

The influence of household farming systems on dietary diversity and caloric intake

The case of Uganda

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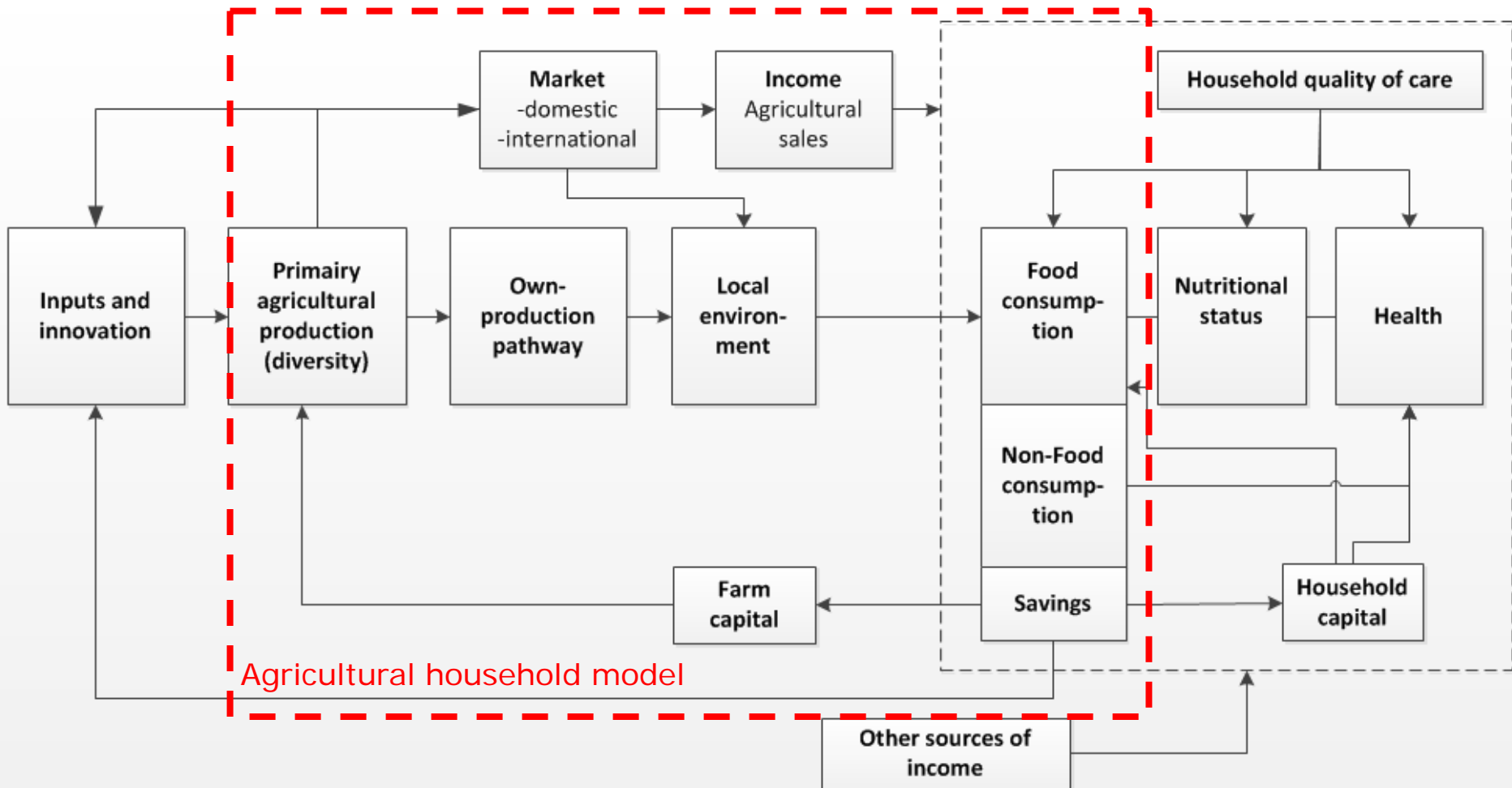
Introduction

