



Horticulture: Key Opportunities for Nutrition **July 9, 2014**

PoSHAN Community Studies, Nepal-- *Insights into the linkages between horticulture, diet and nutritional status*

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Helen Keller
INTERNATIONAL

Specific Aims

Assess – annual, nationally representative sample of VDCs in the Mountains, Hills and Terai:

- **Agricultural practices:** types, amounts of foods grown and marketed; programs reaching and benefiting poor farmers;
- **Household food access and security:** access by rural households; program participation and SES;
- **Diet:** dietary frequencies of mothers and young children
- **Nutritional status:** maternal/preschool child, anthropometry and anemia

Link these stages together: identify pathways that could be improved with agricultural, marketing, nutrition and other public health programs



PoSHAN Community Studies

- Population-based & population proportional to size (households with children <5 y &/or newly married women)
- Observational, multi-year panels (May-July) with sentinel site seasonal surveys
- Stratified by agro-ecological zone (mountains, hills, terai)
- Collaborative
- Market/Farm to Fork to Nut'l Status



Study Design

Listed Districts west-to-east and VDCs alphabetically in each district by zone

Mountain
543 VDCs



Hills
2034 VDCs



Terai
1,394 VDCs



Selected 7 VDCs using systematic random sampling

Mountain
7 VDCs

Hills
7 VDCs

Terai
7 VDCs

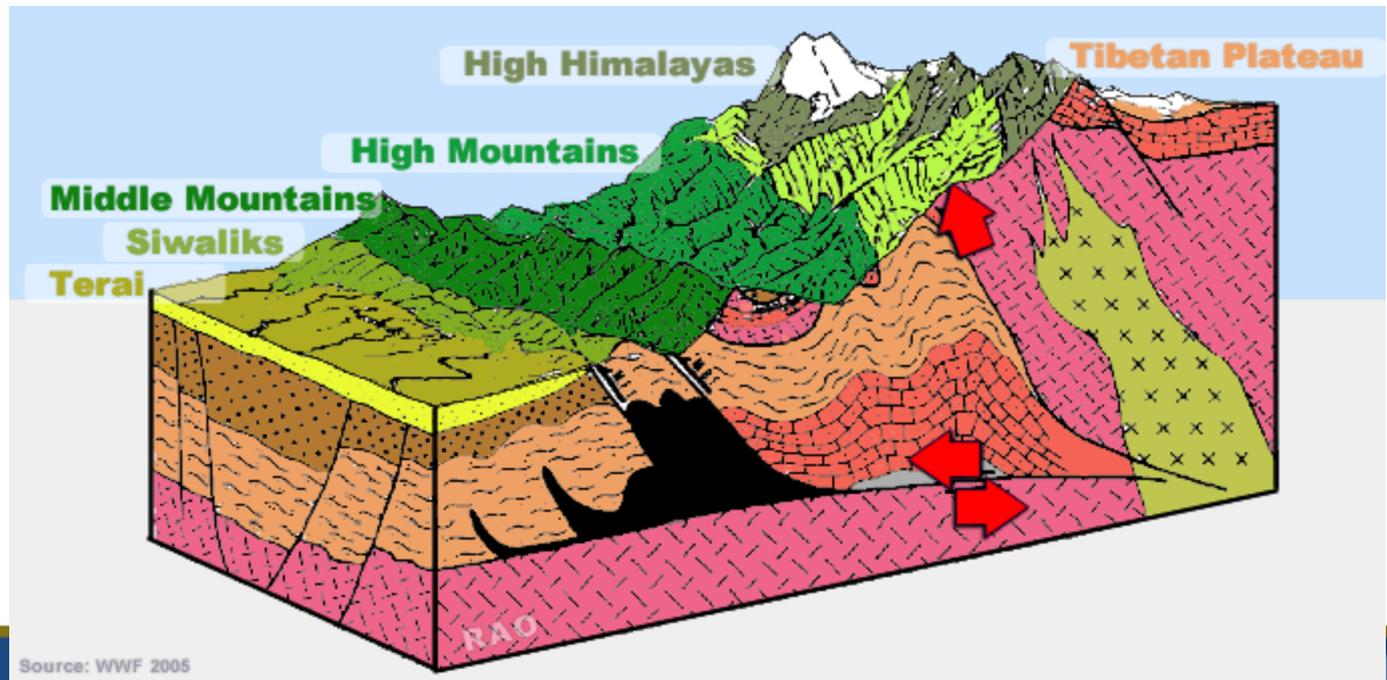
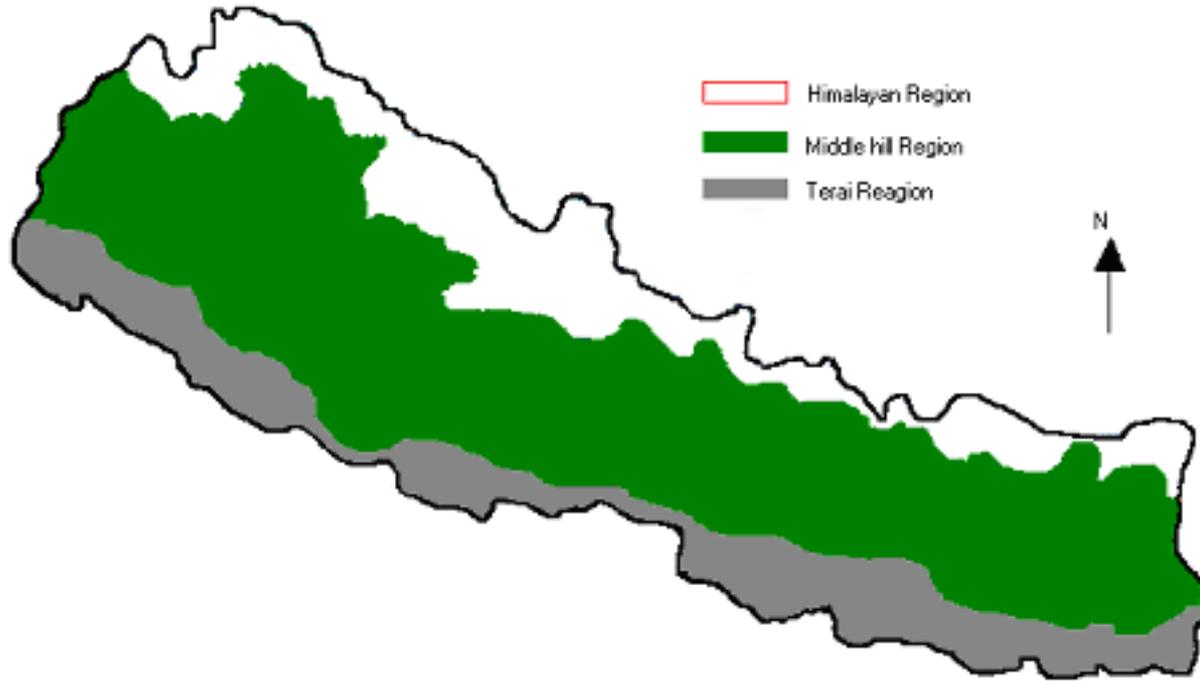
Proportionally selected 3 wards per VDC

Mountain
21 Wards

Hills
21 Wards

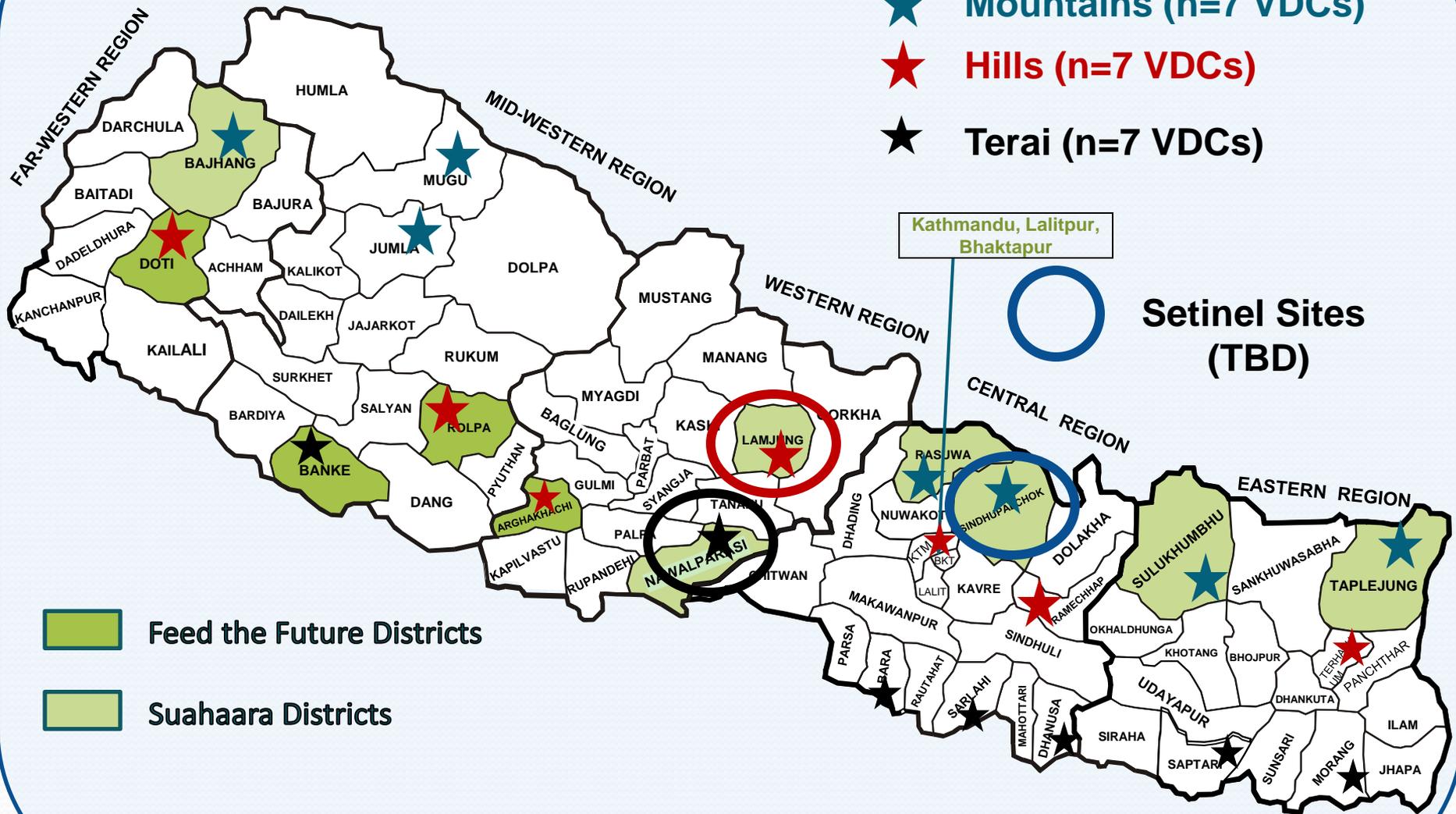
Terai
21 Wards

Data collected on Community, Households, Newlywed Women, Mothers and Children under Five Years



PoSHAN Study Sites

- ★ Mountains (n=7 VDCs)
- ★ Hills (n=7 VDCs)
- ★ Terai (n=7 VDCs)



Feed the Future Districts

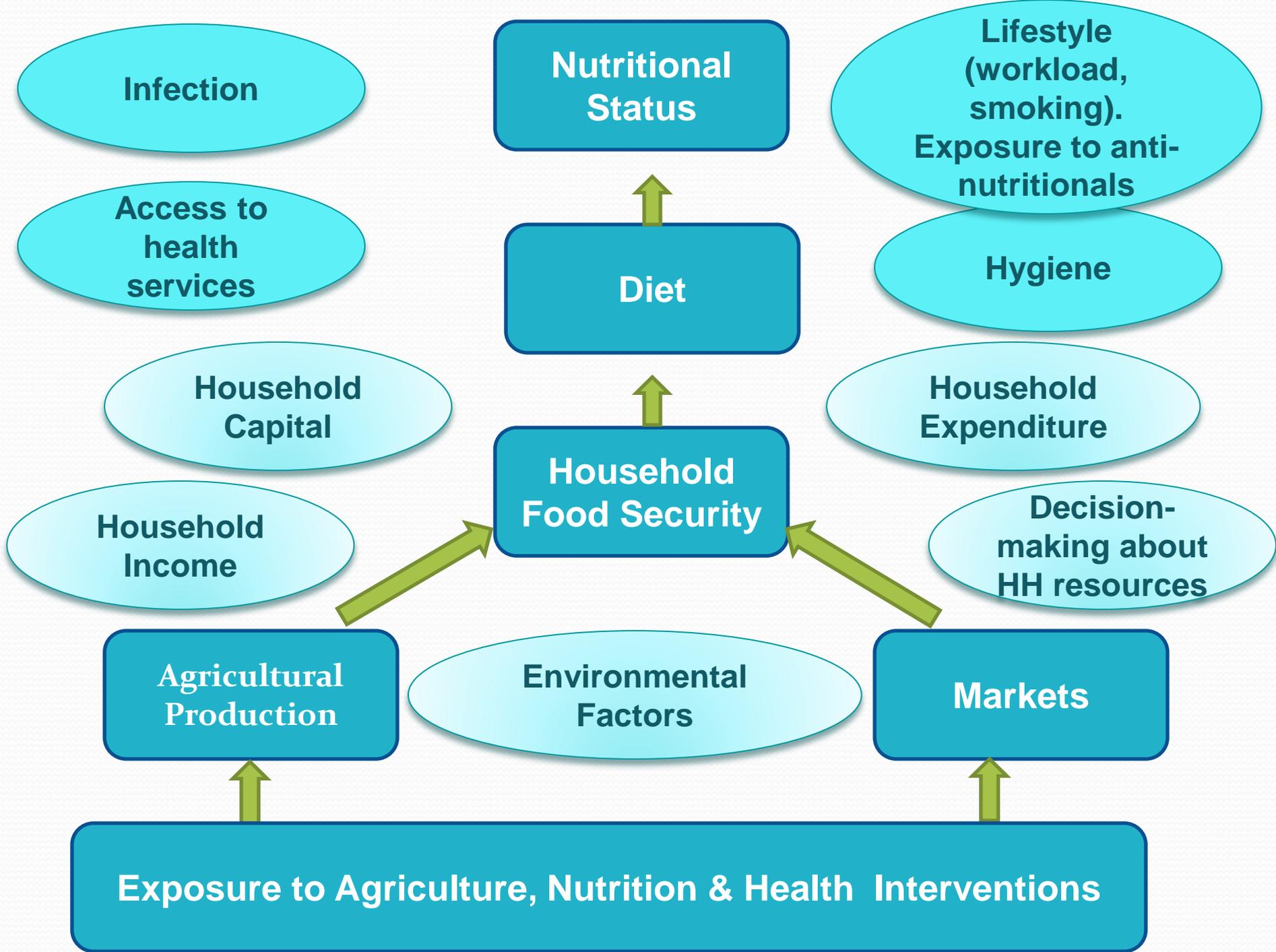
Suhaara Districts

VDC=Village Development Committee

Collaborative

- **Co-PIs:** Dr. Gauchan (NARC), Dr. Adhikari (Tribhuvan University IoM)
- **Tribhuvan University Institute of Medicine (IoM):** Dr. Adhikari (co-PI)
- **New ERA:** Local data collection, entry, mgmt
- **Nepal Technical Assistance Group:** Field supervision
- **Gov't of Nepal:** NPC, MoHP, CHD
- **USAID Mission:**
- **USAID/W:** Funding support for Nutrition Innovation Lab
- **Tufts University:** Co-investigators
- **Johns Hopkins University:** Principle Investigators, Project Scientist and technical team (statistician, data manager, public health specialist)





