

Remoteness, Farm Production, and Dietary Diversity Evidence from Nepal

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Can the same agricultural policies serve these diverse landscapes?



Terai



Mid-hills

Agriculture's Role in Farm Household Diets

Why it's important?

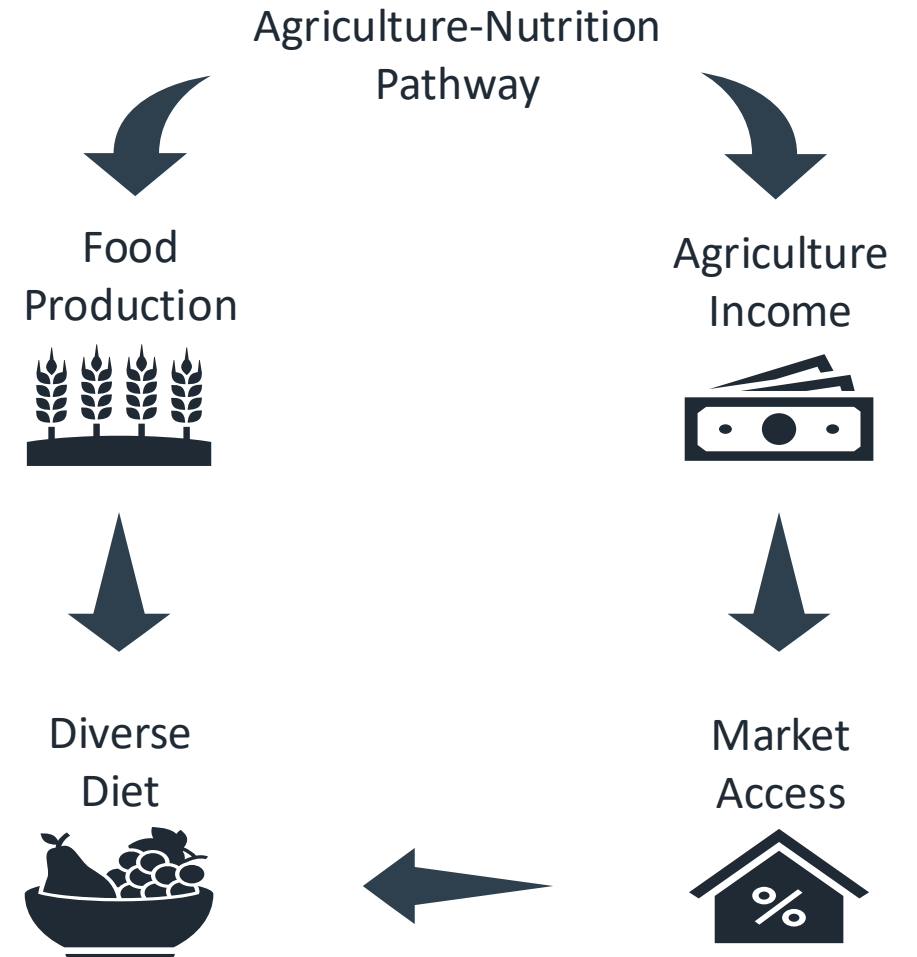
- Essential for food and income globally, especially in LMICs
- Complex link b/w agriculture and nutrition involves multiple factors (Webb & Kennedy, 2014)

How it works?

- Two pathways: Diversification vs Specialization

What does evidence show?

- Farm diversity can improve diets but isn't universally effective (Sibhatu et al., 2015)
- Recent findings suggest market access more important (Remans et al., 2015)
- Effects vary by region (Snapp & Fisher, 2015)