- Productivity increase is the key of further economic development
- There is some mixed evidence that increased productivity affects food security
 - Zambia (Kumar, 1994) ↓ hybrid maize seeds
 - Zambia (Smale et al., 2015) ↑ hybrid maize seeds
 - Central Kenya and Northern Tanzania (Herforth, 2010) ↑ farm diversification
- Food security/nutrition security is a multidimensional concept

Introduction

- Does the increase of productivity increase diversify nutrition of smallholders?
 - Does productivity increase production diversity?
 - Does production diversity increase nutrition diversity?
- Research funded by CIMMYT
 - Yield gap analyses
 - Nutrition gap analyses (UGA, TZA, ETH)
 - Use LSMS data

Framework



Based on Kanter et al. (2015)

Food and nutrition security indicators

- Dietary diversity index (DDS)
 - 12 food groups, 7-day recall period
- Food consumption score (FCS)
 - 12 food groups, weights number of consumption days in 7-day recall period
- Caloric intake
 - Consumption of 69 food items and nutritional contribution
 - i.* cereals, *ii.* roots and tubers, *iii.* pulses and nuts, *iv.* vegetables, *v.* fruit, *vi.* meat, *vii.* eggs, *viii.* fish and seafood, *ix.* milk and dairy products, *x.* oil and fats, *xi.* condiments, and *xii.* sugar

Production diversity indicators

- Crop count
 - 12 crop groups
- Simpson's index
 - $1 - \sum s_j^2$ with $s_j = \frac{a_{ij}}{A_i}$ and $\sum_j = \frac{a_{ij}}{A_i}$ and j is crop type
- Own crop count
 - Crops grown and consumed in 7-day recall period
 - 12 crop groups