Enumerating & addressing households



Interviewing respondent



Assessing Hemoglobin



Measuring weight



Measuring height

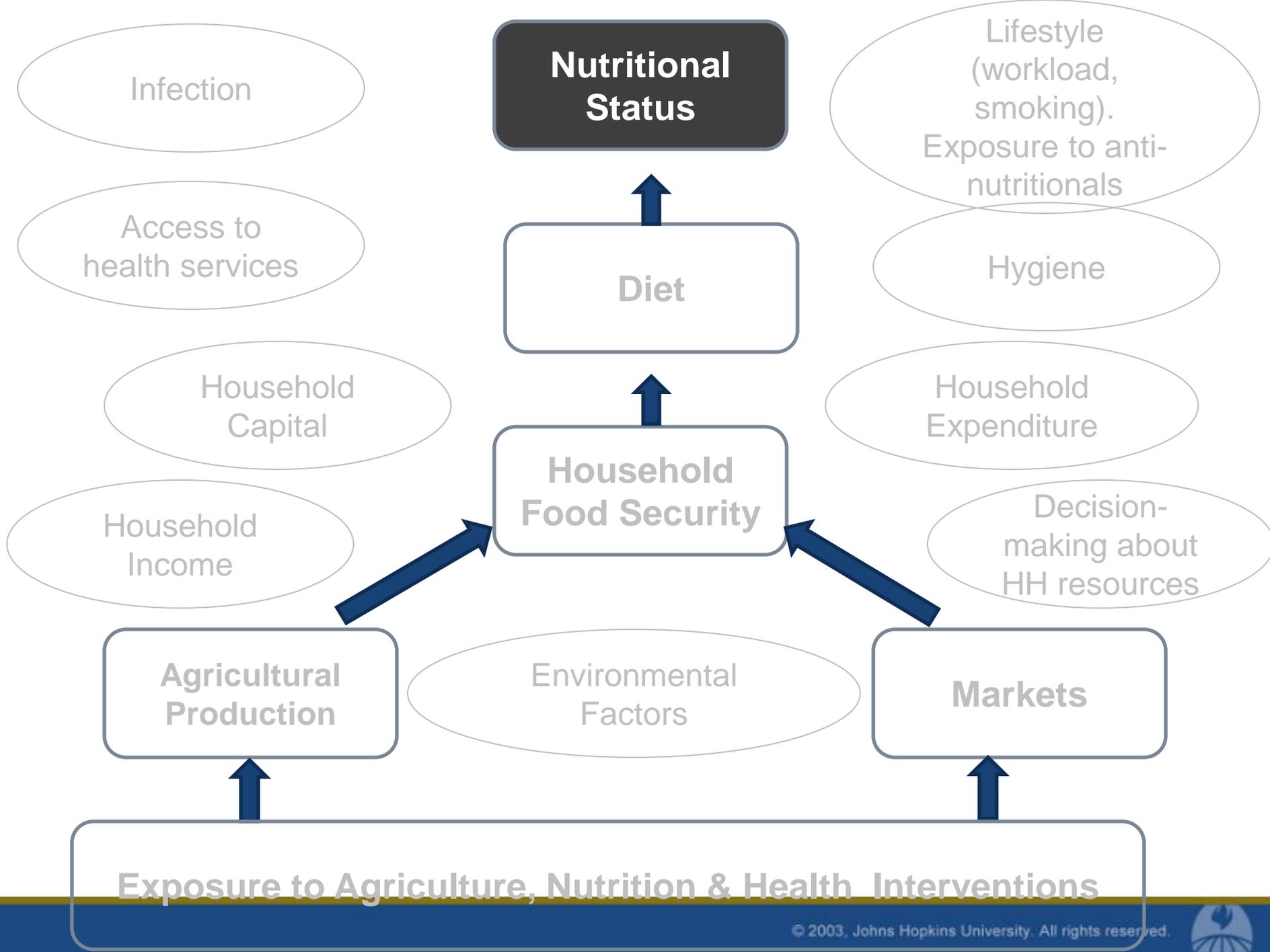


Testing Salt for Iodine

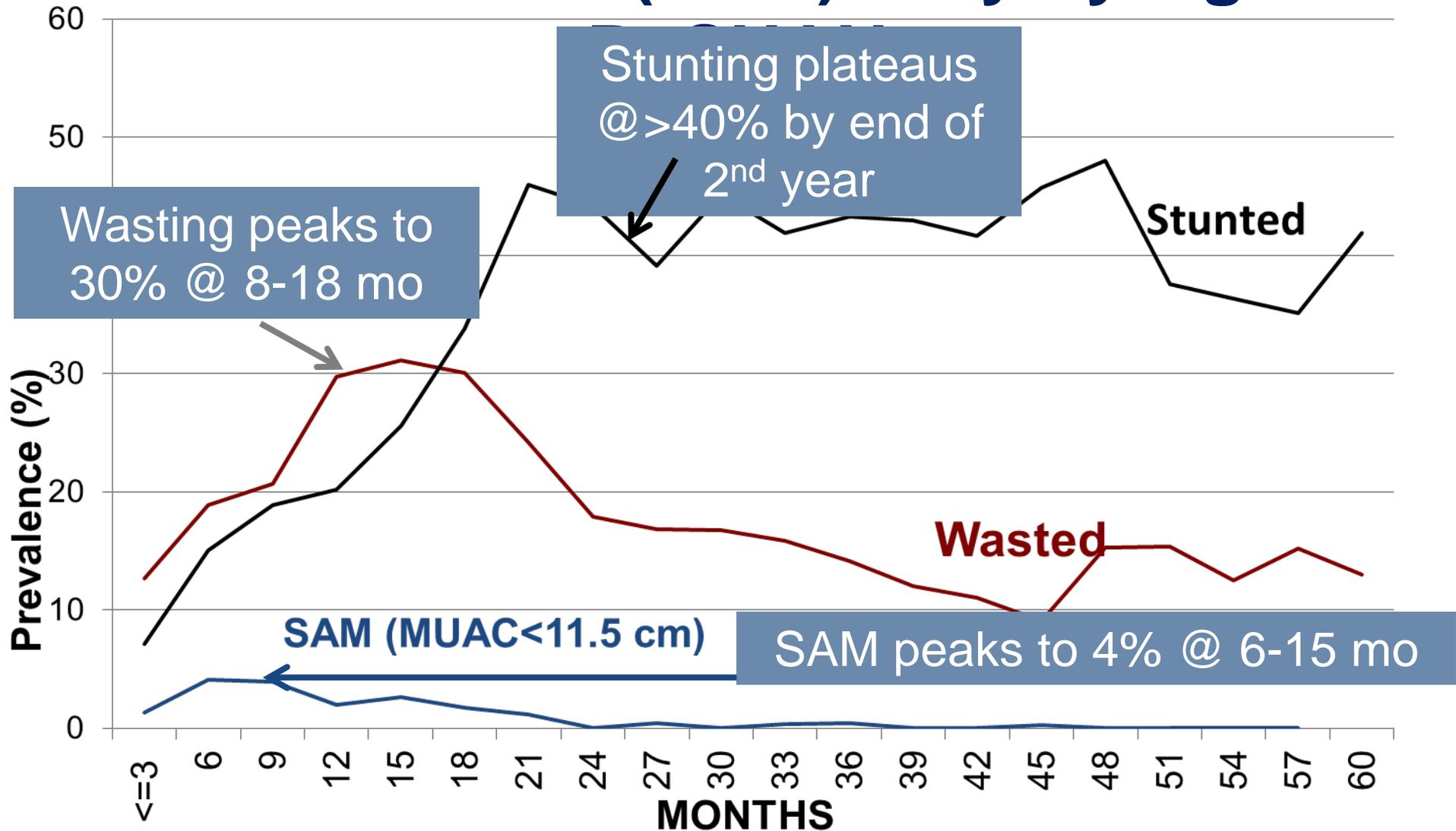


Preliminary Results

First Annual PoSHAN Panel Survey-2013

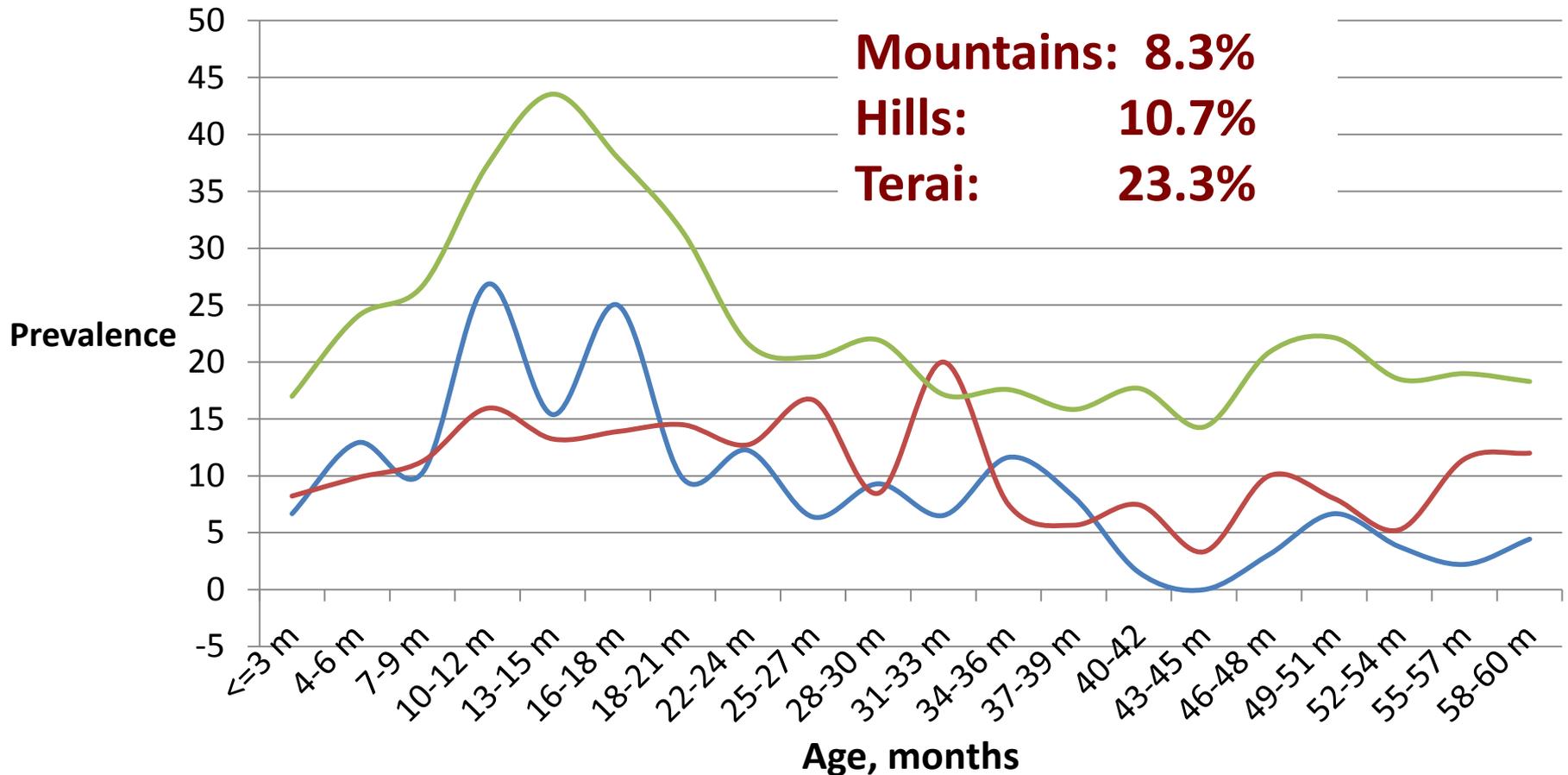


Stunting, Wasting & Severe Acute Malnutrition (SAM) Vary by Age



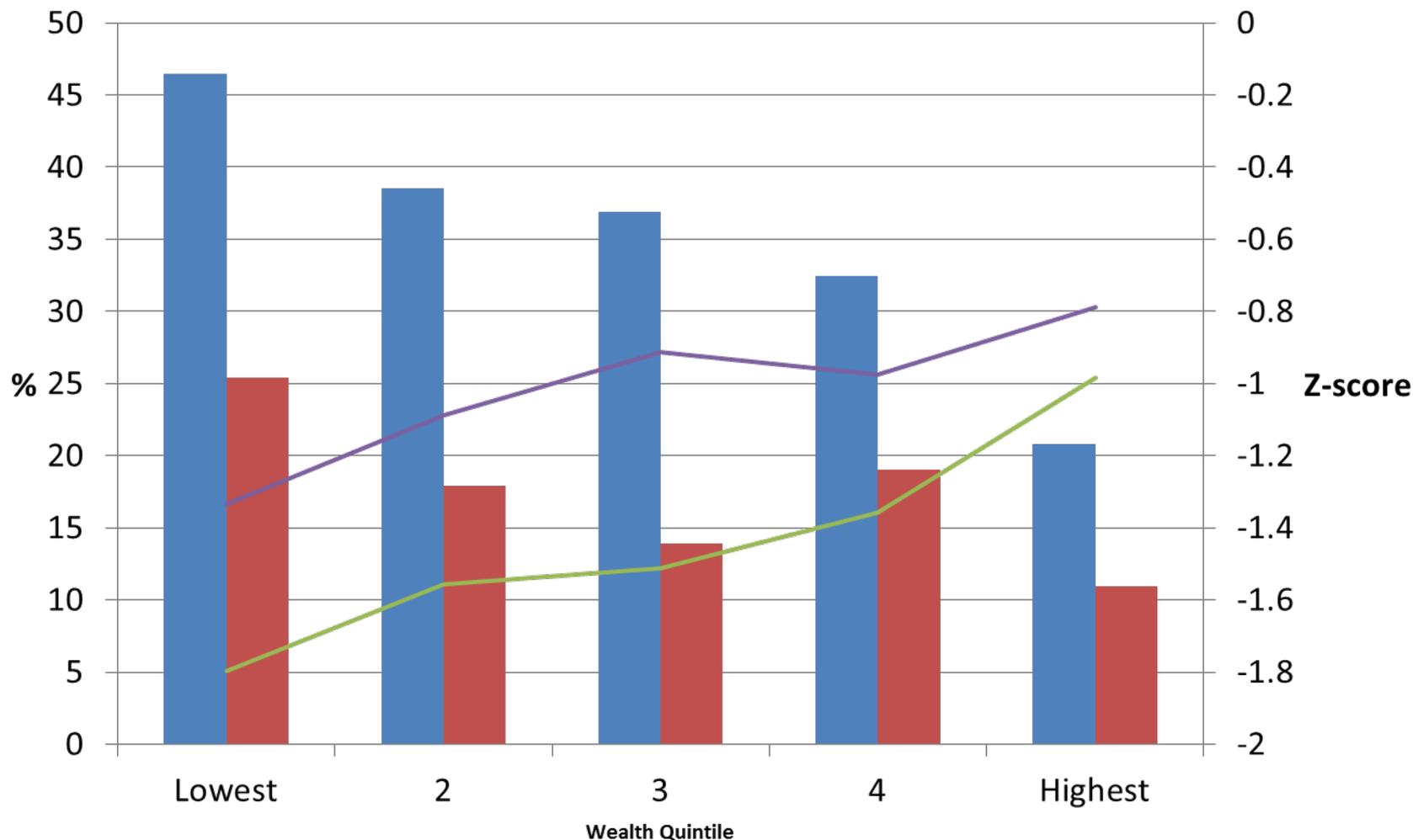