SAMPLE DISTRIBUTION FOR IFPRI NEXUS GAINS BASELINE SURVEY 2023

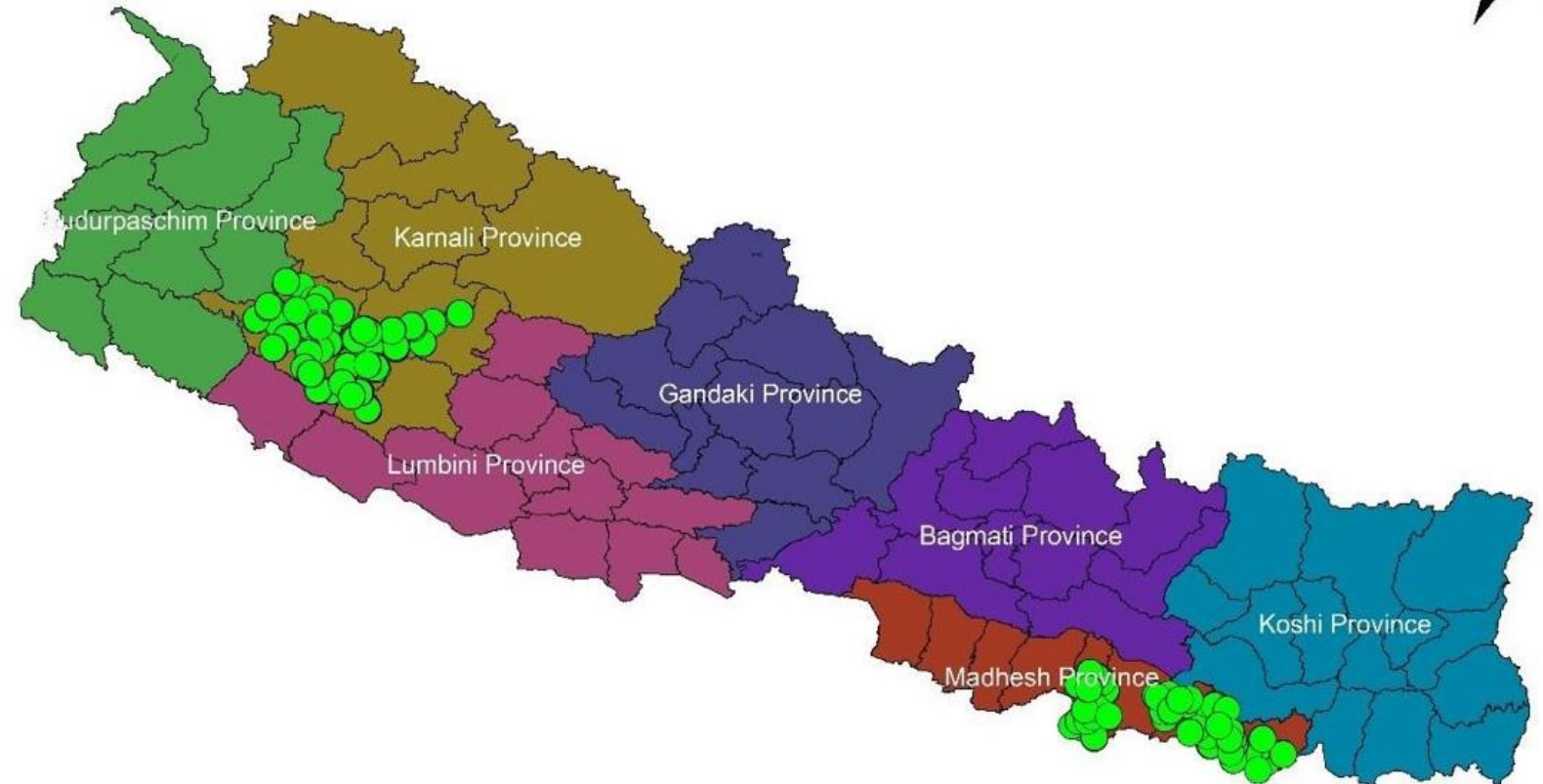


Study Overview

- 2 provinces, 6 districts
- 1000 households, balanced across Terai plains and Mid-hills
- Multi-stage sampling from 2011 Nepal Census

Agricultural Contrasts

- Terai: Rice-dominated, enhanced market access due to better infrastructure and proximity to India
- Mid-hills: Diverse, subsistence-focused with limited market access



Legend

- Sample Distribution



Objectives & Hypotheses / Methods

Objectives

- Examine the link between farm production diversity and household dietary diversity
- Investigate how markets and other factors influence this association

Hypotheses

- Greater farm production diversity correlates with higher household dietary diversity when excluding other factors
- The link between production diversity and dietary diversity strengthens in remote areas and weakens with better market access

