | Migrants – from abroad (%) | 2.0 | 3.0 | 1.0 | 4.0 |
| | Land owned - no (%) | 3.0 | 2.0 | 1.0 | 4.0 |
| **TOTAL VULNERABILITY SUM AND MEAN** | | **15.0 (2.5)** | **12.0 (2.0)** | **15.0 (2.5)** | **18.0 (3.0)** |
| **TOTAL SUM AND MEAN** | | **64.0 (2.67)** | **51.5 (2.15)** | **77.0 (3.21)** | **44.5 (1.85)** |

## 2.3 Composite index among the Koshi Hills (combined), Koshi Tarai (combined) and the two neighbouring districts (separate)

Ranking ordered the indicators from best (rank 1) to worst (rank 4), but is does not reflect the magnitude of the difference between districts. The zero-to-one transformation (d, composite index) quantifies the magnitude of the difference between districts, where a higher value of the indicator refers to a less developed district or group of districts, $d_{ij} = (x_{ij} - min_j)/(max_j - min_j)$, when $x_{ij}$ is the value of the $j^{th}$ indicator in the $i^{th}$ district/group of districts, and $max_j$ and $min_j$ denote the maximum and minimum values respectively over the 4 districts or group of districts of the $j^{th}$ indicator.  The advantage of the zero-to-one transformation is that all d values are free from the unit of measurement. The mean composite indices for each district/group by dimension were calculated by summing up all the d values and a total mean composite index for all dimensions together was calculated for each district. These two approaches are complimentary; the ranking approach orders the districts while the d values and the composite indices reflect the magnitude of the differences between districts.

For example in the ranking of households not receiving remittances in NLSS I Ilam was the worst followed by Koshi Hills, Koshi Tarai and Khotang. The same rank order was also found for remoteness from a health post. But the range between worst and best district was only 14.6% for remittances while it was 47.9% for remoteness. In addition the ranking system forces a 1 unit difference between each rank whereas the actual difference between districts varied.

| Indicator | Koshi Hills | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|
| Remittances (%) | 93.5 | 97.9 | 83.3 | 86.9 |
| Ranking | 3 | 4 | 1 | 2 |
| Difference between Ilam and others (%) | 4.4 | - | 14.6 | 11.0 |
| Remoteness of health post (%) | 26.9 | 52.1 | 4.2 | 10.1 |
| Ranking | 3 | 4 | 1 | 2 |
| Difference between Ilam and others (%) | 25.2 | - | 47.9 | 42.0 |

The composite index sets the best district a value of 0 and the worst district a value of 1.  The poverty composite indices for the other two districts are calculated as follows for remittances:-

1. Ilam = 1 and Khotang = 0 composite indices.
2. Difference between maximum (Ilam) and minimum (Khotang) = (97.9% - 83.3%) = 14.6.
3. District – minimum district, Koshi Hills - Khotang = 93.5-83.3 = 10.2
   Koshi Tarai – Khotang = 86.9-83.3 = 3.6
4. Composite index for  Koshi Hills = 10.2/14.6 = 0.70
5. Composite index for Koshi Tarai = 3.6/14.6 = 0.25

The same method is used to calculate the composite indices for remoteness:

| Indicator | Koshi Hills | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|
| Remittances (%) | 93.5 | 97.9 | 83.3 | 86.9 |
| Composite index | 0.70 | 1.0 | 0 | 0.25 |
| Remoteness of health post (%) | 26.9 | 52.1 | 4.2 | 10.1 |
| Composite index | 0.47 | 1.0 | 0 | 0.12 |

The zero-to-one scoring transformations are presented in Tables 2.7 to 2.9 for the three surveys together with the total sum and mean composite indices.  The results were very similar to those found using ranking.  For chronic poverty the Koshi Tarai was the best over all three surveys while Khotang was the worst in both NLSS I and III. The Koshi Hills chronic poverty mean

worsened between survey 1 and II but improved in survey III.  Vulnerability mean scores were more homogeneous and there were no significant mean differences between groups in any survey. When all chronic poverty and vulnerability indicators were analysed the results replicated what had been found using just the chronic poverty indicators i.e. there was no significant differences in mean composite scores in NLSS I, but in NLSS II and III Ilam and the Koshi Tarai had very similar and low means, while the Koshi Hills and Khotang had much higher (worse) and similar means.

