Association of agricultural diversity and children's dietary diversity in Vietnam and Ethiopia.

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INTRODUCTION/BACKGROUND

Background:

- Poor diet quality persisted among children from small-holder farmers households in low- and middle- income countries.[1]
- Dietary diversity serves as an indicator of diet quality and nutrition.[2]
- Increasing household crop biodiversity has been proposed as a development strategy to improve nutrition among small-holder farmers.[3]
- Small body of literature supports the hypothesis that there is a positive association between household-level farm diversity and household- and individual- level dietary diversity.[4]

RESEARCH APPROACHES

Research aims:

Examine at two time points among children aged 5 and 8 among households that grow crops in Ethiopia and Vietnam:

1) if household-level agricultural biodiversity is associated with dietary diversity
2) effect modification from household wealth and subsistence levels
3) mediation from market orientation (sales versus subsistence)

Study Population

- Children from Ethiopia and Vietnam at age 5 and 8 from rural households who grew any crops in 2006 and 2009
- Data source: Young Lives, a longitudinal dataset from Oxford University

Methods

Independent Variable: Agricultural biodiversity measured two ways:

Crop Species Richness: count of total crop species grown by the household in the last 12 months

Crop Nutritional Functional Richness: count of plant nutritional food groups grown by the household in the last 12 months (4 groups)

Dependent Variable: Children's Dietary Diversity Scores (DDS)

Continuous: count of the total number food groups consumed in the last 24 hours (7 groups)

Covariates: child gender, agricultural sales in the last year, proportion of food consumed from own harvest, head of household gender and age, household size, ownership of any animal, total agricultural land, value of harvest sold in the last year, household nonfood and food expenditures in the last 15 days.

Statistical Analysis

Generalized Estimating Equations clustered on child (to account for correlation over multiple data rounds)

Interaction terms: household wealth and household proportion of food consumed from own harvest

Path analysis: household proportion of food consumed from own harvest and agricultural sales in the last 12 months.

RESULTS

Children's dietary diversity scores and household wealth higher in Vietnam. Crop diversity indicators and consumption of food from own harvest higher in Ethiopia.

Demographic characteristics, 2006 mean ± SD	Ethiopia n=1012	Vietnam n=1083
Children's dietary diversity score (DDS)	2.9 ± 1.0	4.3 ± 1.3
Crop species richness (CSR)	3.9 ±1.8	2.7 ± 1.6
Crop nutritional functional richness (CNFR)	1.8 ± 0.8	1.6 ± 0.7
Wealth index score	0.19 ±0.11	0.46 ±0.17
Proportion of household food from own harvest	0.6 ± 0.3	0.3 ± 0.3

Positive associations of crop diversity and children's dietary diversity in Ethiopia.

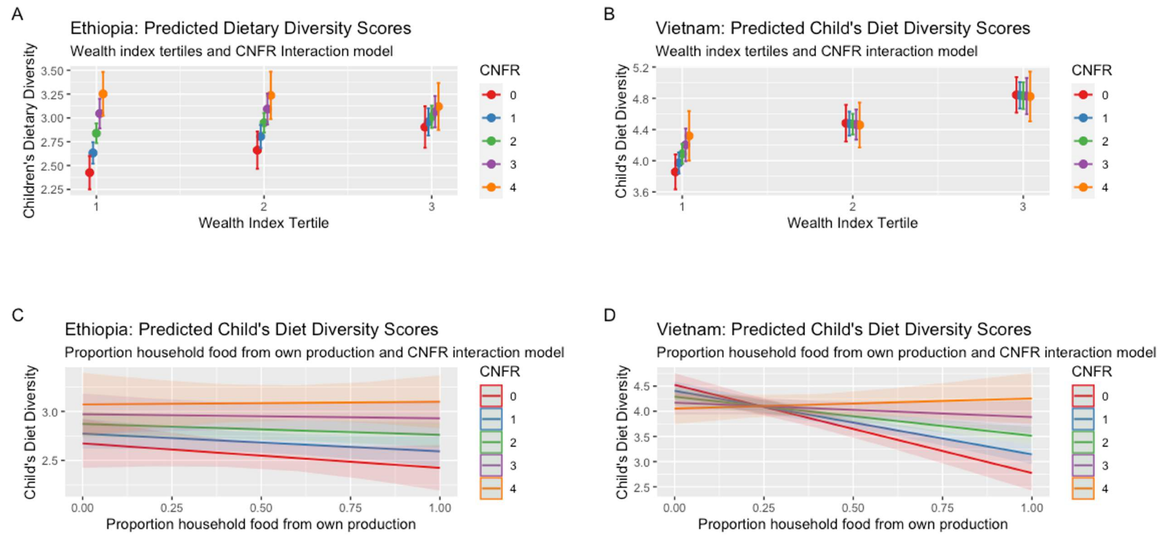
Associations of crop diversity and children's dietary diversity in Ethiopia and Vietnam