Wasting is 2x's higher in the Terai at almost all age groups compared to Hills and Mountains

— Mountains — Hills — Terai



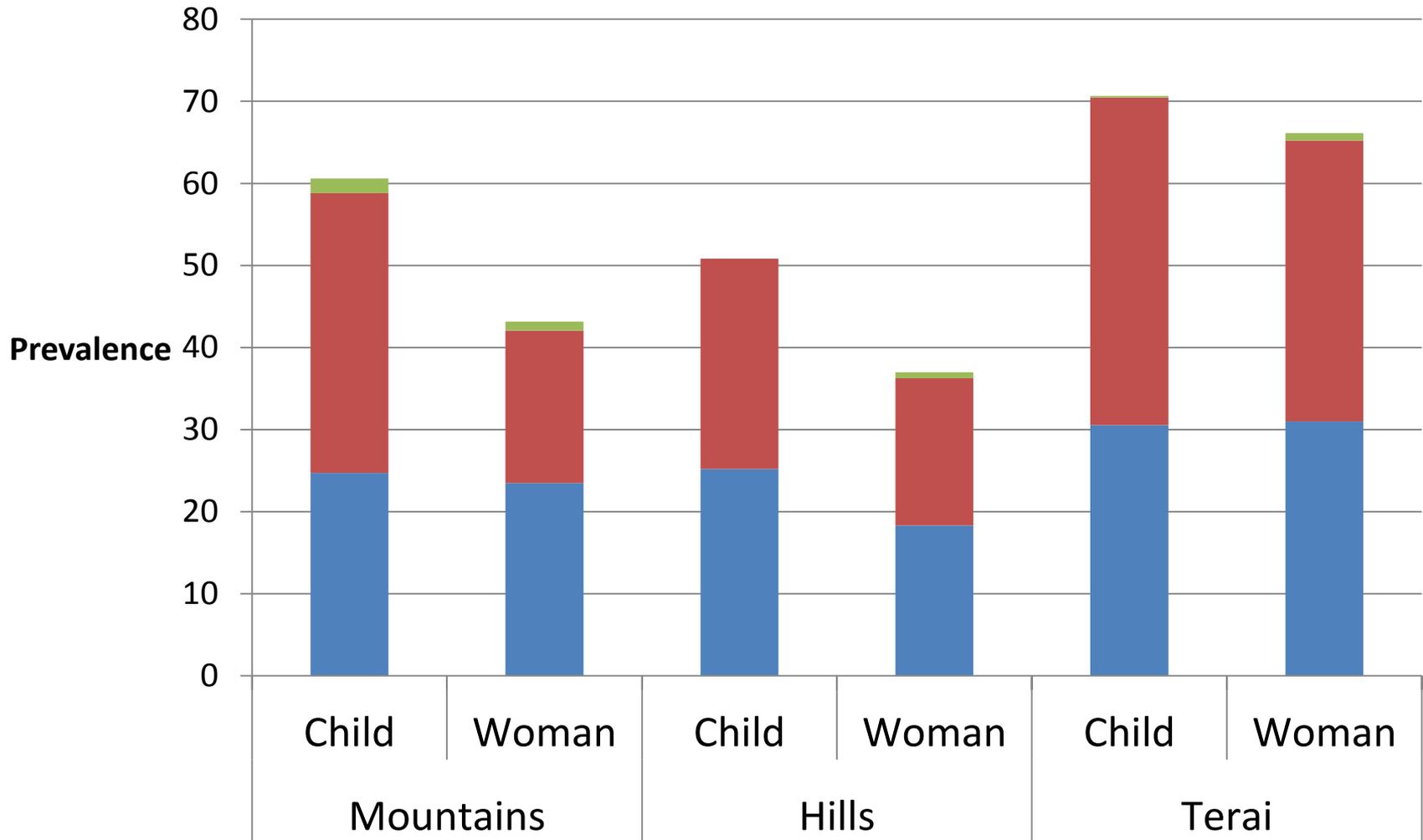
Higher wealth quintile associated with better nut'l status

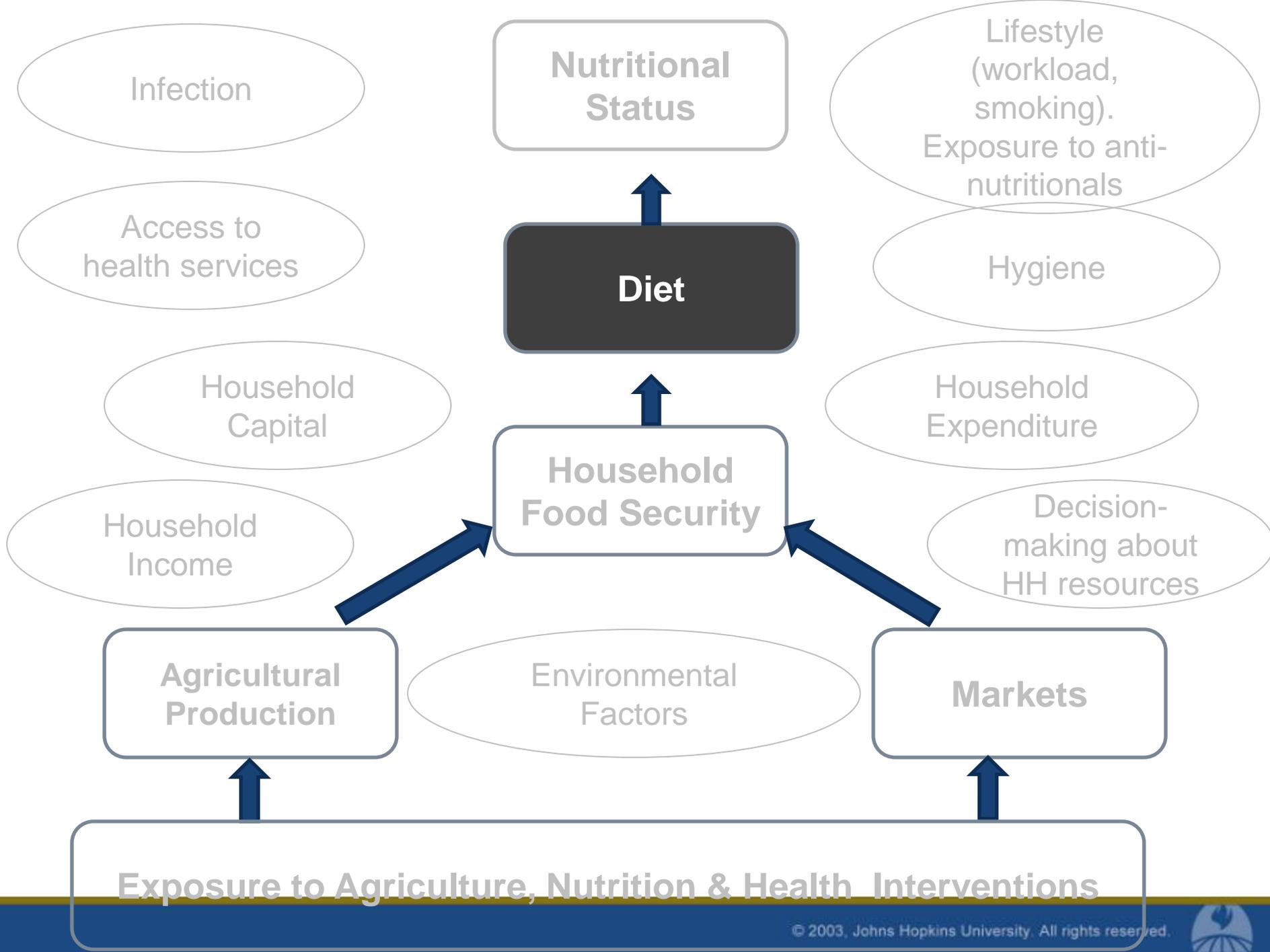
■ Stunted ■ Wasted — HAZ — WLZ



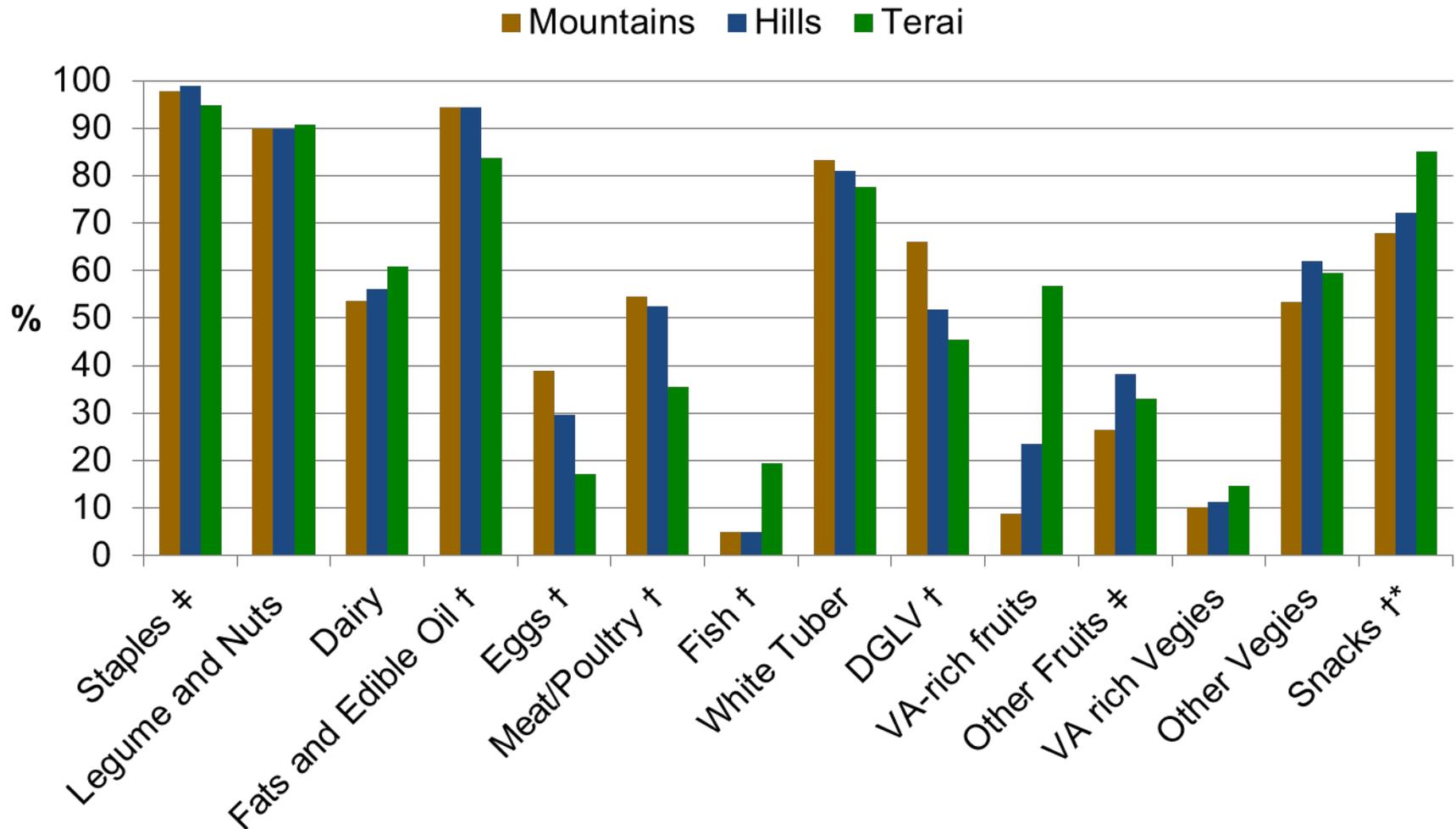
Maternal and child anemia prevalence high, esp in Terai and Mountains.

