

## Relationship between food security and dietary diversity in Nicaraguan households

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### Background

- “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”<sup>[1]</sup>
- Food security is a multidimensional concept with four domains<sup>[2]</sup>, yet most studies focus only on access and neglect utilization, or food choice.

### Research questions

- How does access affect food choice?
- What effect do culturally valued foods have on food security?

### Predictions

- There will be a negative relationship between dietary diversity and increasing levels of food insecurity.
- Red meat, beans and milk will have a positive effect on food security status.

### Methods

**Data collected** from 456 households in Leon in 2012 and from 250 households in Los Robles in 2015 (N = 706). Assessed access with the Latin American and Caribbean Food Security Scale (ELCSA)<sup>[3]</sup> (Cronbach’s alpha = 0.822) and converted scores to food security categories. Assessed food choice with a locally-developed food frequency questionnaire (Cronbach’s alpha = 0.769), converted to Household Dietary Diversity Scores where the highest possible score is 12<sup>[4]</sup>.

**Data analysis** performed in R using packages ltm, haven and MASS.

### Results

#### Main findings

- There is a very weak relationship between food security and diet diversity.
- Culturally valued foods including beef, chicken and milk have a significant positive effect on food security status.

- Kruskal-Wallis rank-sum test showed significant differences in HDDS between food security categories ( $\chi^2 = 40.2$ ,  $df = 3$ ,  $p = 9.5 \times 10^{-9}$ ).
- Pairwise comparisons using Wilcoxon rank-sum test with Benjamini-Hochberg correction for multiple comparisons showed significant differences, except between food secure and slightly insecure households, and slightly insecure and moderately insecure households (**Table 1**).
- Spearman’s rank correlation showed weak relationship between access and utilization ( $\rho = -0.2$ ,  $p < 0.0001$ ) (**Insight 1**).

**Table 1.** Pairwise comparisons using Wilcoxon rank-sum test with BH correction.

	Severe insecurity	Moderate insecurity	Slight insecurity
Moderate insecurity	0.0019*	-	-
Slight insecurity	1.1x10 <sup>-8</sup> *	0.0508	-
Food secure	1.1x10 <sup>-8</sup> *	0.0495*	0.6089

Note: asterisks (\*) indicate significant interactions.

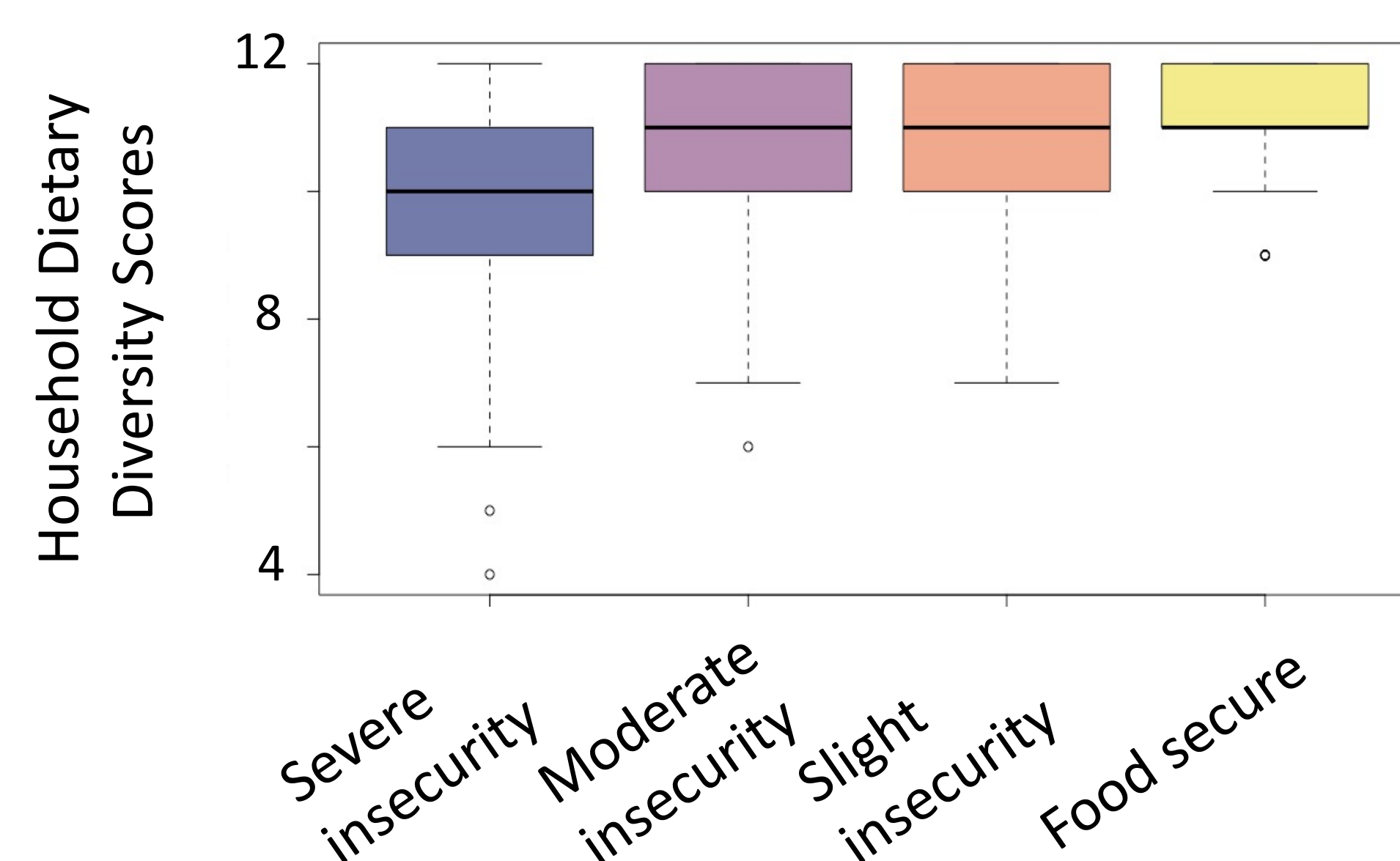
- Ordered logistic regression showed that beef, chicken and milk had a positive effect on food security status ( $p < 0.05$ ), but beans did not have a significant effect (**Insight 2**).