**Table 2.7: Composite index of the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS I**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
| | | | Ilam | Khotang | |
|---|---|---|---|---|---|
| **Severity** | Poverty (CBN) Total (%) | .21 | .0 | .29 | 1.00 |
| | Poverty – food poor (%) | .23 | .0 | .39 | 1.00 |
| | Poverty – non-food poor (%) | .0 | .64 | .09 | 1.00 |
| | Adult illiteracy rate (%) | .0 | .40 | 1.00 | .31 |
| | Remittances – no (%) | .70 | 1.00 | .0 | .25 |
| **Health** | Child mortality – all (%) | 1.00 | .35 | .0 | .35 |
| | Child immunisation – no (%) | 1.00 | .30 | .00 | .89 |
| **Standard of living** | Electricity – no (%) | .40 | 1.00 | 1.00 | .0 |
| | Drinking water not MDG (%) | 1.00 | .67 | .44 | .0 |
| | Sanitation not MDG (%) | .55 | 1.00 | 1.00 | .0 |
| | Wall construction – poor (%) | .78 | .79 | 1.00 | .0 |
| | Roof construction – poor (%) | .29 | .49 | 1.00 | .0 |
| | Cooking – poor (%) | .08 | 1.00 | 1.00 | .0 |
| | Assets – none (%) | .21 | .52 | 1.00 | .0 |
| **Women's empowerment & gender disparity** | Female headed (%) | .15 | .0 | 1.00 | .10 |
| **Remoteness** | Remoteness health post >60 mins (%) | .47 | 1.00 | .0 | .12 |
| | Remoteness road head >60 mins (%) | .70 | .44 | 1.00 | .0 |
| | Remoteness market >60 mins (%) | .67 | .67 | 1.00 | .0 |
| **TOTAL CHRONIC POVERTY SUM AND MEAN** | | **3.26 (0.54)** | **2.50 (0.42)** | **3.40 (0.57)** | **3.57 (0.60)** |
| **Vulnerability** | Caste – Dalit (%) | 1.00 | .91 | .40 | .0 |
| | Rural (%) | .56 | .0 | 1.00 | .43 |
| | Dependency ratio (%) | .25 | .0 | 1.00 | .14 |
| | Loans – yes (%) | .38 | .41 | .0 | 1.00 |
| | Migrants – from abroad (%) | 1.00 | 1.00 | 1.00 | 1.00 |
| | Land owned - no (%) | .07 | .18 | .0 | 1.00 |
| **TOTAL VULNERABILITY SUM AND MEAN** | | **8.46 (0.47)** | **10.26 (0.57)** | **11.21 (0.62)** | **5.02 (0.28)** |
| **TOTAL SUM AND MEAN** | | **11.72 (0.49)** | **12.76 (0.53)** | **14.61 (0.61)** | **8.59 (0.36)** |