■ Mild ■ Moderate ■ Severe

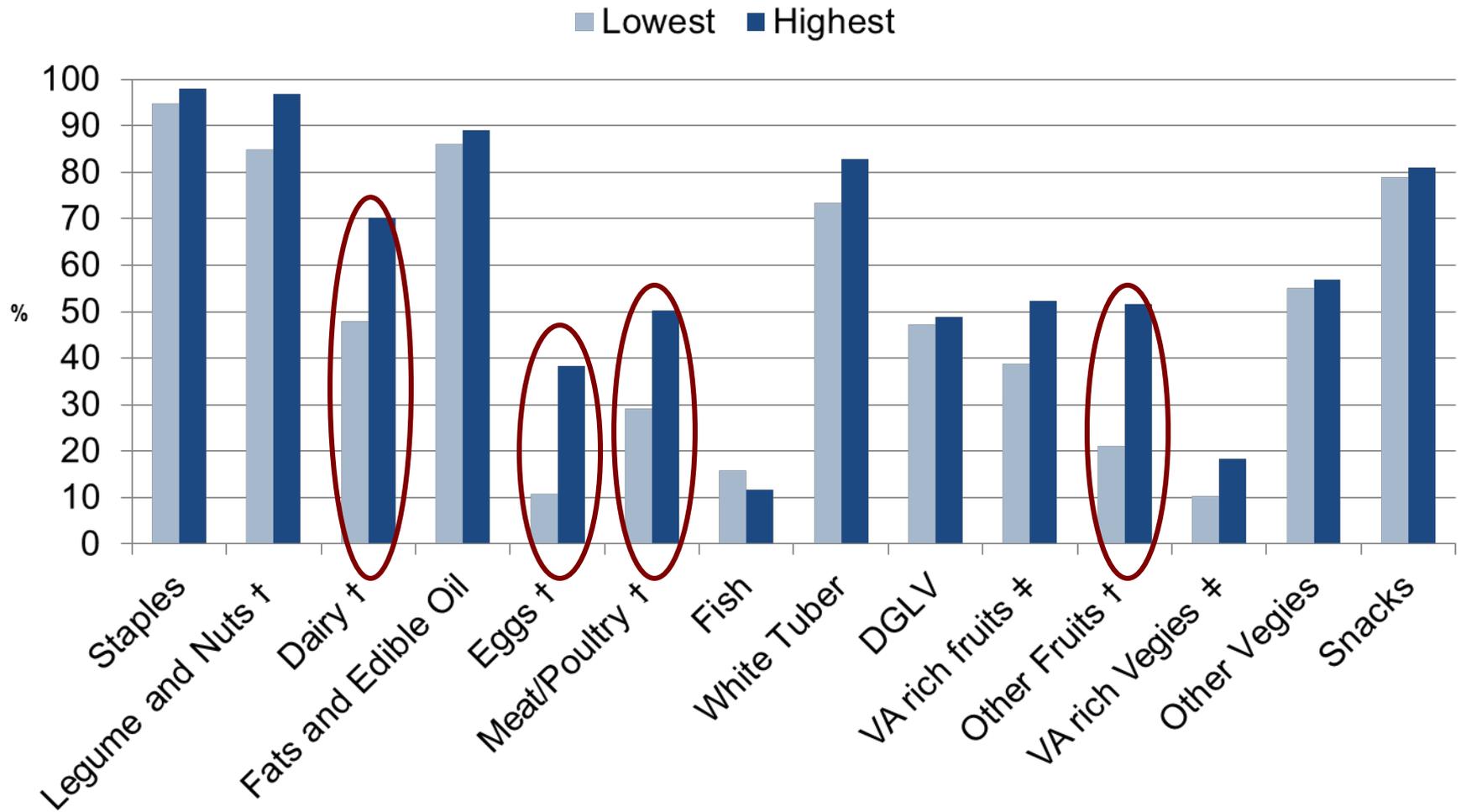




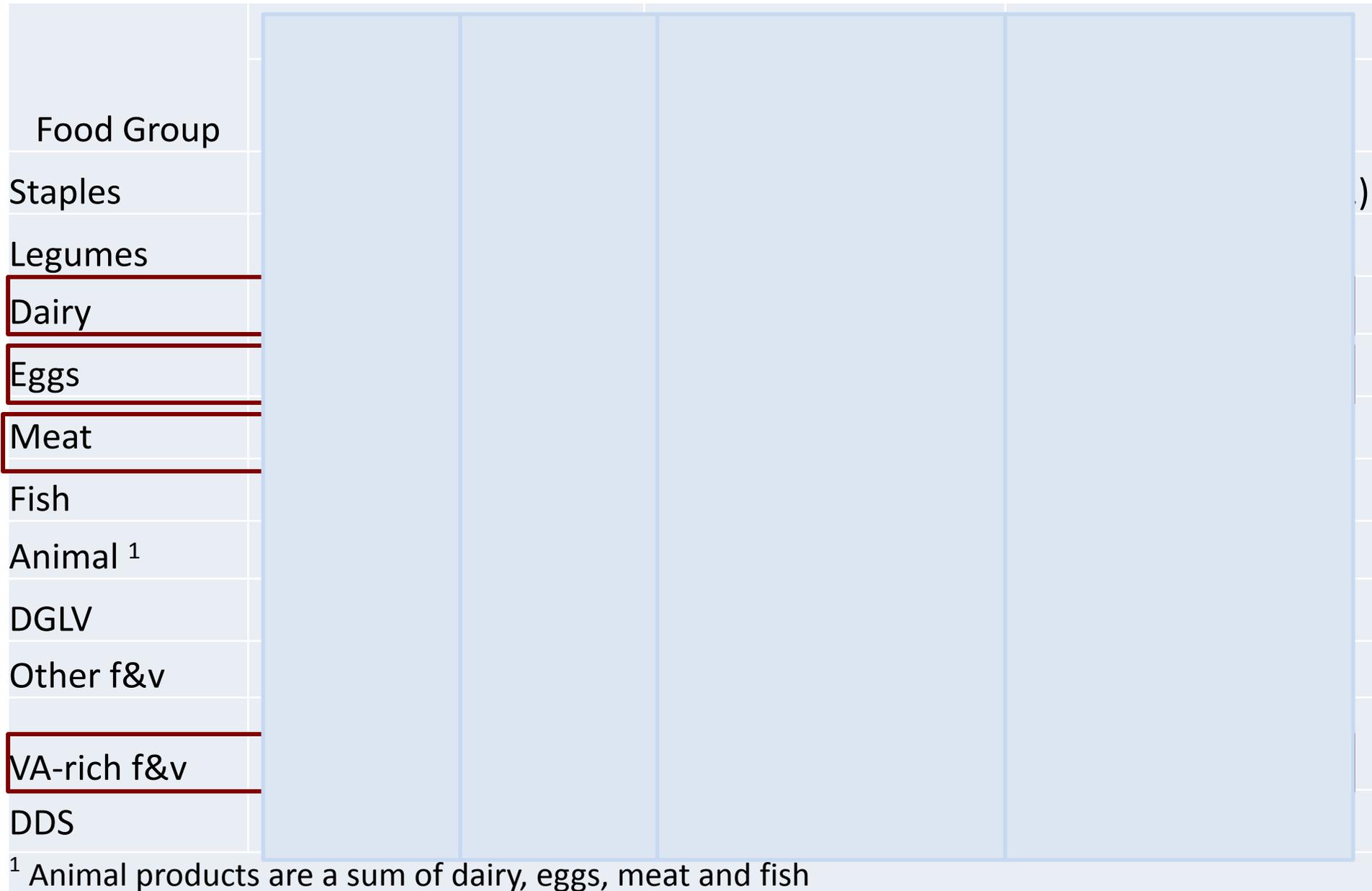
Proportion of children 6-23 m of age who consumed food from group ≥ 1 x/wk by agro-ecological zone



Percent of children 6-23 m of age who consumed food group $\geq 1x/wk$ by lowest & highest wealth quintile

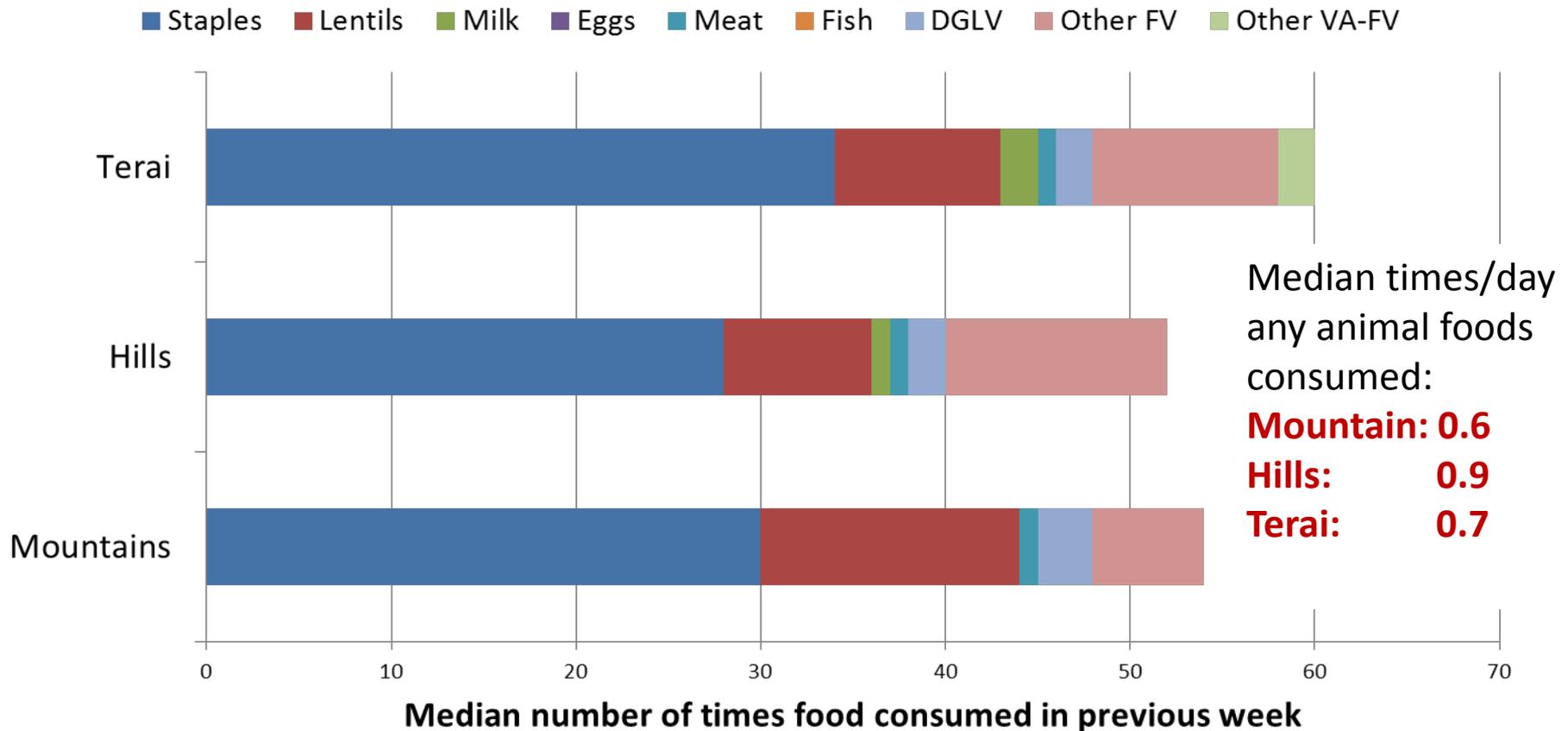


% Women consuming & median weekly frequency

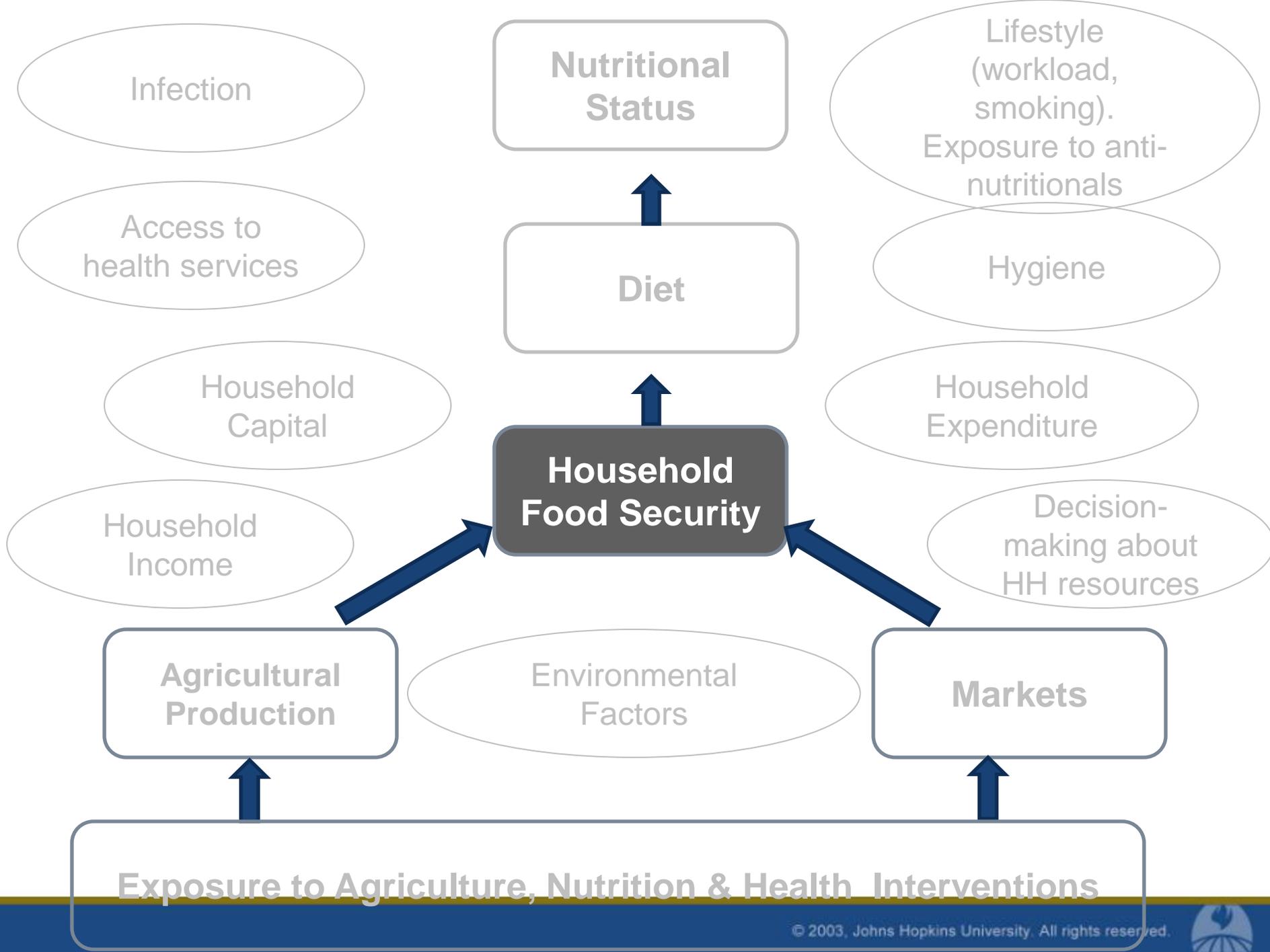


Overall maternal diet is mostly staple cereals, “other” fruits & vegs, & lentils. Median intake of any animal food <1x/day in all agro-ecological zones