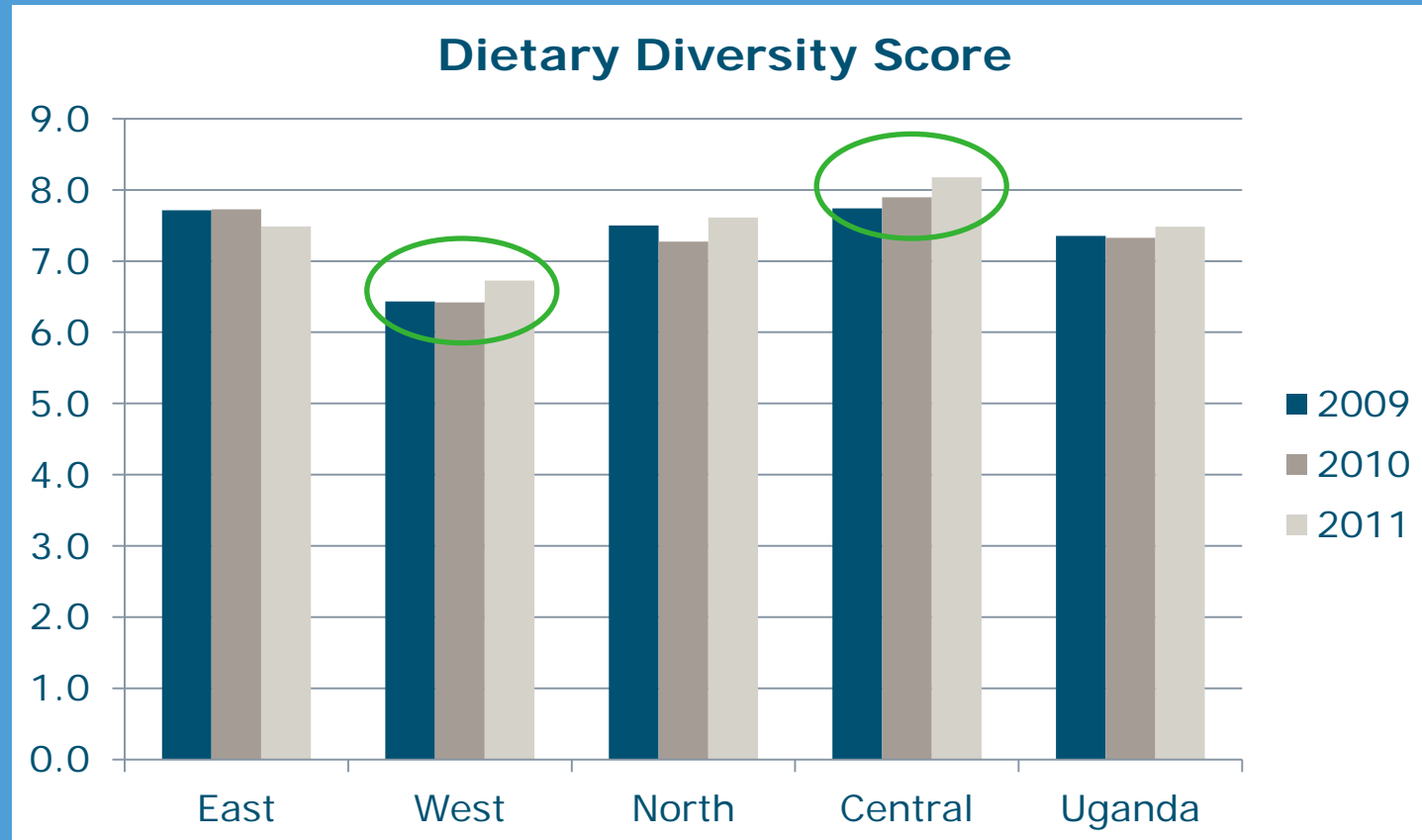
Methodology

- Panel data (empirical model)
- Linear models (3x3)
 - 3 dependent variables for household nutrition diversity
 - 3 production diversity indicators
 - Fixed-effects estimations (based on Hausman test)
- Household characteristics
- Farm characteristics
- Socio-economic characteristics