Primary model: Basic relationship b/w production (PD_i) and dietary diversity (HDD_i)

$$HDD_i = \alpha_0 + \alpha_1 PD_i + \varepsilon_i$$

Extended model: Includes market access (MA_i) and socio-economic factors (H_i)

$$HDD_i = \alpha_0 + \alpha_1 PD_i + \alpha_2 MA_i + \alpha_3 H_i + \varepsilon_i$$

} Mid-hills
} Terai

Interaction model: Includes interaction terms

$$HDD_i = \alpha_0 + \alpha_1 PD_i + \alpha_2 MA_i + \alpha_3 (Interaction) + \alpha_4 H_i + \varepsilon_i$$

$MA_i \times PD_i$
 $MA_i \times Wealth_i$

Key Variables

Maternal Dietary Diversity (Y-variable)

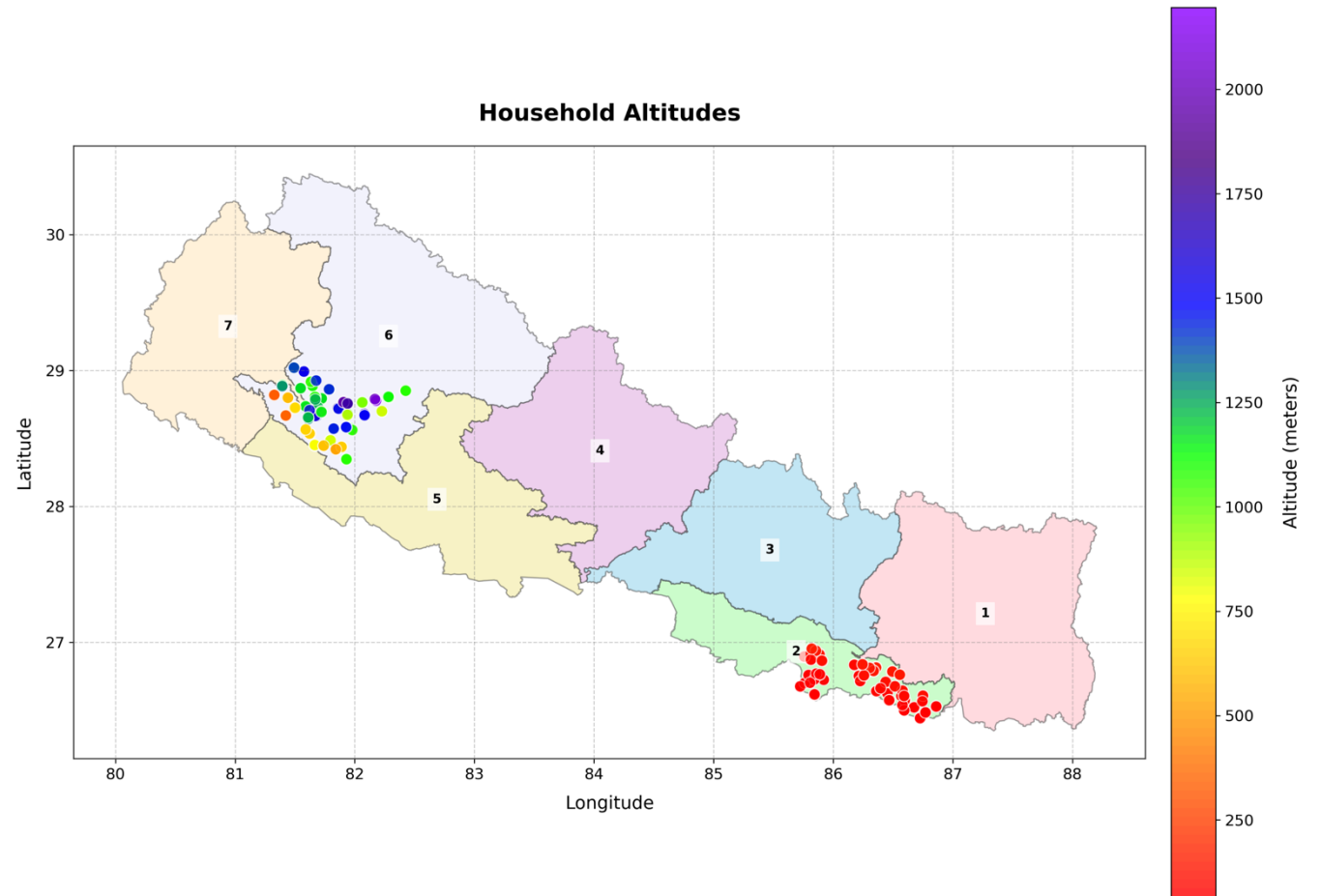
- Food Group Diversity Score (FGDS) (0-10 score)
- 24-hour recall