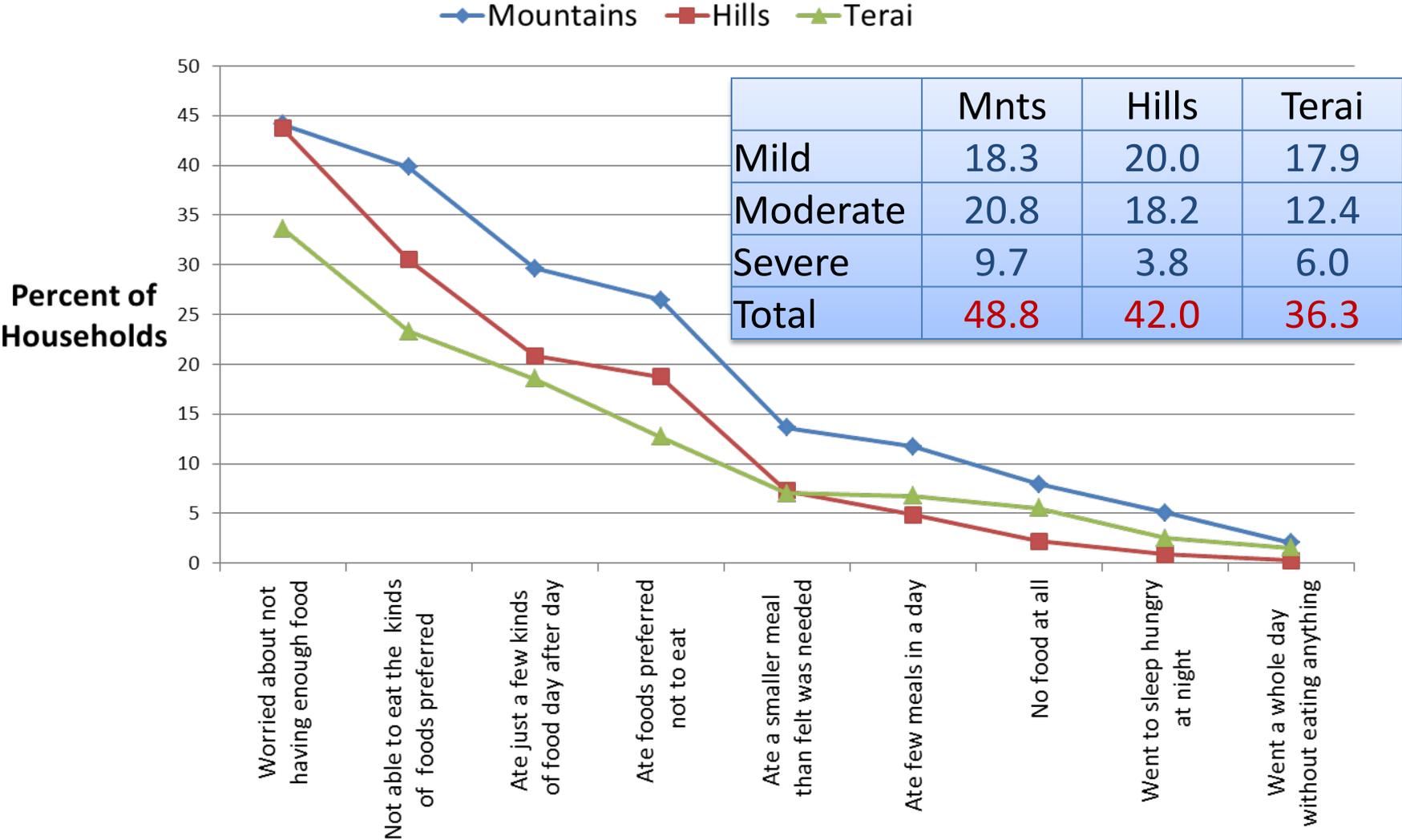
Weekly median frequency of food consumption among reproductive age women in Nepal by agroecological zone



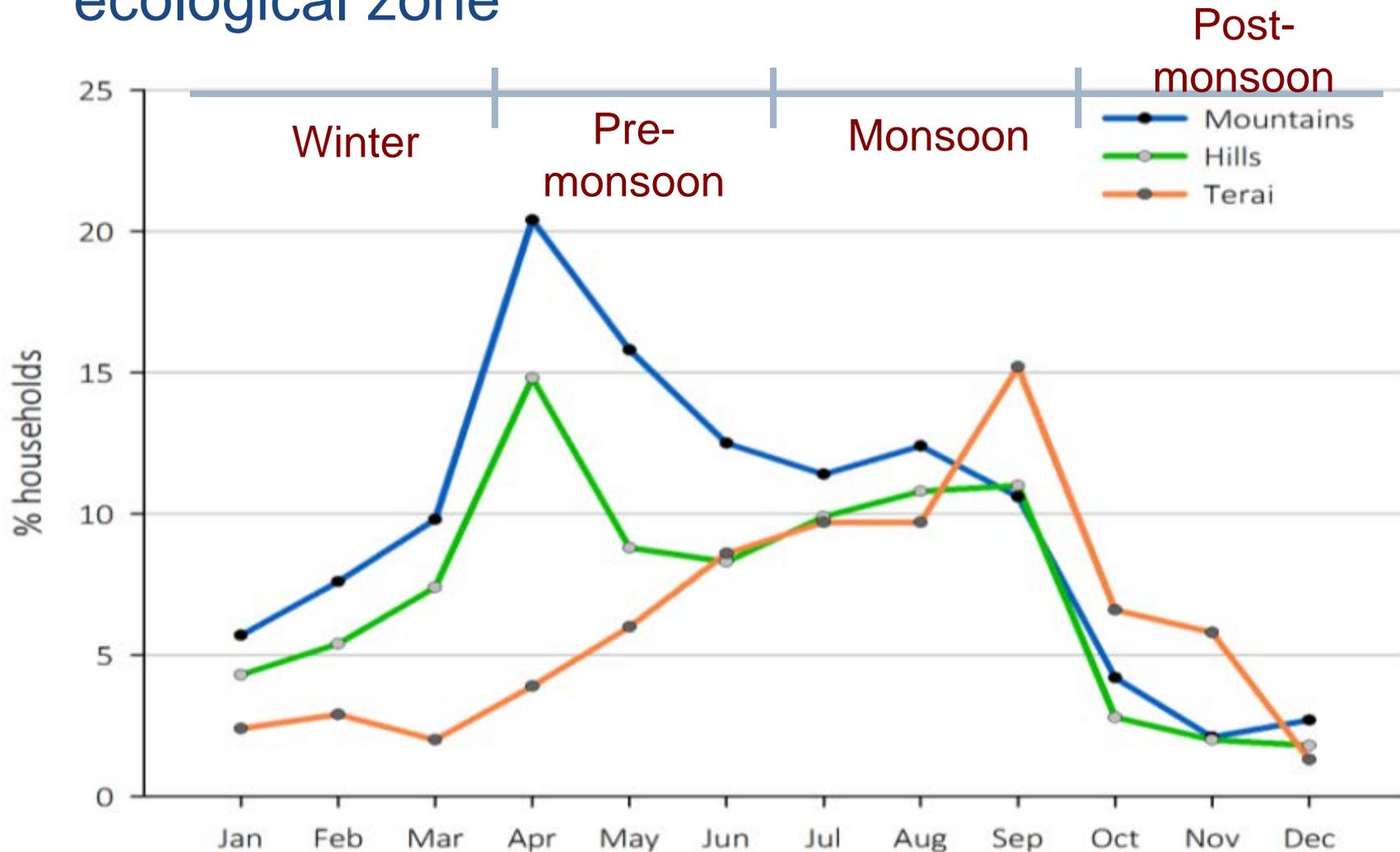
Any animal foods includes dairy, eggs, milk or fish



Household food insecurity is higher & more severe in mountains compared with hills and terai