	Ethiopia				**Vietnam**			
	Child's DDS, β	95% CI	Child's DDS, β	95% CI	Child's DDS, β	95% CI	Child's DDS, β	95% CI
N children	1012	1012	1012	1012	1083	1083	1083	1083
CNFR	0.14 ***	0.08 – 0.20	-	-	0.03	-0.04 – 0.10	-	-
CSR	-	-	0.03 *	0.00 – 0.05	-	-	0.02	-0.02 – 0.06
WI: medium	0.12 *	0.03 – 0.22	0.13 *	0.03 – 0.22	0.44 ***	0.31 – 0.57	0.44 ***	0.31 – 0.57
WI: high	0.20 ***	0.09 – 0.31	0.20 ***	0.09 – 0.31	0.81 ***	0.65 – 0.97	0.81 ***	0.65 – 0.97
Proportion of household food from own production								
	-0.13	-0.29 – 0.03	-0.09	-0.25 – 0.07	-1.03 ***	-1.30 – -0.75	-1.03 ***	-1.30 – -0.75

[1] all models adjusted for child gender, head of household gender and age, household size, ownership of any animal, total agricultural land, value of harvest sold in the last year, household nonfood and food expenditures in the last 15 days.
Significance codes: * p<0.05 ** p<0.01 *** p<0.00

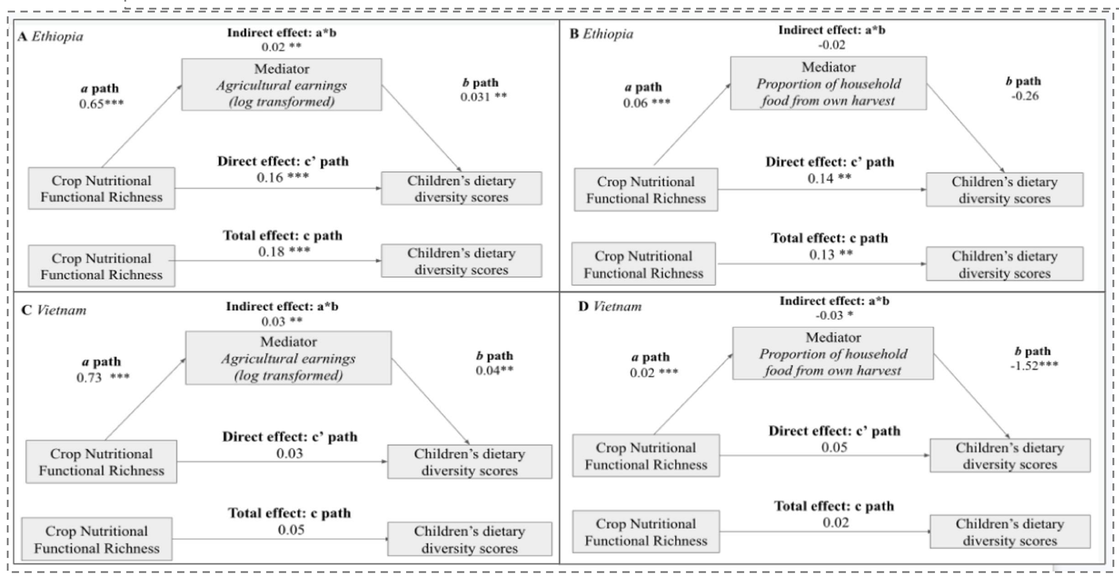
Effect Modification from Wealth and Subsistence

Interaction from household wealth tertile in Ethiopia (Panel A), but not Vietnam (Panel B)
Interaction from the proportion of household food from own production in Vietnam (Panel D) but not Ethiopia (Panel C)



Path Analysis from Market Orientation

Significant mediation from agricultural earnings (11%) in Ethiopia



DISCUSSION AND CONCLUSION

This study provides evidence that crop diversity is associated with small increases in dietary diversity in pre-adolescent school-aged children in some contexts, especially those from poor and subsistence-oriented households. Modest mediation from agricultural sales indicates that diversification may provide a route to market engagement in some settings with potential implications for children's dietary diversity.

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