Farm Production Diversity (X-variable)

- Count of crop and livestock species on farm
- Captures diversity over a full year

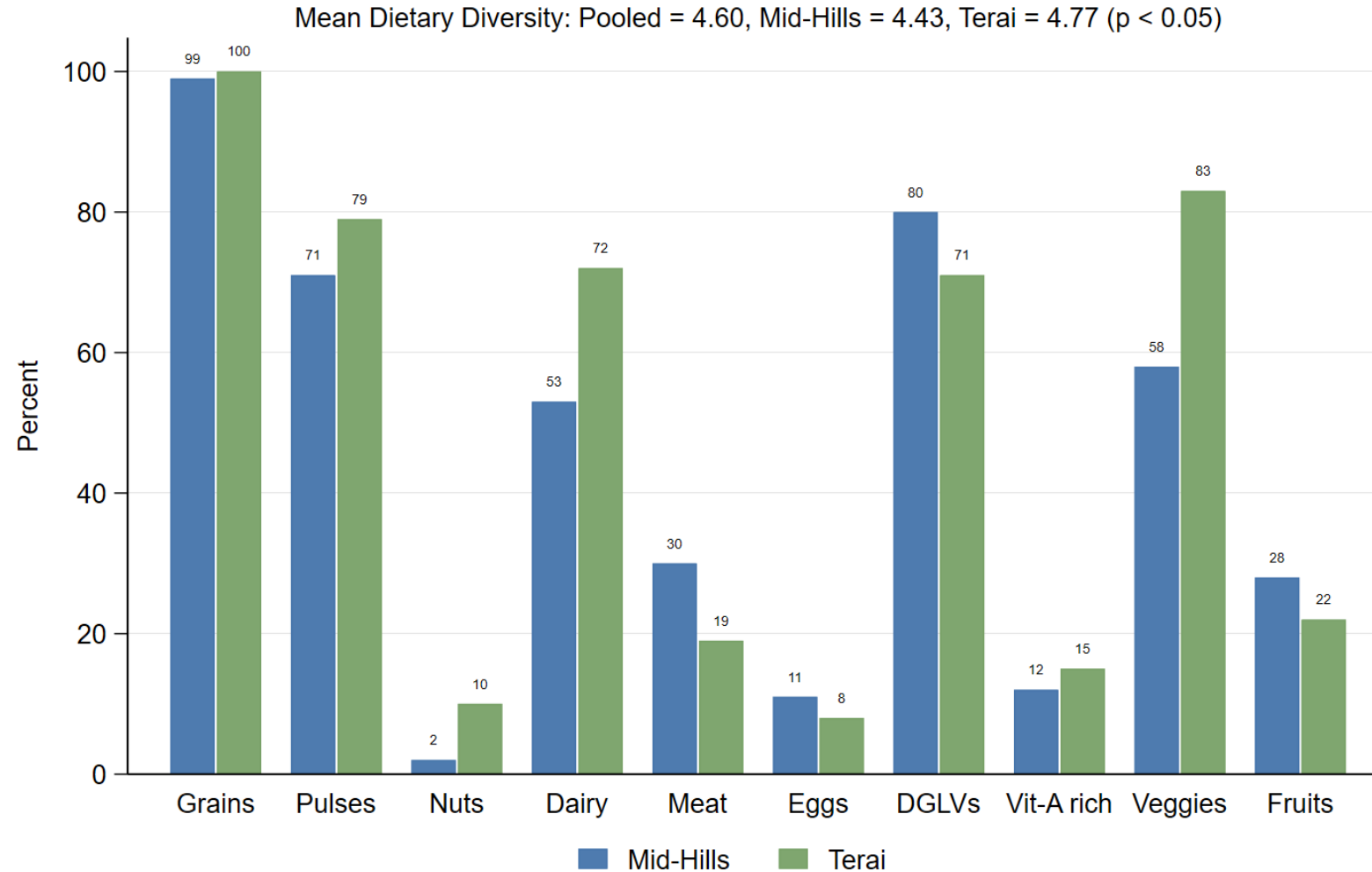
Market Access (X-variable)