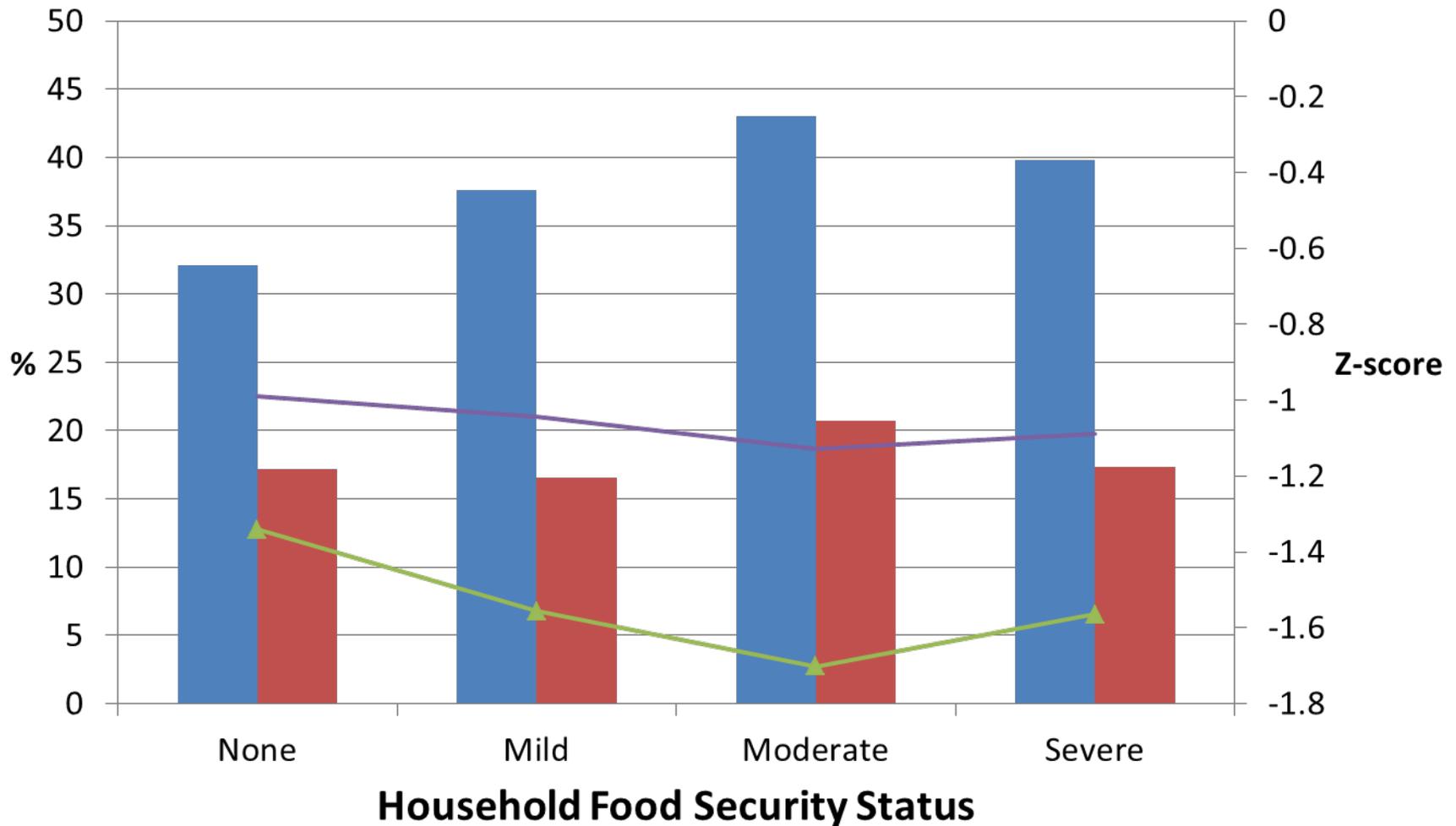


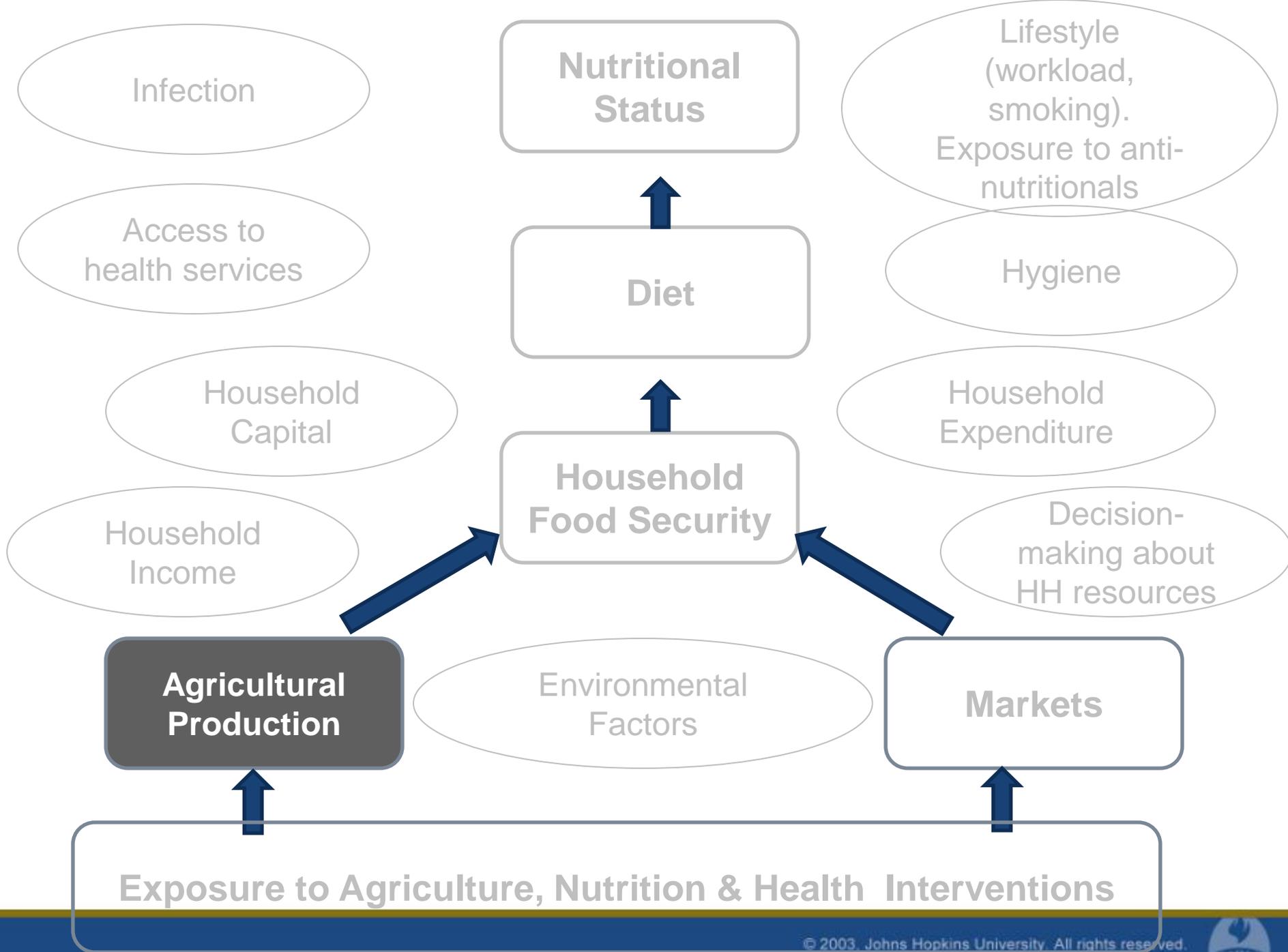
Months in which households reported not having enough food to meet family's needs by agro-ecological zone



Higher perceived household food insecurity associated with higher prevalence of child stunting & wasting (somewhat)

■ Stunted ■ Wasted ▲ LAZ — WLZ



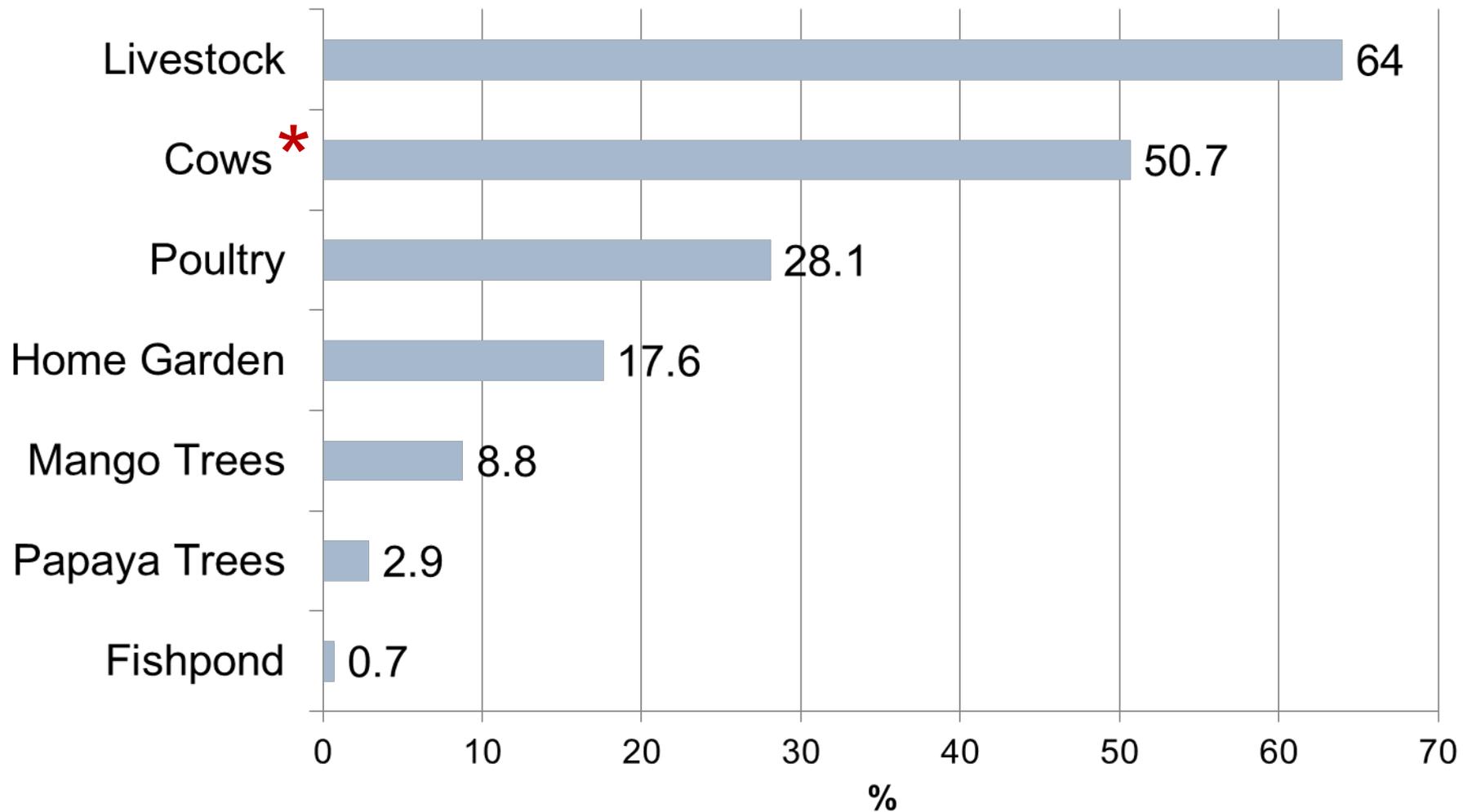


Land use and size

Land use	% of households owning
Productive land	69.0
Cultivate crops	62.3
Home garden	17.6
Orchard/Tea garden	0.0
Flower garden	0.5
Share cropping	4.7



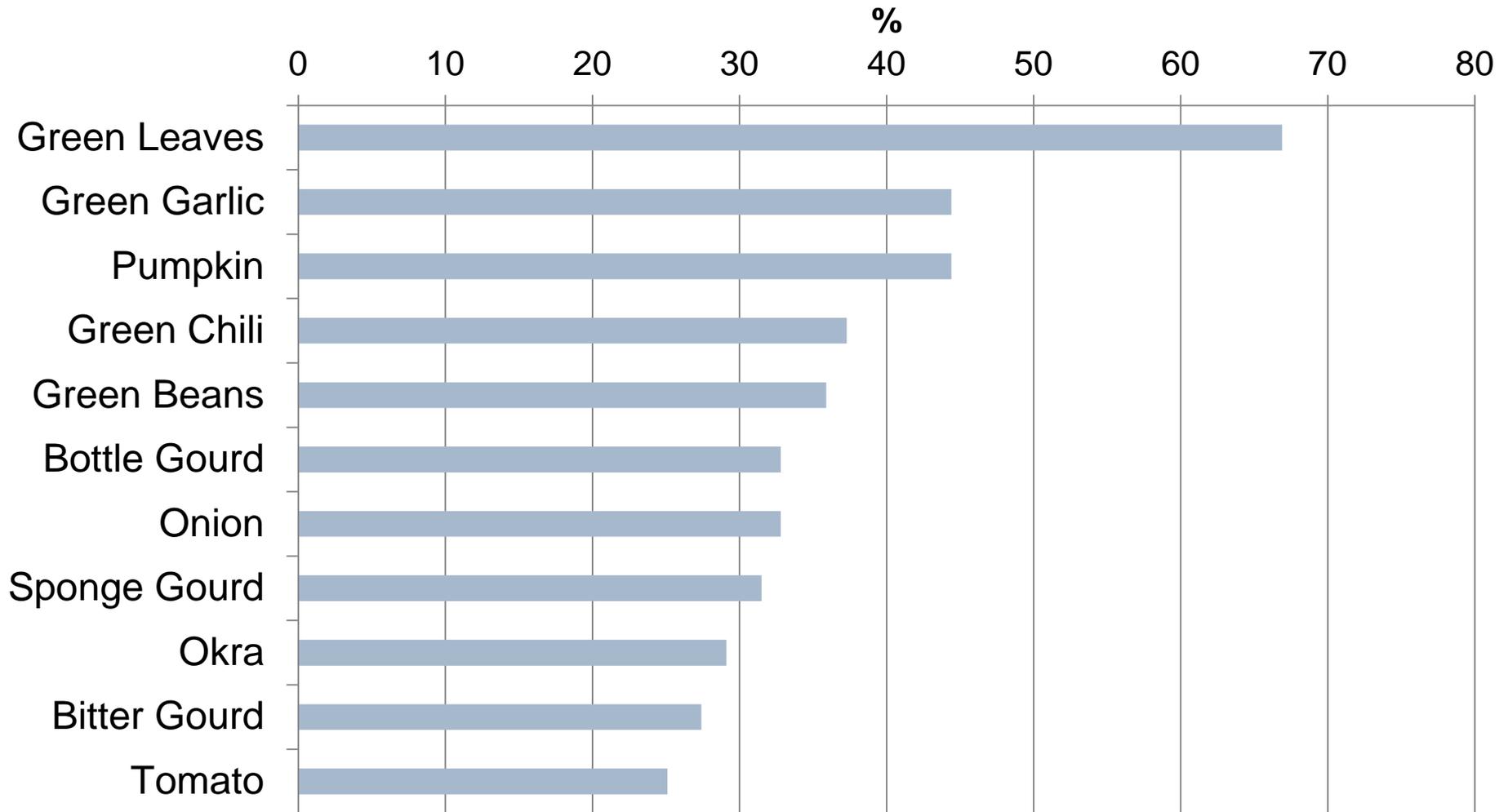
Proportion of households with productive assets