### Conclusions

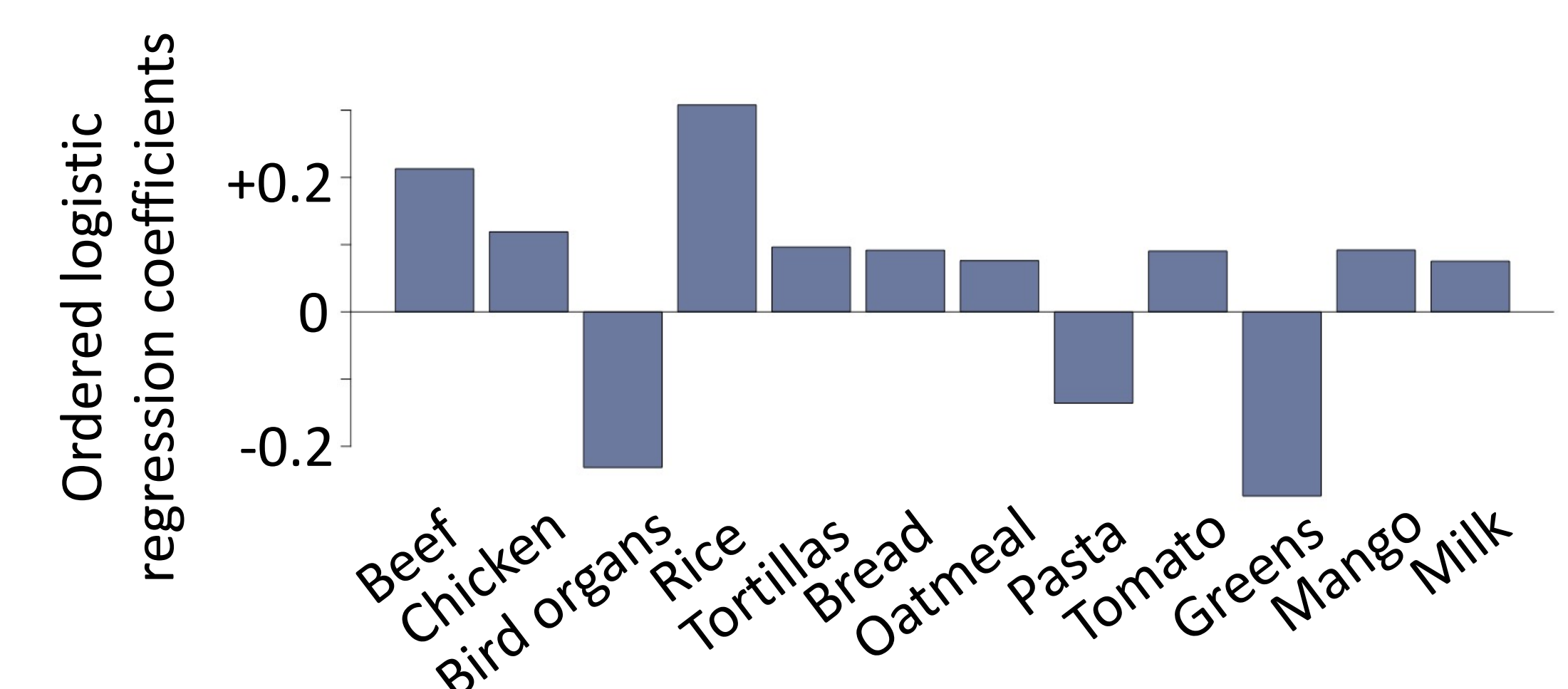
- The relationship between dietary diversity and food security status may be driven by households experiencing severe food insecurity.
- Household dietary diversity scores may not capture the lived experience of food insecurity.
- Future research should focus on food insecurity coping strategies.

*There is a very weak relationship between food security and diet diversity in Nicaragua.*

Photo credit Warren M Wilson



**Insight 1:** The relationship may be driven by severe food insecurity.



**Insight 2:** Consumption of culturally valued foods has a significant positive effect on food security.