- Household altitude
- Captured using GPS coordinates and SRTM DEM



Results

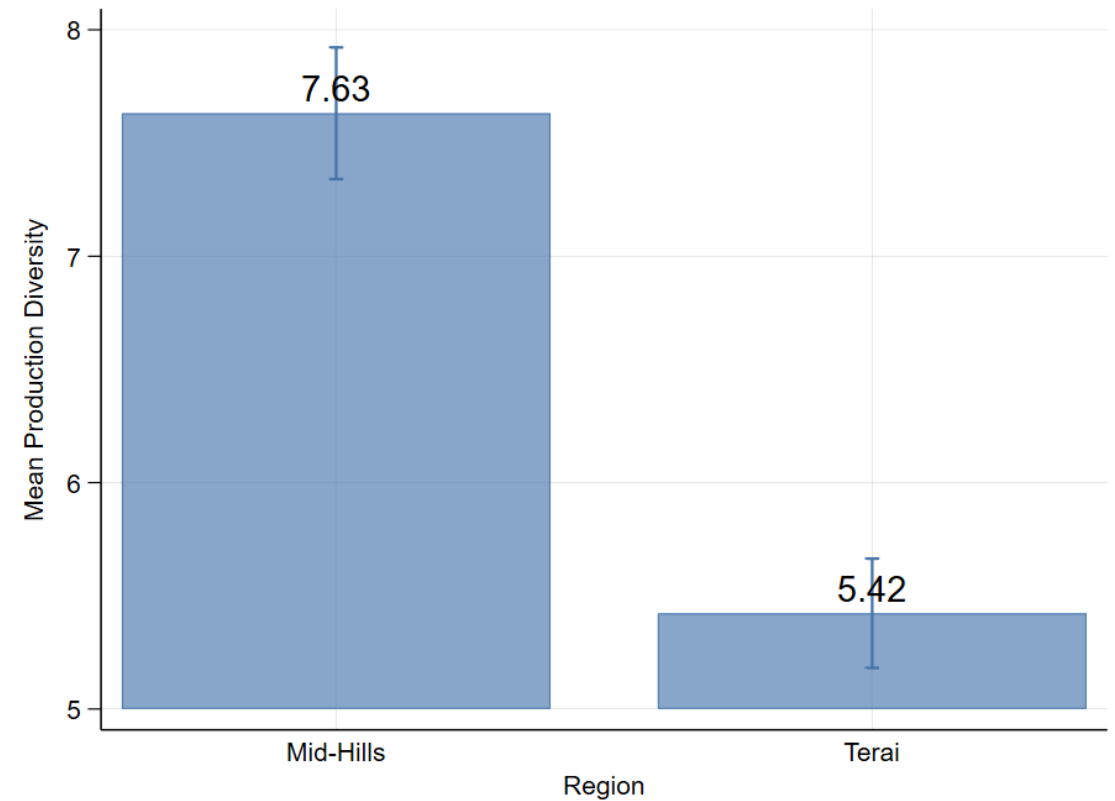
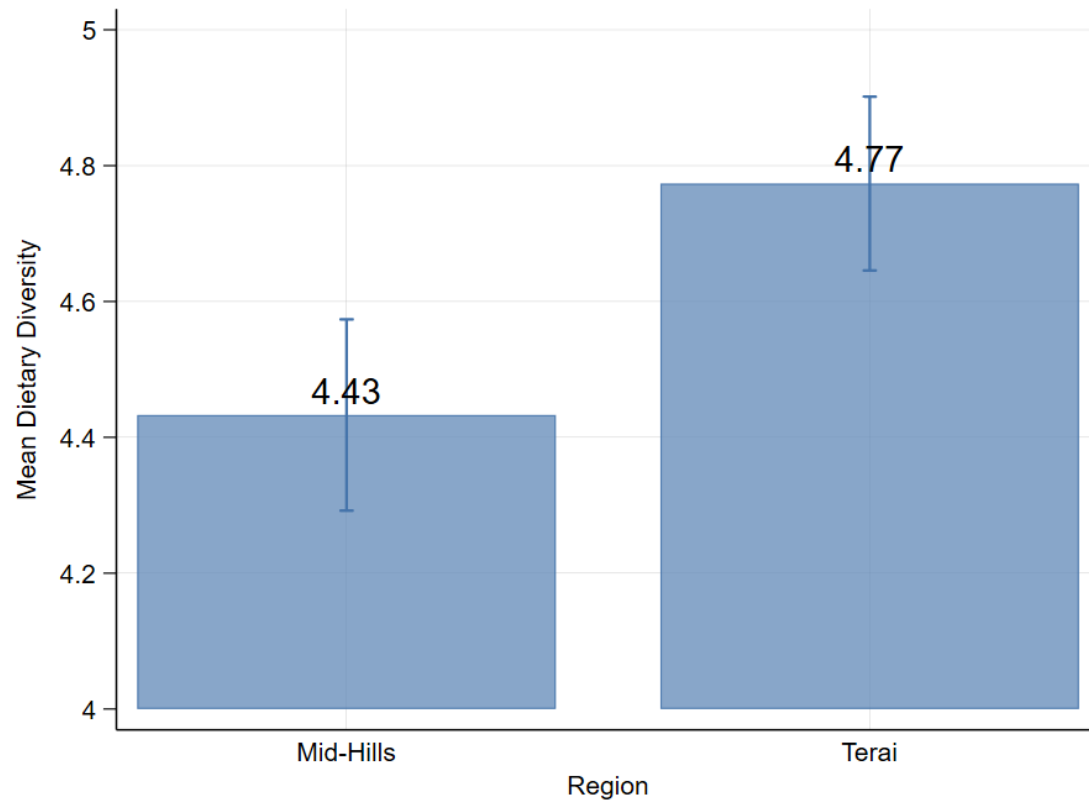
Current Food Consumption Patterns