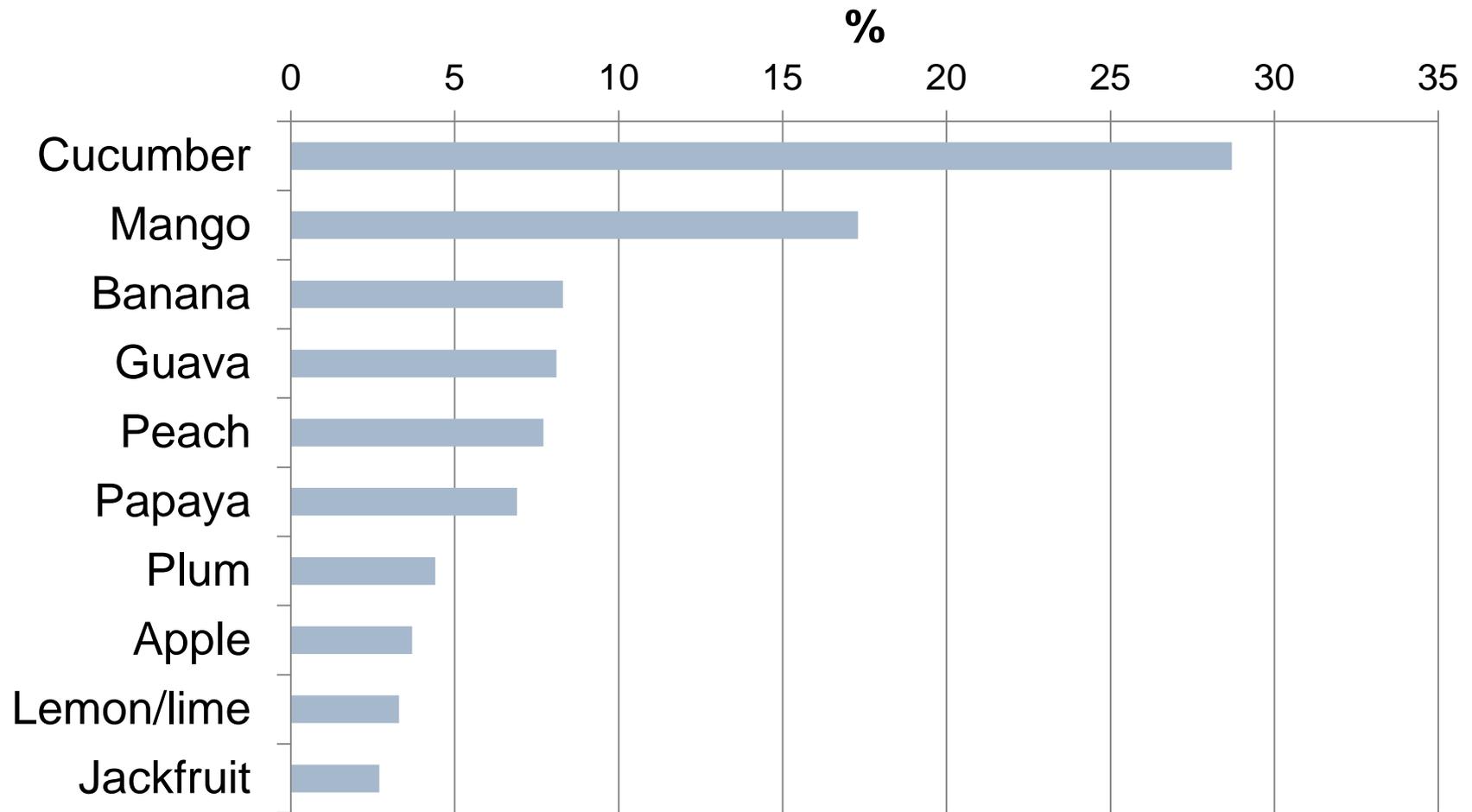
* includes cattle/buffalo/oxen/yak



Proportion of households growing specific vegetables

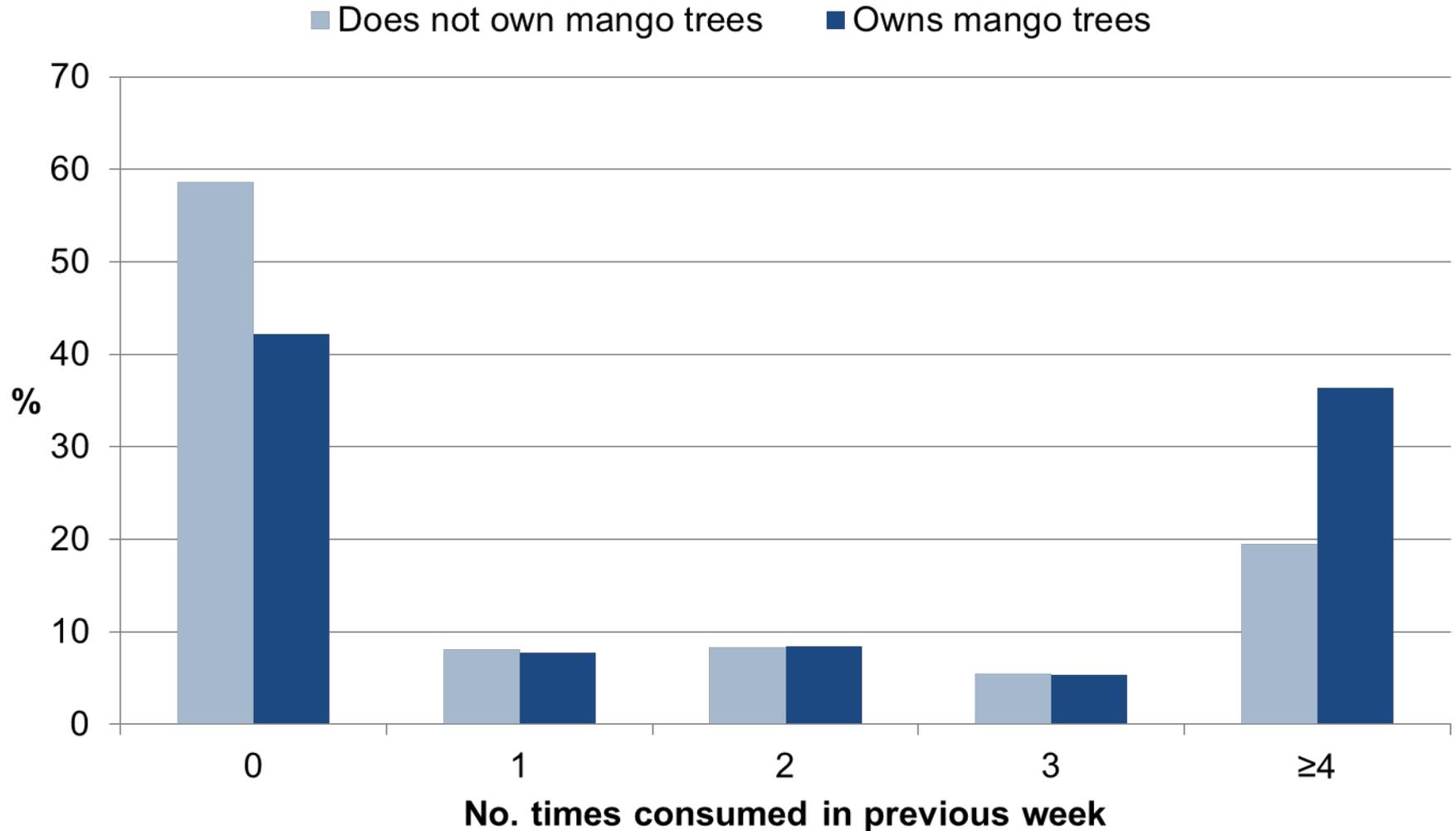


Proportion of households growing specific fruits

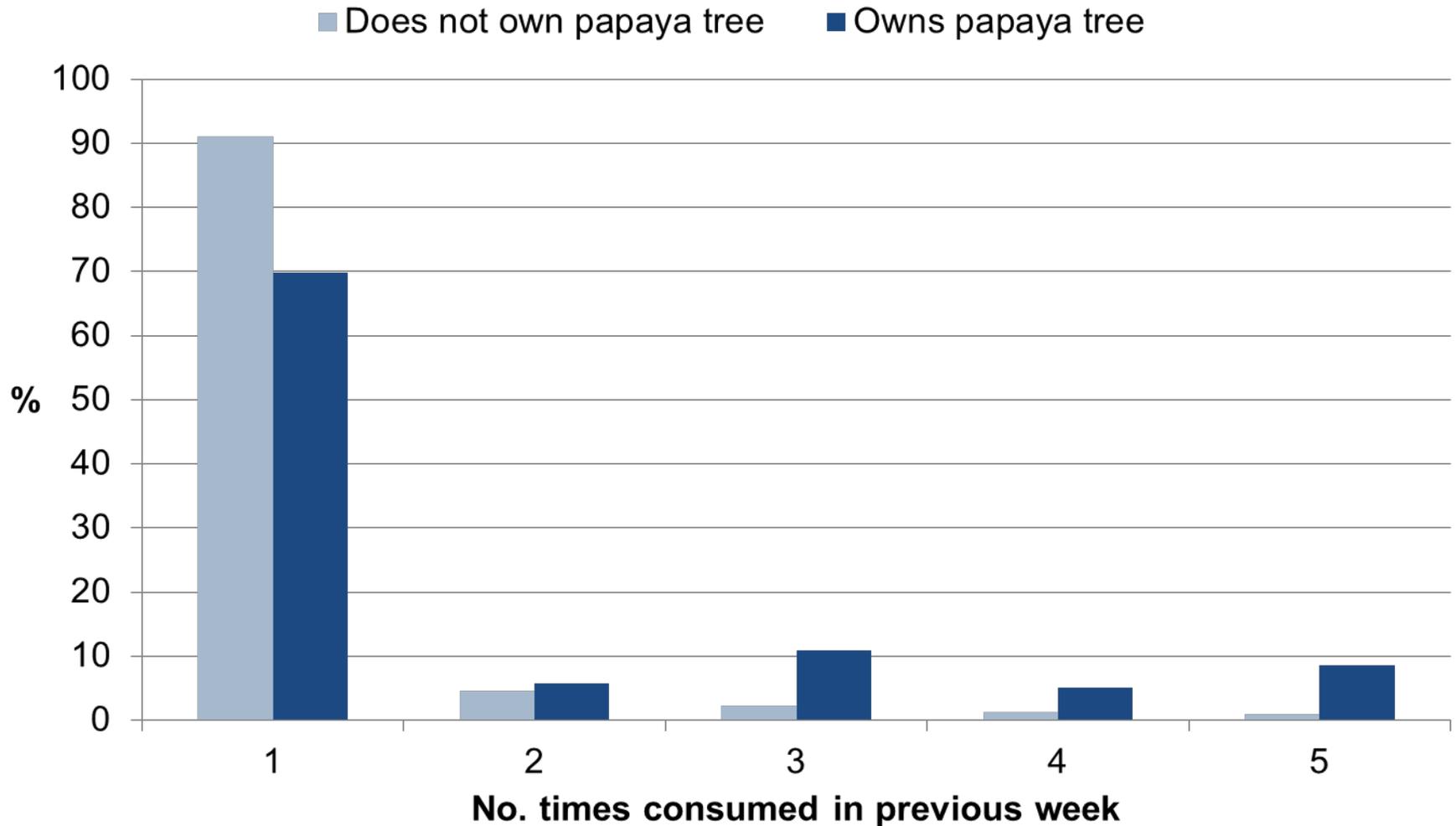


Do people eat what they grow or raise?

Weekly frequency of **MANGO** consumption among Nepali WRAs by household ownership of **MANGO TREES**

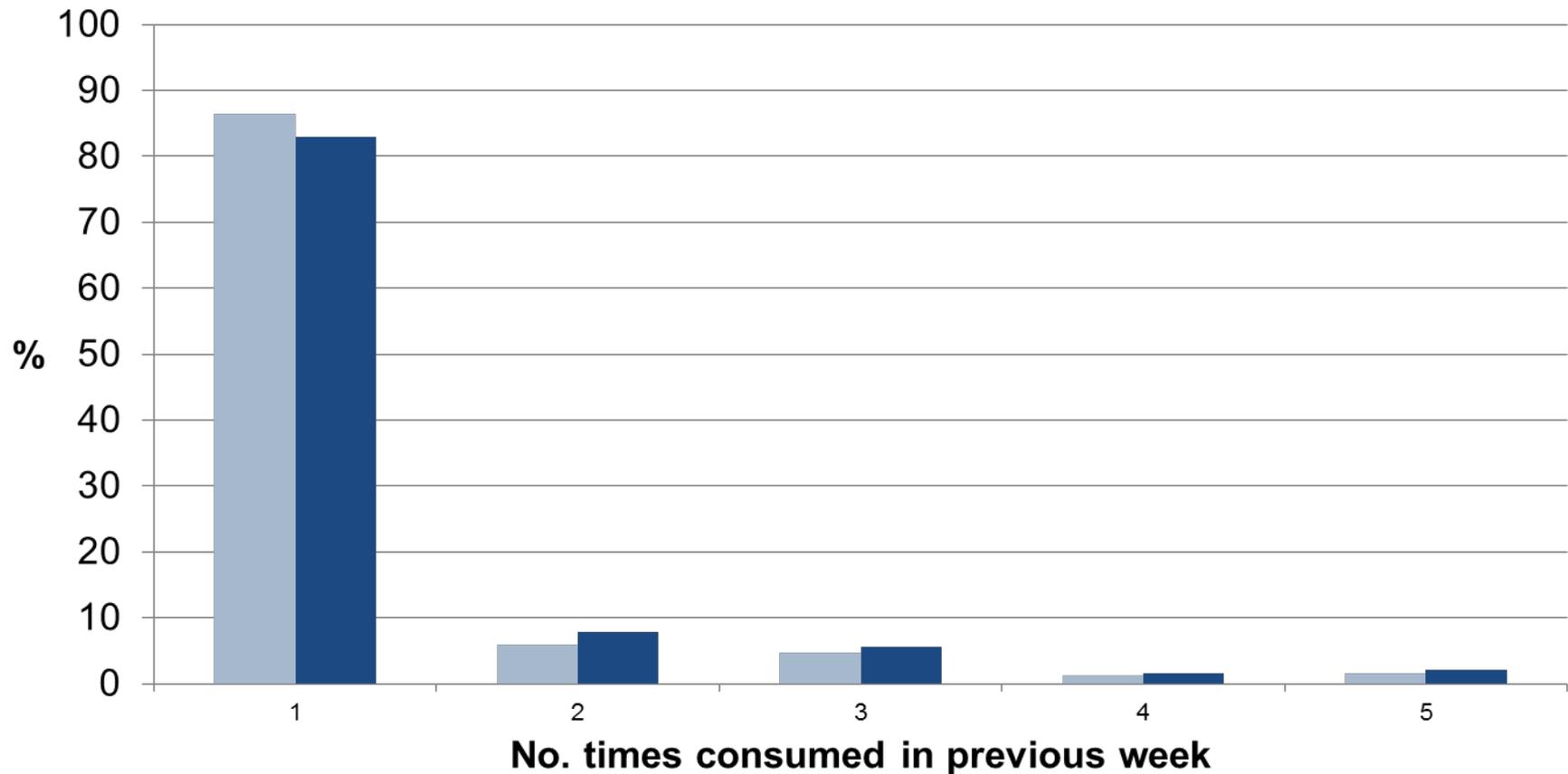


Weekly frequency of **RIPE PAPAYA** consumption among Nepali WRAs by household ownership of **PAPAYA TREES**

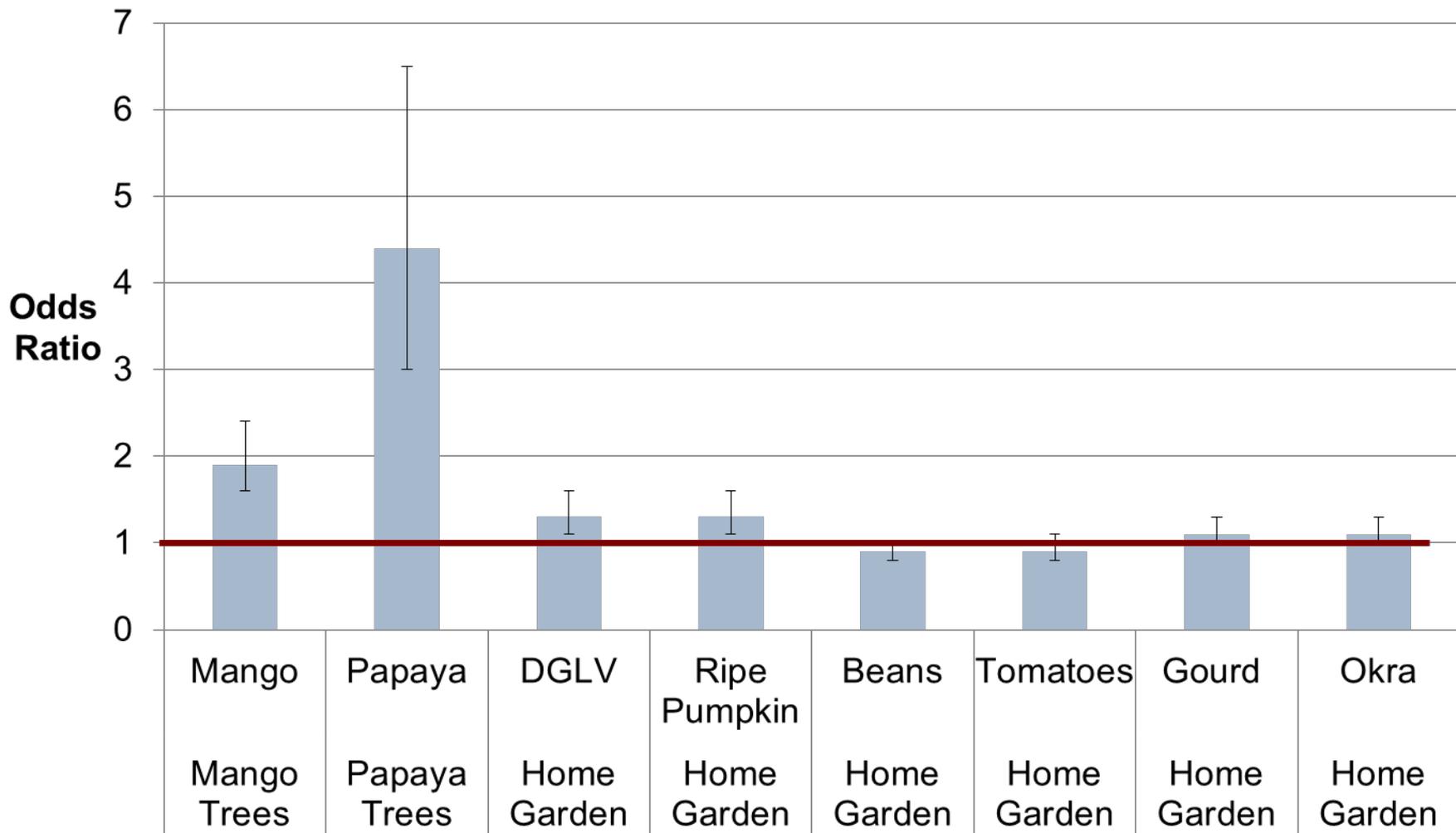


Weekly frequency of **RIPE PUMPKIN** consumption among Nepali WRAs by household ownership of **HOME GARDENS**