**Table 2.8: Composite index of the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS II**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 1.00 | .0 | .90 | .04 |
| | Poverty – food poor (%) | .97 | .0 | 1.00 | .34 |
| | Poverty – non-food poor (%) | .81 | .09 | 1.00 | .0 |
| | Adult illiteracy rate (%) | .59 | 1.00 | .0 | .96 |
| | Remittances – no (%) | 1.00 | .0 | .82 | .91 |
| **Health** | Child mortality – all (%) | 1.00 | .29 | .0 | .88 |
| | Child immunisation – no (%) | .51 | .0 | 1.00 | .17 |
| **Standard of living** | Electricity – no (%) | .74 | .13 | 1.00 | .0 |
| | Drinking water not MDG (%) | .73 | .55 | 1.00 | .0 |
| | Sanitation not MDG (%) | .42 | .0 | 1.00 | .54 |
| | Wall construction – poor (%) | .85 | .05 | 1.00 | .0 |
| | Roof construction – poor (%) | .78 | .06 | 1.00 | .0 |
| | Cooking – poor (%) | .89 | .30 | 1.00 | .0 |
| | Assets – none (%) | .72 | .53 | 1.00 | .0 |
| **Women's empowerment & gender disparity** | Female headed (%) | 1.00 | .95 | .0 | .34 |
| **Remoteness** | Remoteness health post >60 mins (%) | 1.00 | .80 | .19 | .0 |
| | Remoteness road head >60 mins (%) | .77 | .0 | 1.00 | .03 |
| | Remoteness market >60 mins (%) | .67 | .21 | 1.00 | .0 |
| **TOTAL CHRONIC POVERTY SUM AND MEAN** | | **3.26 (0.54)** | **2.50 (0.42)** | **3.40 (0.57)** | **3.57 (0.60)** |
| **Vulnerability** | Caste – Dalit (%) | .27 | .0 | 1.00 | .04 |
| | Rural (%) | .88 | .65 | 1.00 | .0 |
| | Dependency ratio (%) | .70 | .0 | 1.00 | .28 |
| | Loans – yes (%) | .0 | .11 | 1.00 | .56 |
| | Migrants – from abroad (%) | .08 | .57 | .00 | 1.00 |
| | Land owned - no (%) | .15 | .76 | .00 | 1.00 |
| **TOTAL VULNERABILITY SUM AND MEAN** | | **8.46 (0.47)** | **10.26 (0.57)** | **11.21 (062)** | **5.02 (0.28)** |
| **TOTAL SUM AND MEAN** | | **16.56 (0.69)** | **7.05 (0.29)** | **17.91 (0.75)** | **7.09 (0.30)** |

**Table 2.9: Composite index of the indicators in the four Koshi Hills Districts (combined), the two neighbouring districts (separately) and the Koshi Tarai (combined) for NLSS III**

| Dimension | Indicator | Koshi Hills | Neighbouring Districts | | Koshi Tarai |
|---|---|---|---|---|---|
| | | | Ilam | Khotang | |
| **Severity** | Poverty (CBN) Total (%) | 1.00 | .0 | .74 | .31 |
| | Poverty – food poor (%) | .68 | .94 | 1.00 | .0 |
| | Poverty – non-food poor (%) | 1.00 | .0 | .88 | .89 |
| | Adult illiteracy rate (%) | .11 | 1.00 | .0 | .51 |
| | Remittances – no (%) | .30 | .67 | 1.00 | .0 |
| **Health** | Child mortality – all (%) | .0 | .75 | 1.00 | .75 |
| | Child immunisation – no (%) | .0 | .27 | 1.00 | .19 |
| **Standard of living** | Electricity – no (%) | .88 | .62 | 1.00 | .0 |
| | Drinking water not MDG (%)m | .37 | .10 | 1.00 | .0 |
| | Sanitation not MDG (%) | .88 | .38 | 1.00 | .0 |
| | Wall construction – poor (%) | .99 | .74 | 1.00 | .0 |
| | Roof construction – poor (%) | .80 | .0 | 1.00 | .11 |
| | Cooking – poor (%) | .80 | .89 | 1.00 | .0 |
| | Assets – none (%) | .37 | .26 | 1.00 | .0 |
| **Women's empowerment & gender disparity** | Female headed (%) | .86 | .0 | .39 | 1.00 |
| **Remoteness** | Remoteness health post >60 mins (%) | 1.00 | .77 | .52 | .0 |
| | Remoteness road head >60 mins (%) | .47 | .02 | 1.00 | .00 |
| | Remoteness market >60 mins (%) | .66 | .29 | 1.00 | .0 |
| **TOTAL CHRONIC POVERTY SUM AND MEAN** | | **2.13 (0.36)** | **1.24 (0.21)** | **3.00 (0.50)** | **3.98 (0.66)** |
| **Vulnerability** | Caste – Dalit (%) | .28 | .0 | 1.00 | .54 |
| | Rural (%) | .48 | .68 | 1.00 | .0 |
| | Dependency ratio (%) | .78 | .0 | 1.00 | .44 |
| | Loans – yes (%) | .32 | .04 | .0 | 1.00 |
| | Migrants – from abroad (%) | .19 | .46 | .00 | 1.00 |
| | Land owned - no (%) | .08 | .06 | .0 | 1.00 |
| **TOTAL VULNERABILITY SUM AND MEAN** | | **11.19 (0.62)** | **7.70 (0.43)** | **15.53 (0.86)** | **3.78 (0.21)** |
| **TOTAL SUM AND MEAN** | | **13.32 (0.55)** | **8.94 (0.37)** | **18.53 (0.77)** | **7.76 (0.32)** |