The Wealth Factor



More diverse farms don't always mean more diverse diets



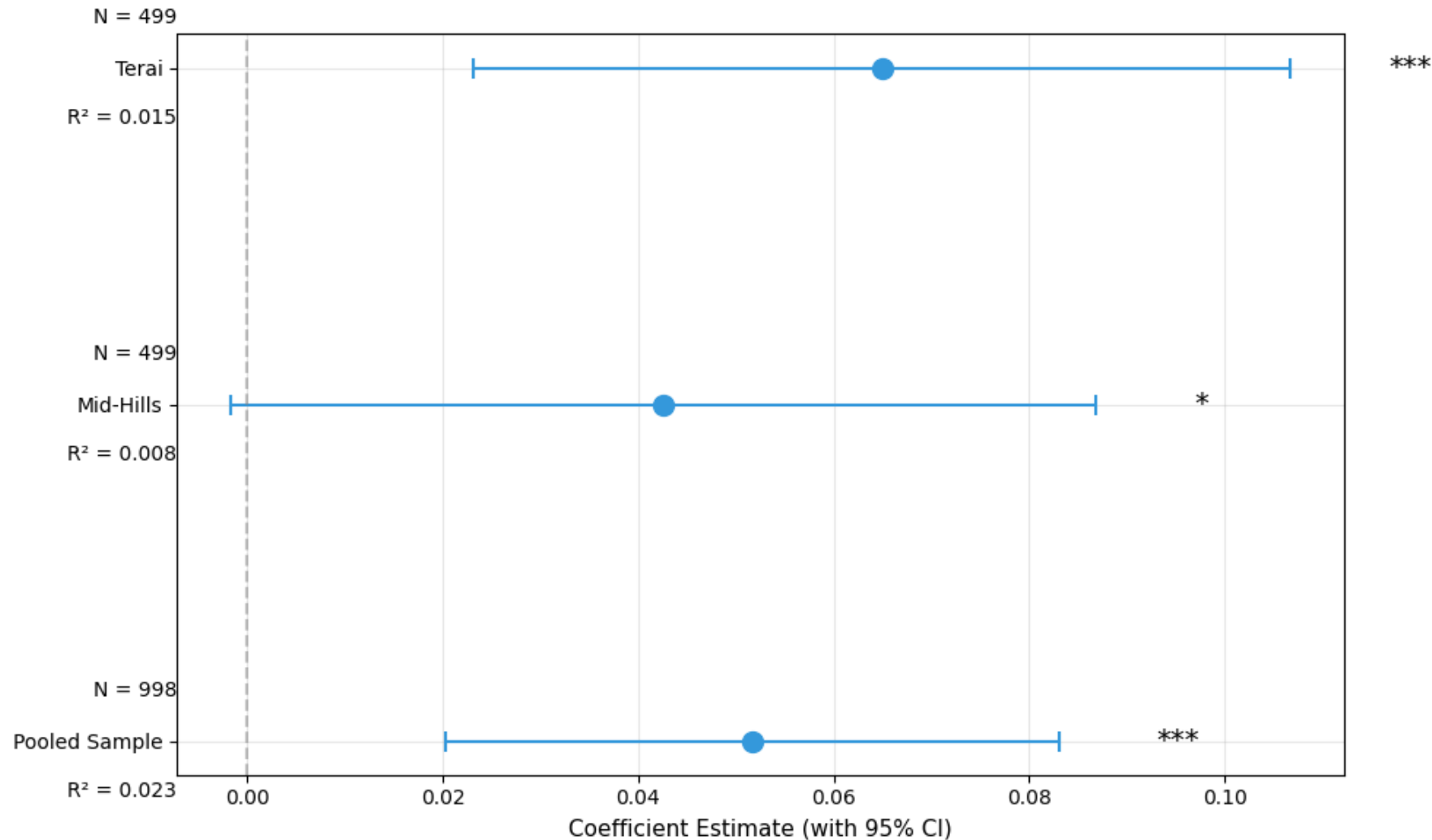
Mean scores with 95% CI

Does Farm Diversity Influence Dietary Diversity?

Farm production diversity shows positive but modest association with dietary diversity

Effect strength varies by region:

- Stronger in Terai
- Weaker in Mid-hills



Market Access Matters

Production diversity matters more in remote areas!

	Pooled	Mid-Hills	Terai
Production Diversity Score	0.036** (0.016)	0.050** (0.022)	0.013 (0.023)
Market Access / Altitude	-0.159** (0.078)	-0.174** (0.083)	-0.072 (1.913)
Commercialization Ratio	0.004* (0.002)	0.002 (0.003)	0.006** (0.002)
Per Capita Livestock Income	0.009** (0.004)	0.007 (0.005)	0.016*** (0.006)
Wealth Index	0.140*** (0.040)	0.055 (0.047)	0.309*** (0.055)
Farm Size	0.066*** (0.021)	0.022 (0.088)	0.053** (0.021)
Controls	Yes	Yes	Yes
Observations	998	499	499
R-squared	0.125	0.180	0.184

Notes: *** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Controls include household size, caste, and age, gender, and education level of the household head, and households' possession of kitchen gardens.

Context Matters

Findings support and extend our hypothesis:

- Market access moderates the relationships between both production diversity and wealth with diets

Results are robust, consistent across Poisson and linear regression models

	Model 1	Model 2
Production Diversity Score	0.003 (0.024)	0.034** (0.016)