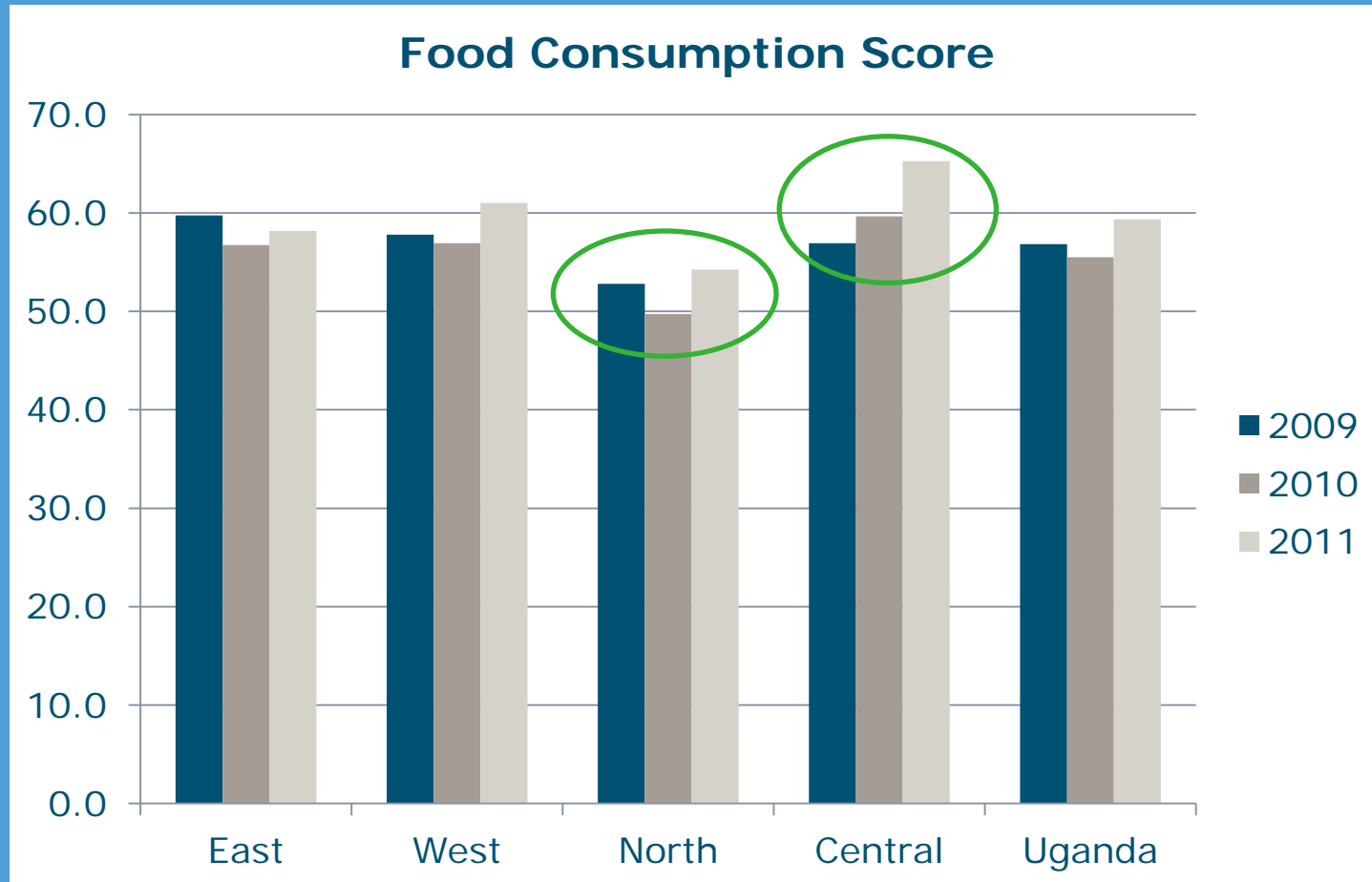
Data

- LSMS data for Uganda
 - 2009/2010 (3,123 obs.)
 - 2010/2011 (2,716 obs.)
 - 2011/2012 (2,716 obs.)
- Panel (max. 1,722 observations)
- Production data (plot level)
- Consumption (household level)
- Socio demographic data (individual level)