## 2.4 Poverty Gap and Squared Poverty Gap Indices

The Poverty Gap (PG) measures the shortfall in consumption of each household below the poverty line (defined by NLSS as the cost of basic needs, CBN) setting a zero gap for all those households above the CBN. It is usually expressed as the average amount per household. The Poverty Gap Index (PGI) expresses the PG as a percentage of CBN and provides a measure of the depth of poverty and PGI measures how far, on average, a household falls below the poverty line.

PGI $= 1/n ( \Sigma(CBN- y_i)/CBN$

Where, $y_i$ is the actual consumption of each household. The larger the PGI the greater the poverty gap.

The Squared Poverty Gap Index (SPGI) is a measure of the degree of inequality among the poor themselves and is the weighted sum of the individual household poverty gap where the weights are the proportionate poverty gaps themselves (i.e. the square). The act of squaring the poverty gap gives greater weight to the poverty gap of the poorest houses since their poverty gap will be larger. The larger the SPGI the greater the degree of inequality.

The analyses presented in Tables 2.10 to 2.12 show overall PGI, food PGI and Non-food PGI and indicate that there were significant differences in means in NLSS I and II but not NLSS III. In NLSS I the Koshi Tarai had the worst total, food and non-food PGIs but in NLSS II the Koshi Hills and Khotang were the worst for all three PGIs. The SPGIs followed a similar pattern.

**Table 2.10: Mean Overall Poverty Gap Index (PGI) by district/group in NLSS I**

| District/group | Overall PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 3.1 | | ns | ns | <0.001 |
| Ilam | 3.4 | <0.001 | - | ns | <0.001 |
| Khotang | 5.6 | | - | - | ns |
| Koshi Tarai | 12.5 | | - | - | - |

**Table 2.11: Mean Overall Poverty Gap Index (PGI) by district/group in NLSS II**

| District/group | Overall PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 11.7 | | 0.001 | ns | <0.001 |
| Ilam | 3.7 | <0.001 | - | ns | ns |
| Khotang | 11.3 | | - | - | 0.005 |
| Koshi Tarai | 2.4 | | - | - | - |

**Table 2.12: Mean Overall Poverty Gap Index (PGI) by district/group in NLSS III**

| District/group | Overall PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 2.6 | | ns | ns | ns |
| Ilam | 1.5 | ns | - | ns | ns |
| Khotang | 2.2 | | - | - | ns |
| Koshi Tarai | 2.0 | | - | - | - |

**Table 2.13: Mean Food Poverty Gap Index (PGI) by district/group in NLSS I**

| District/group | Food PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 4.1 | | ns | ns | <0.001 |
| Ilam | 4.4 | <0.001 | - | ns | 0.001 |
| Khotang | 7.8 | | - | - | ns |
| Koshi Tarai | 13.5 | | - | - | - |