Market Access / Altitude	-0.209** (0.084)	-0.188** (0.077)
Commercialization Ratio	0.004** (0.002)	0.004** (0.002)
Per Capita Livestock Income	0.009** (0.004)	0.010** (0.004)
Wealth Index	0.144*** (0.040)	0.274*** (0.053)
Farm Size	0.066*** (0.021)	0.058*** (0.021)
Production Diversity × Altitude	0.005* (0.003)	
Wealth Index × Altitude		-0.020*** (0.006)
Controls	Yes	Yes
Observations	998	998
R-squared	0.128	0.135

Notes: *** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

Controls include household size, caste, and age, gender, and education level of the household head, and households' possession of kitchen gardens.

Policy Implications

- Complex three-way relationship

Production Diversity ↔ Market Access ↔ Household Wealth

Dietary Diversity

- One-size-fits-all policies may not be effective – effectiveness of strategies varies significantly depending on local market access
- Need for context-specific strategies
- Short-term Strategies:
 - Remote areas → Focus on production diversity
 - Market-connected areas → Strengthen existing market linkages
- Long-term Solutions - Improve market access in remote areas through infrastructure development, transportation networks, storage facilities, market information systems etc.

Acknowledgments



NEXUS Gains:
Realizing Multiple Benefits
Across Water, Energy, Food
and Ecosystems

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Thank you!

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