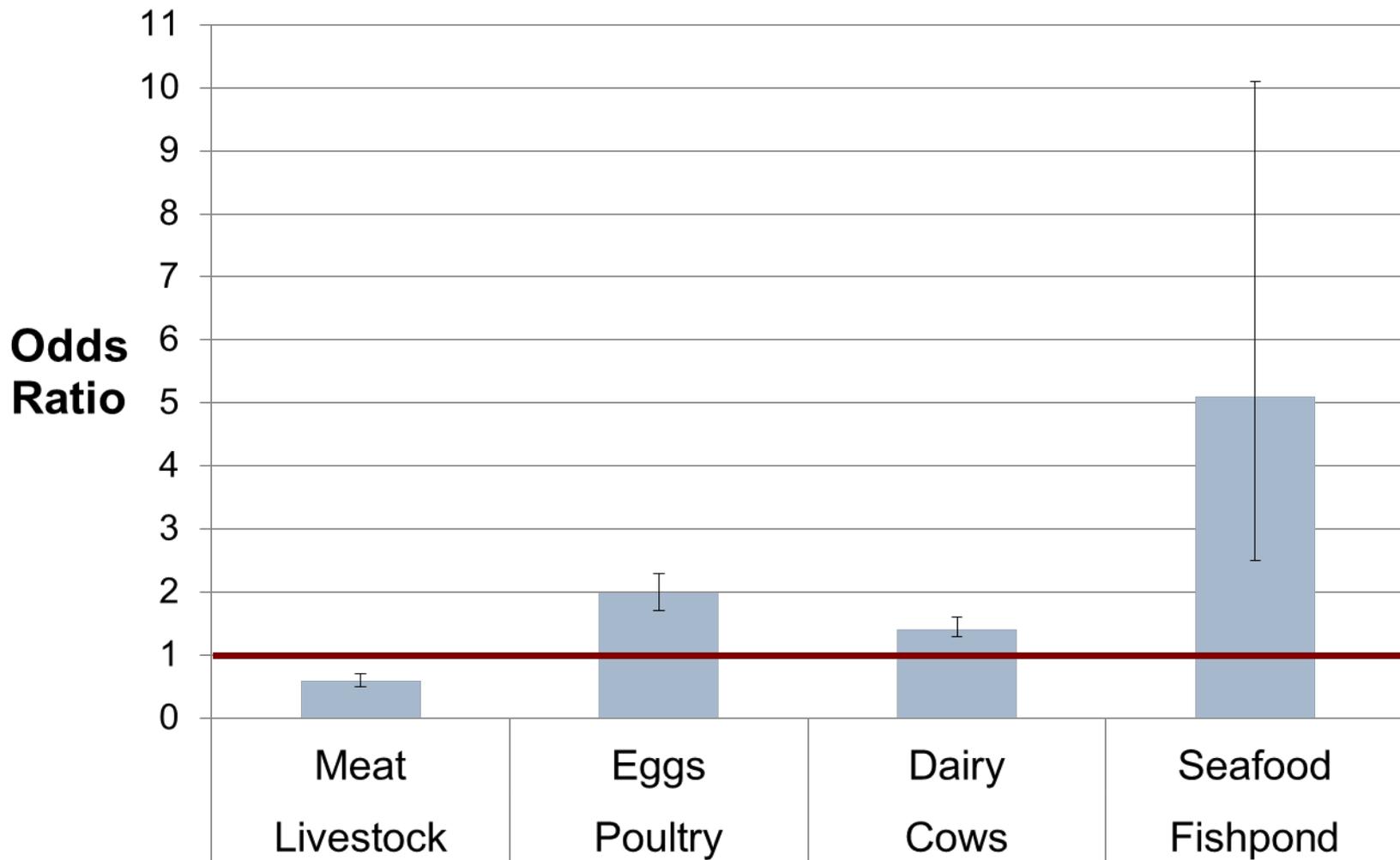
■ Does not have home garden ■ Has home garden

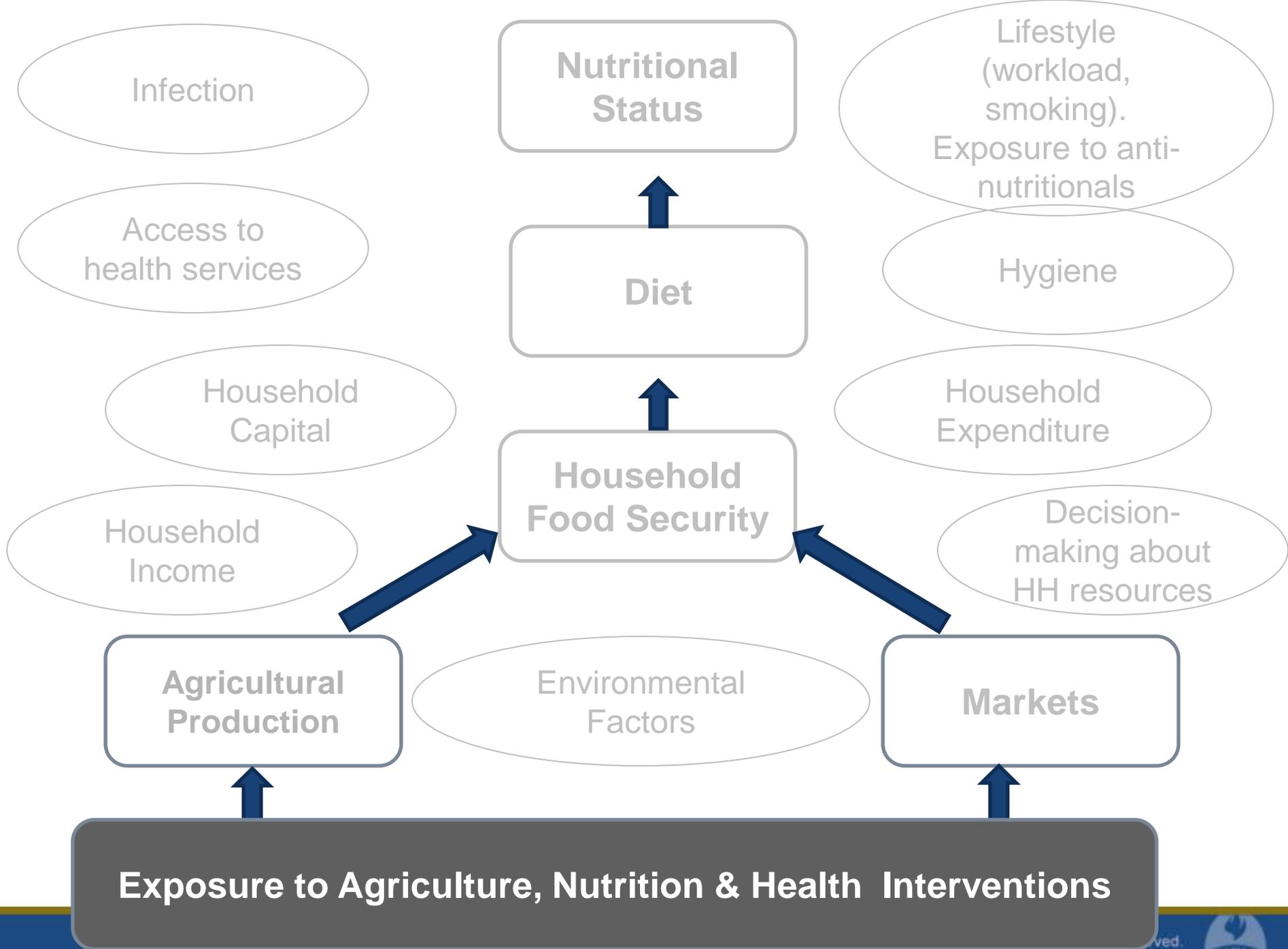


Relative odds (OR, 95%CI) of consuming food item $\geq 1x/wk$ among Nepali WRA in households which owned vs. did not own asset



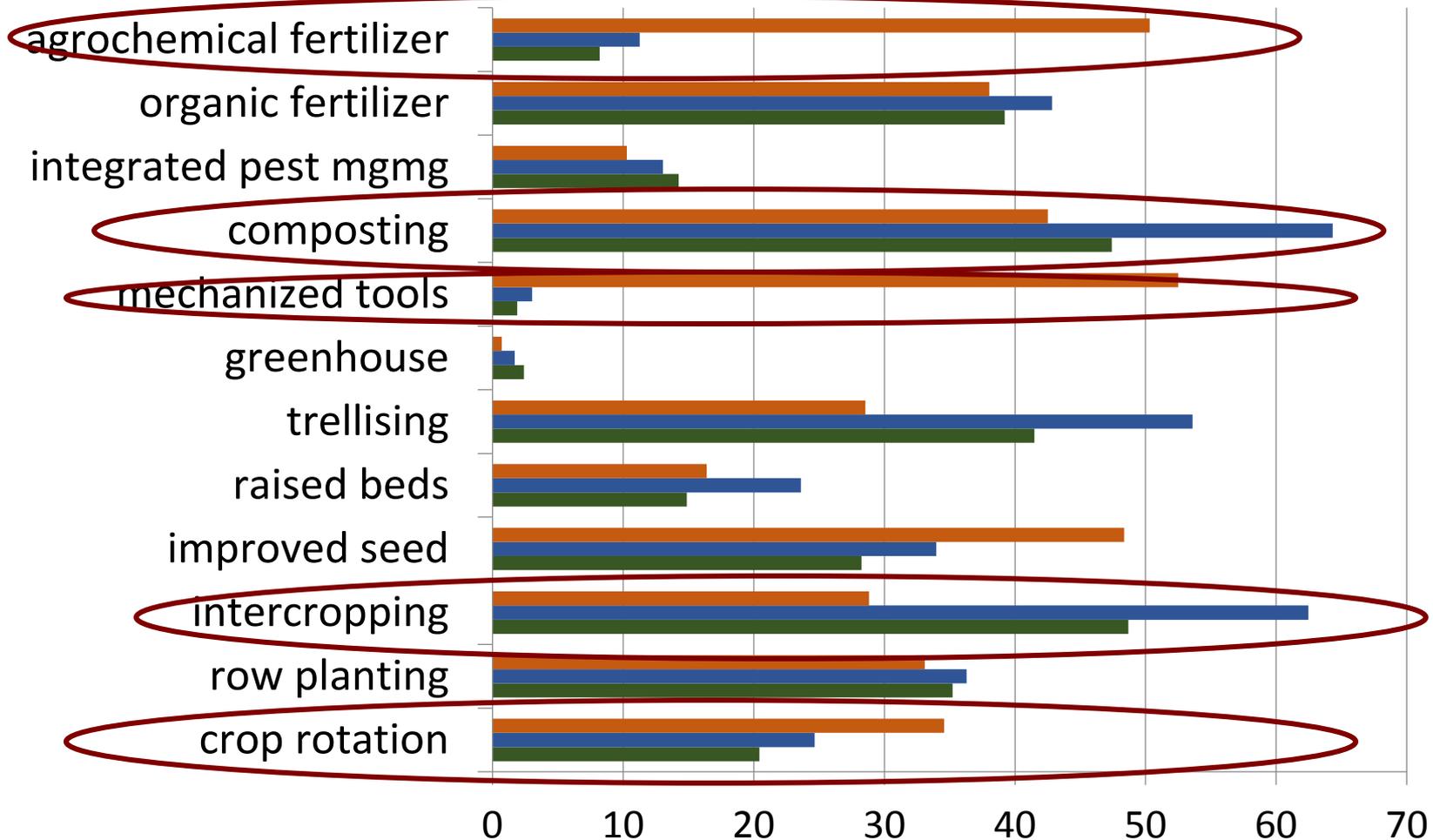
Relative odds (OR & 95%CI) of consuming food item $\geq 1x/wk$ among Nepali WRA in household owns vs not owned asset





Percent of households practicing improved agricultural innovations

Terai Hills Mountains



%



Observations to date—Zones Vary

Food security is highest in the Terai

- Better agricultural practices

- Lowest prices of inputs

- Lowest food prices

- Dietary diversity is highest

Nutritional status is not better in the Terai

- Mothers are more wasted & anemic

- Children are more wasted



Observations to Date: Perceived Food Insecurity is Real

As reported household food insecurity worsens...

Dietary diversity goes down

Animal source foods decrease in diet

Maternal wasting increases (not shown)

Childhood stunting increases, also wasting (less consistently)

Crop diversity appears maintained (not shown)



Observations to Date:

Average landholding is small—600 to 700 m²

Low proportion of homes with home gardens (17%) or fruit trees

Variety & nutritive value of vegetables grown could use improvement

Households owning specific productive assets are more likely to consume some foods (eggs, dairy, mango, papaya, DGLV) and not others (meat, beans, tomato, gourd) compared to households without these assets

Adoption of improved agricultural practices varies by agro-ecological zone



What Can PoSHAN Do?

- 1) measure and link, each year, agricultural practices to food security to diet to nutritional status of children and women
- 2) detect trends over time in practices and linkages
- 3) annual surveys show best times of year, in general, all other seasons can be counted on to be worse
- 4) identify needs of highest priority to change, and programs with most potential to do so
- 5) replace dogma with evidence to drive change in the future



Thank You!