**Table 2.14 Mean Food Poverty Gap Index (PGI) by district/group in NLSS II**

| District/group | Food PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 7.8 | | 0.022 | ns | <0.001 |
| Ilam | 2.5 | <0.001 | - | ns | ns |
| Khotang | 7.3 | | - | - | ns |
| Koshi Tarai | 3.1 | | - | - | - |

**Table 2.15: Mean Food Poverty Gap Index (PGI) by district/group in NLSS III**

| District/group | Food PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 2.2 | | ns | ns | ns |
| Ilam | 3.2 | ns | - | ns | ns |
| Khotang | 2.9 | | - | - | ns |
| Koshi Tarai | 1.8 | | - | - | - |

**Table 2.16: Mean Non-food Poverty Gap Index (PGI) by district/group in NLSS I**

| District/group | Non-food PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 7.0 | | ns | ns | <0.001 |
| Ilam | 13.7 | 0.003 | - | <0.001 | ns |
| Khotang | 9.5 | | - | - | <0.001 |
| Koshi Tarai | 16.6 | | - | - | - |

**Table 2.17: Mean Non-food Poverty Gap Index (PGI) by district/group in NLSS II**

| District/group | Non-food PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 27.8 | | <0.001 | ns | <0.001 |
| Ilam | 9.6 | <0.001 | - | <0.001 | ns |
| Khotang | 32.7 | | - | - | <0.001 |
| Koshi Tarai | 5.4 | | - | - | - |

**Table 2.18: Mean Non-food Poverty Gap Index (PGI) by district/group in NLSS III**

| District/group | Non-food PGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 7.5 | | ns | ns | ns |
| Ilam | 2.7 | ns | - | ns | ns |
| Khotang | 4.8 | | - | - | ns |
| Koshi Tarai | 7.0 | | - | - | - |

**Table 2.19: Mean Overall Squared Poverty Gap Index (SPGI) by district/group in NLSS I**

| District/group | Overall SPGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 0.7 | | ns | ns | <0.001 |
| Ilam | 1.3 | <0.001 | - | ns | 0.012 |
| Khotang | 2.6 | | - | - | ns |
| Koshi Tarai | 4.9 | | - | - | - |

**Table 2.20: Mean Overall Squared Poverty Gap Index (SPGI) by district/group in NLSS II**

| District/group | Overall SPGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 4.4 | | 0.01 | ns | <0.001 |
| Ilam | 1.5 | <0.001 | - | ns | ns |
| Khotang | 4.4 | | - | - | 0.001 |
| Koshi Tarai | 0.6 | | - | - | - |

**Table 2.21: Mean Overall Squared Poverty Gap Index (SPGI) by district/group in NLSS III**

| District/group | Overall SPGI | p | Post-hoc differences between district/groups | | |
| --- | --- | --- | --- | --- | --- |
| | | | Ilam | Khotang | Koshi Tarai |
| Koshi Hills | 0.8 | | ns | ns | ns |
| Ilam | 0.4 | ns | - | ns | ns |
| Khotang | 0.7 | | - | - | ns |
| Koshi Tarai | 0.5 | | - | - | - |

**Table 2.22: Mean Food Squared Poverty Gap Index (SPGI) by district/group in NLSS I**

| District/group | Food SPGI | p | Post-hoc differences between district/groups | | |
| | | | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|---|
| Koshi Hills | 1.0 | | ns | ns | <0.001 |
| Ilam | 1.5 | <0.001 | - | ns | 0.022 |
| Khotang | 3.6 | | - | - | ns |
| Koshi Tarai | 5.1 | | - | - | - |

**Table 2.23 Mean Food Squared Poverty Gap Index (SPGI) by district/group in NLSS II**

| District/group | Food SPGI | p | Post-hoc differences between district/groups | | |
| | | | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|---|
| Koshi Hills | 2.7 | | ns | ns | <0.001 |
| Ilam | 0.8 | <0.001 | - | ns | ns |
| Khotang | 2.4 | | - | - | ns |
| Koshi Tarai | 0.7 | | - | - | - |