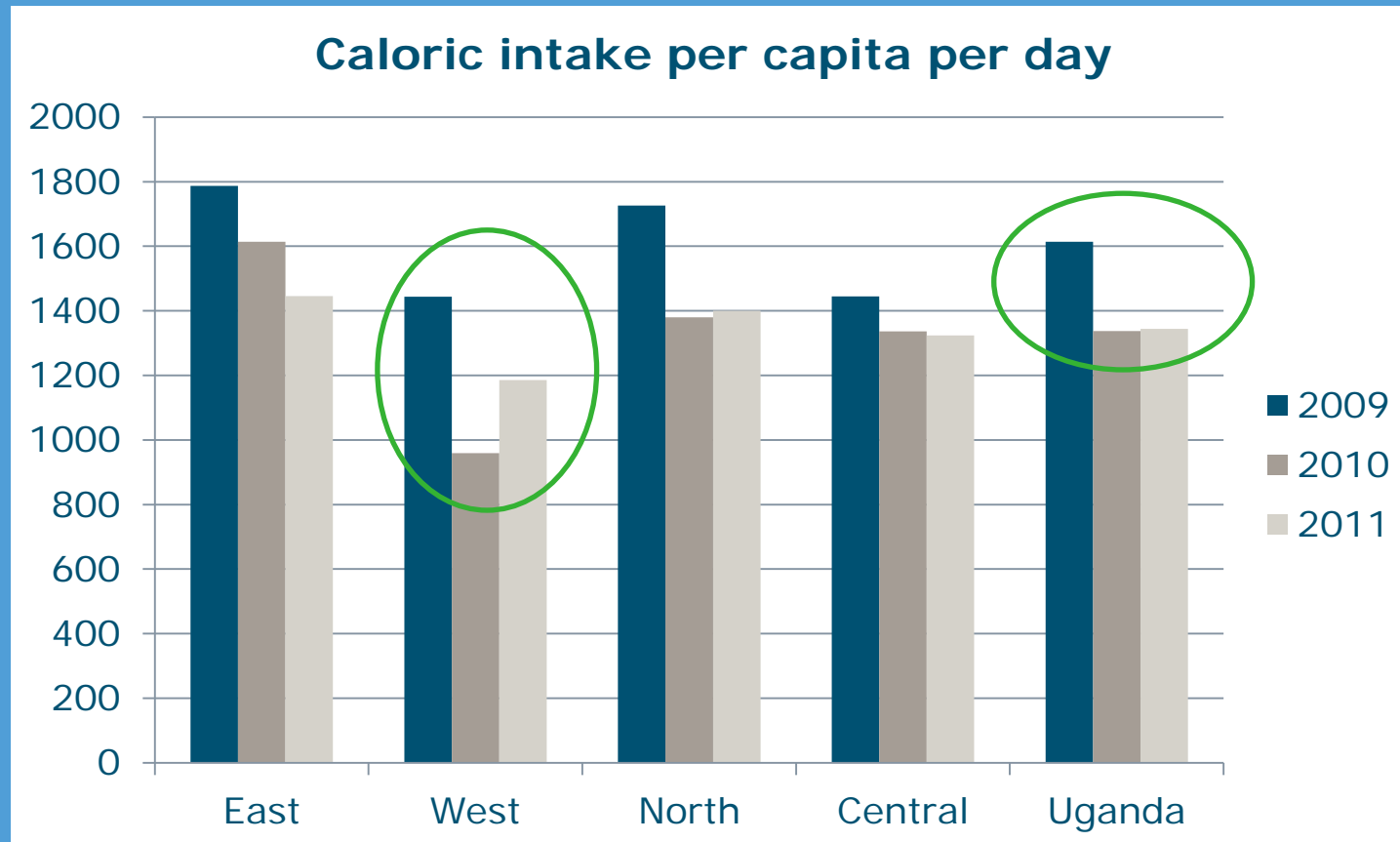
Nutrition diversity Uganda



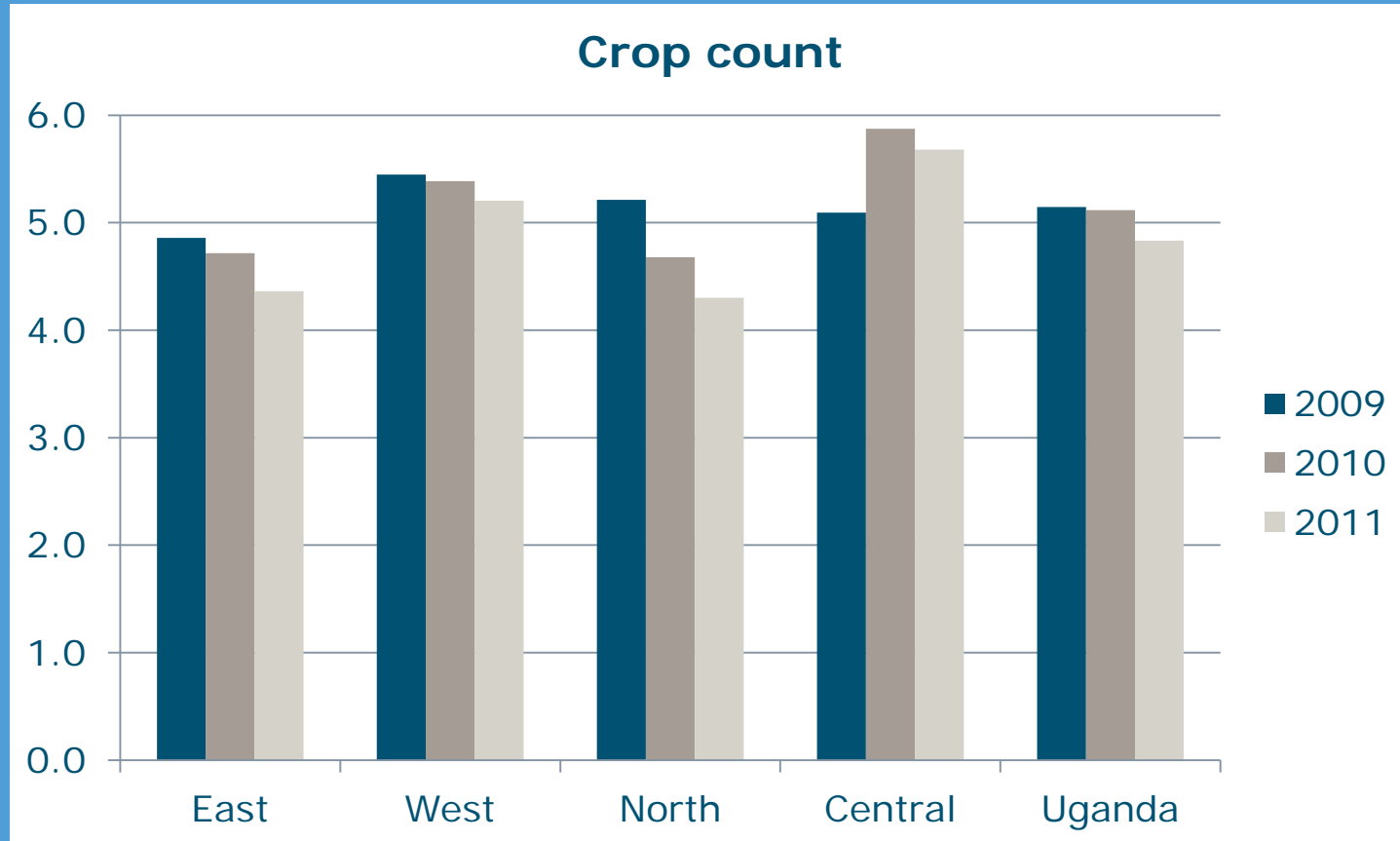
Nutrition diversity Uganda



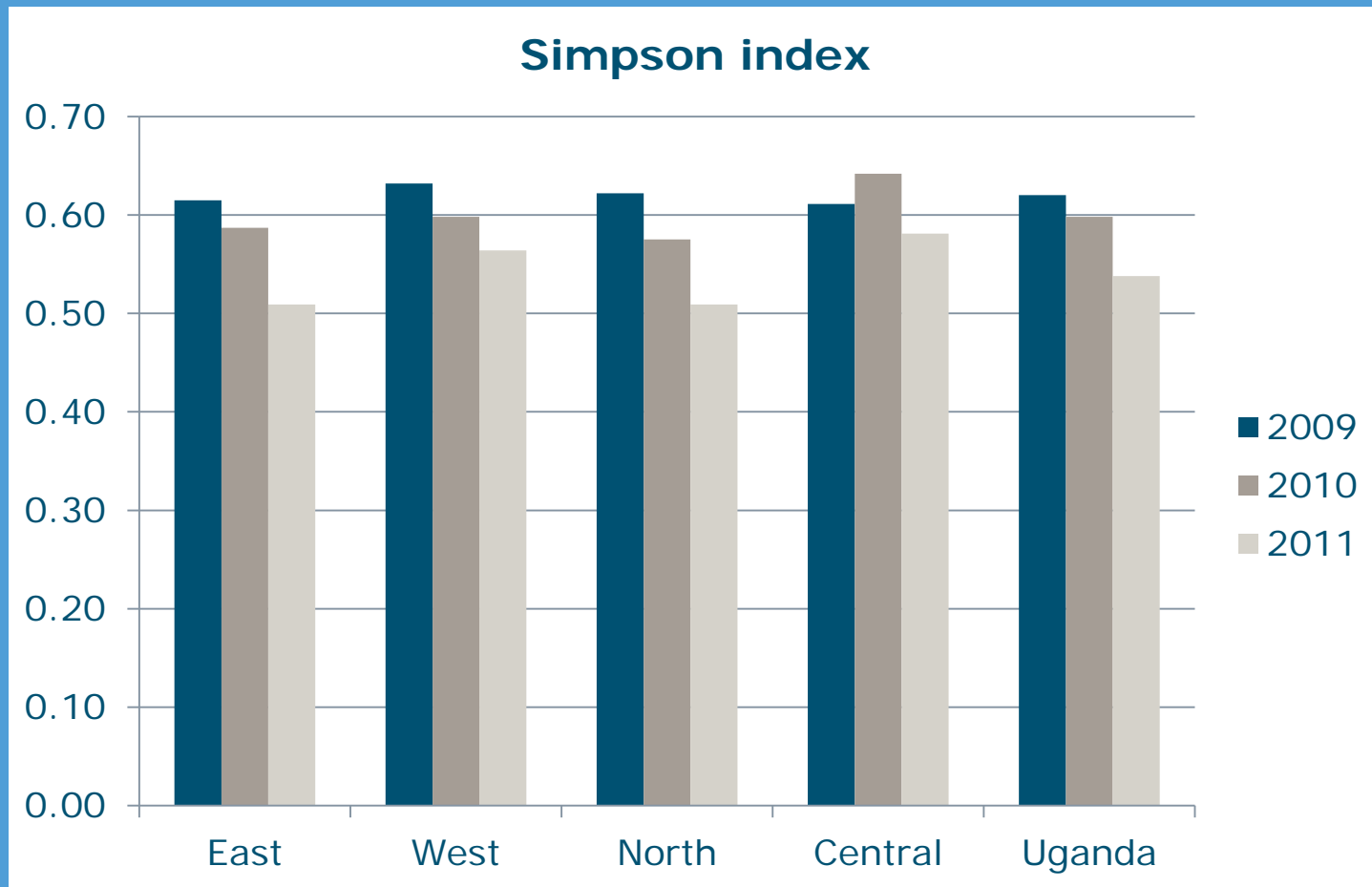
Nutrition diversity Uganda



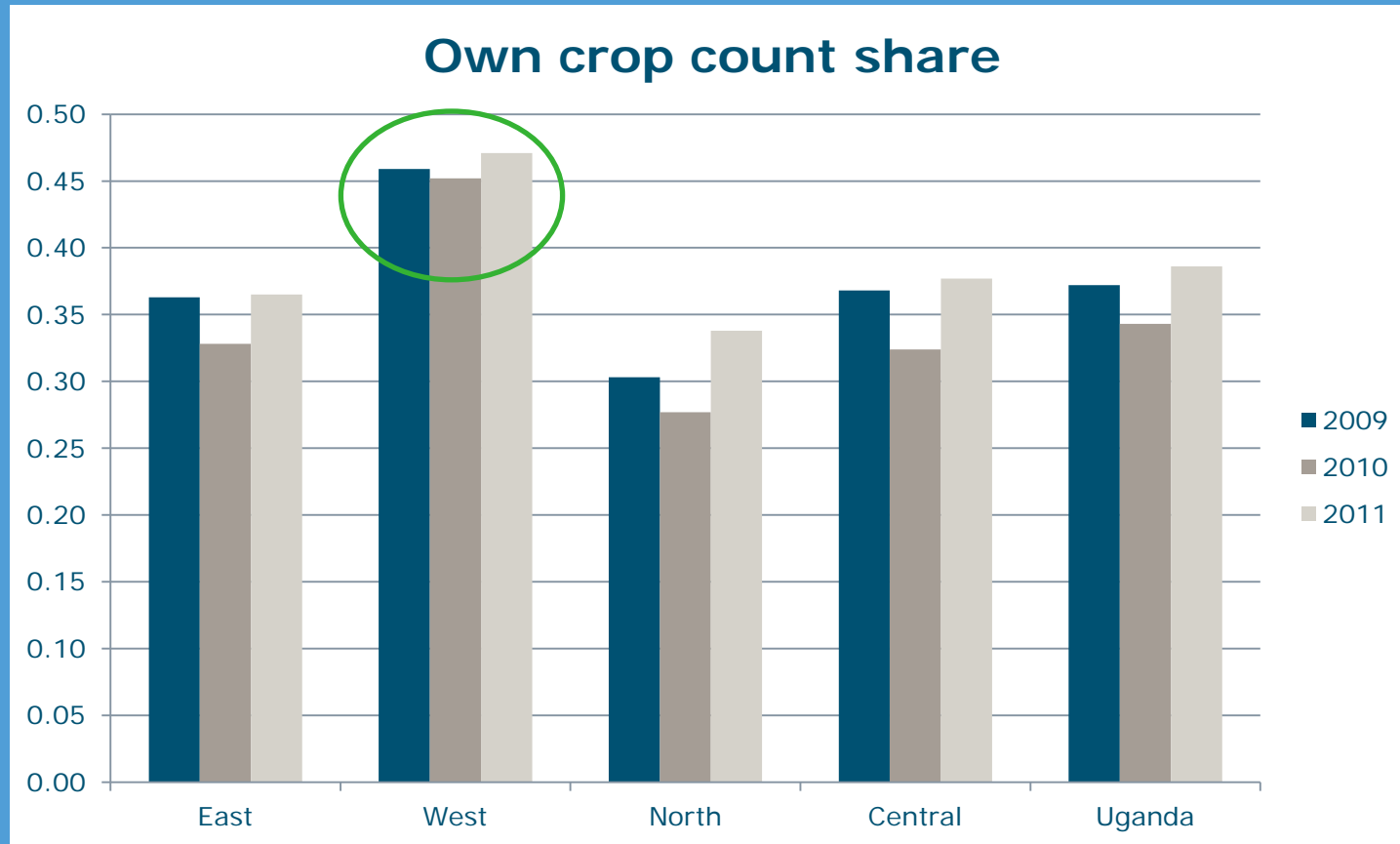
Production diversity Uganda



Production diversity Uganda



Production diversity Uganda



Regression results DDS

	(1)	(2)	(3)
Production diversity			
Crop count	0.046		
Simpson's index		0.364	
Own crop ratio			0.059
Household size	0.008	0.016	0.009
Household head gender - Male	-0.316	-0.449	-0.332
Age of the household head	-0.006	-0.001	-0.005
Education level of the household head	0.004	0.008	0.004
Food expenditure	0.001	0.002	0.001
Incomes	0.007	0.006	0.007
Total cropped area	0.001	0.001	0.001
Proportion of own production	-0.303	-0.345	-0.275
# non-agricultural income sources	0.011	0.008	0.011
Agriculture Decision - Household Head	0.048	0.154	0.056
Year 2009-10	7.414	7.069	7.416
Year 2010-11	7.227	6.890	7.229
Year 2011-12	7.494	7.136	7.484

Regression results FCS

	(1)	(2)	(3)
Production diversity			
Crop count	0.668		
Simpson's index		3.585	
Own crop ratio			0.844
Household size	0.113	0.281	0.131
Household head gender - Male	-1.435	-4.451	-1.664
Age of the household head	0.032	0.163	0.038
Education level of the household head	0.076	0.123	0.078
Food expenditure	0.021	0.022	0.021
Incomes	-0.029	-0.029	-0.024
Total cropped area	0.024	0.025	0.023
Proportion of own production	10.62	11.24	11.04
# non-agricultural income sources	-0.838	-0.986	-0.842
Agriculture Decision - Household Head	1.066	1.516	1.183
Year 2009-10	42.12	36.97	42.21
Year 2010-11	39.96	34.67	40.05
Year 2011-12	43.79	38.32	43.72

Regression results on caloric intake (HH)

	(1)	(2)	(3)
Production diversity			
Crop count	1.599		
Simpson's index		-2.688	
Own crop ratio			0.971
Household size	3.549	3.985	3.626
Household head gender - Male	12.034	15.448	11.396
Age of the household head	-0.932	-1.177	-0.919
Education level of the household head	0.589	0.818	0.601
Food expenditure	0.054	0.056	0.054
Incomes	0.110	-0.010	0.123
Total cropped area	0.101	0.062	0.100
Proportion of own production	39.812	39.764	41.325
# non-agricultural income sources	-0.157	-1.147	-0.129
Agriculture Decision - Household Head	0.559	-0.086	0.978
Year 2009-10	32.840	45.926	36.066
Year 2010-11	23.489	36.314	26.62
Year 2011-12	25.399	37.343	28.085

Summary of results

	DDS	FCS	Caloric intake
Crop count	0.046 ***	0.668 ***	1.599 **
Simpson' s index	0.364 **	3.585 **	-2.688
Own production ratio	0.059 *	0.844 **	0.971

Conclusions

- Nutrition indicators differ across regions and have a mixed development DDS↑ and FCS and Caloric intake ↓
- Production diversity shows a negative trend
- Positive relationship between production diversity and nutrition indicators
 - For caloric intake, only crop count has positive impact
- Food expenditures increase food and nutrition diversity
- Household size is positively correlated to caloric intake

Discussion and further research

- Possible endogeneity of income and food expenditures
- DDS might require Poisson estimation
- Caloric intake per capita instead of household
- Is there a difference for maize and non-maize growers?
- Have do small-holders behave?
 - Produce more of the same (market pathway)
 - Produce more divers set of crops (own production pathway)

Thank you!

Questions?



Ugali and cabbage