**Table 2.24: Mean Food Squared Poverty Gap Index (SPGI) by district/group in NLSS III**

| District/group | Food SPGI | p | Post-hoc differences between district/groups | | |
| | | | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|---|
| Koshi Hills | 0.7 | | ns | ns | ns |
| Ilam | 1.1 | ns | - | ns | ns |
| Khotang | 1.0 | | - | - | ns |
| Koshi Tarai | 0.4 | | - | - | - |

**Table 2.25: Mean Non-food Squared Poverty Gap Index (SPGI) by district/group in NLSS I**

| District/group | Non-food SPGI | p | Post-hoc differences between district/groups | | |
| | | | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|---|
| Koshi Hills | 2.7 | | ns | ns | 0.002 |
| Ilam | 6.7 | 0.003 | - | ns | ns |
| Khotang | 4.0 | | - | - | ns |
| Koshi Tarai | 8.8 | | - | - | - |

**Table 2.26: Mean Non-food Squared Poverty Gap Index (SPGI) by district/group in NLSS II**

| District/group | Non-food SPGI | p | Post-hoc differences between district/groups | | |
| | | | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|---|
| Koshi Hills | 16.2 | | <0.001 | ns | <0.001 |
| Ilam | 5.5 | <0.001 | - | 0.001 | ns |
| Khotang | 19.3 | | - | - | <0.001 |
| Koshi Tarai | 2.2 | | - | - | - |

**Table 2.27: Mean Non-food Squared Poverty Gap Index (SPGI) by district/group in NLSS III**

| District/group | Non-food SPGI | p | Post-hoc differences between district/groups | | |
| | | | Ilam | Khotang | Koshi Tarai |
|---|---|---|---|---|---|
| Koshi Hills | 3.2 | ns | ns | ns | ns |
| Ilam | 0.9 | | - | ns | ns |
| Khotang | 1.4 | | - | - | ns |
| Koshi Tarai | 5.1 | | - | - | - |

# 3. Conclusions

**3.1** A total of 24 indicators were used in these analyses, of which 18 indicators dealt with chronic poverty and the other 6 indicators with vulnerability.

**3.2** The 18 chronic poverty indicators were grouped into 5 dimensions of severity, health, standard of living, women's empowerment and gender disparity and remoteness.  Vulnerability was not subdivided.

**3.3** Absolute poverty showed considerable variation between the 4 districts/groups in NLSS I and II with the highest levels of overall poverty in the Koshi Tarai in NLSS I (41.1%) and Koshi Hills (40.2%) in NLSS II. There was also a very large increase in poverty in the Koshi Hills and Khotang between NLSS I and II and a large fall in the Koshi Tarai. There was little variation between the 4 district groups in NLSS III (range 10.7% - 14.2%).

**3.4** The multidimensional approach based on the ranking analysis revealed that Khotang had the highest levels of chronic poverty and vulnerability over all three surveys and the Koshi Tarai the least. The Koshi Hills districts were ranked 2nd/3rd worst across the three surveys.  There was no significant variation in mean ranking across the four districts/groups in NLSS I but in NLSS II and III, the four districts/groups could be split into two groups of Koshi Hills and Khotang together (highest multidimensional poverty) and Ilam and Koshi Tarai together (lowest)

**3.5** The composite index analyses yielded very similar findings to the ranking; there were no significant differences in mean composite scores between the 4 districts/groups in NLSS I but in NLSS II and III, Ilam and the Koshi Tarai had very similar low means while the Koshi Hills and Khotang had much higher levels of multidimensional poverty.

**3.6** The Poverty Gap index analyses revealed that there were no significant differences in mean overall, food and non-food poverty gap indices between the four districts/groups in NLSS III. However significant differences were apparent in NLSS I and II with the Koshi Tarai worst in NLSS I and Khotang worst in NLSS II.  The squared PGIs followed a similar pattern.