Assessment of on-farm, market and wild food diversity in three agro-ecological zones of Western Kenya

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1. Context

Agrobiodiversity (ABD) can support dietary diversity

- Positive influence on soil fertility, and crop productivity → support food security
- Increased chances of agro-ecosystem resilience to environmental changes
- Essential for adapting to climate change

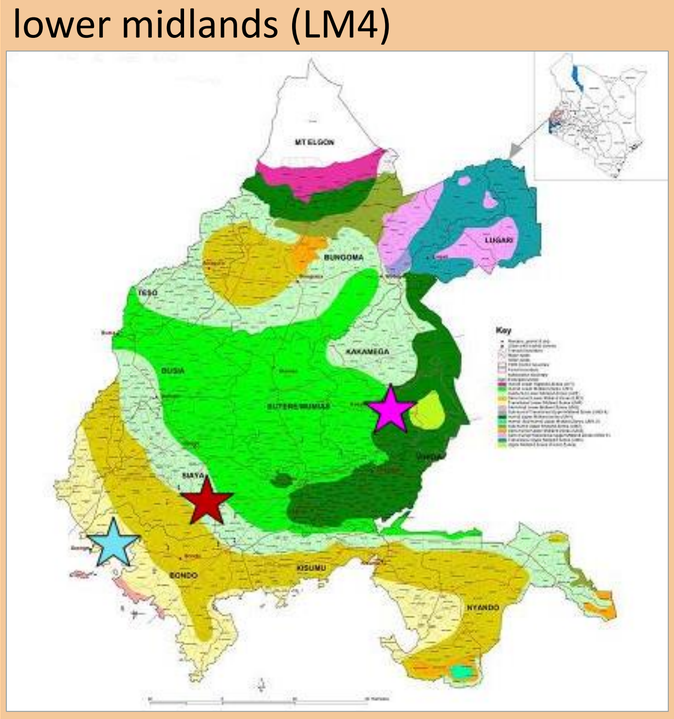
2. Objectives

- Assessment of on-farm, market, and wild food diversity on smallholder farms and local markets
- Evaluation of accessibility, availability and usage of food crops

3. Materials and methods

Study site: 6 Villages of Western Province and Nyanza Province, Western Kenya

Agro-ecological zones (AEZ): humid upper midlands (UM1), Subhumid lower midlands (LM2), transitional lower midlands (LM4)



UM1 (Kakamega)

LM2 (Siaya)

LM4 (Bondo)

Figure 1: Map of the study districts in Western Kenya

Duration: Nov/Dec 2013; Feb/Mar 2014

Tools: 10 market surveys on key markets (2013, 2014), 30 individual household interviews incl. farm inventories and transect walks (2014; 5 per village)

Analysis: ABD indices, **S**ummed **D**ominance **R**atio (SDR), SAS STAT (PROC GLM)

4a. Results market inventory

Table 1: Differences in market variables between AEZ

- No significant differences between AEZ
- Fruit diversity was higher in the dry season (data not shown)

Table 1	UM1 *n = 4*		LM2 *n = 2*		LM4 *n = 4*		GLM proc	
	Mean	STD	Mean	STD	Mean	STD	F Value	pr>F
RS (Nov/Dec13)								
H(s)	1.750	+/- 0.233	2.000	+/- 0.057	1.453	+/- 0.706	1.32	.299
Number of stalls	254.5	+/- 116.1	338.5	+/- 13.4	198.5	+/- 141.2	1.23	.322
DS (Feb/Mar14)								
H(s)	1.783	+/- 0.155	1.740	+/- 0.141	1.408	+/- 0.422	0.70	.406
Number of stalls	244.0	+/- 96.8	310.5	+/- 21.9	145.3	+/- 83.0	0.96	.184

Remarks: Rs = Rainy season; DS = Dry season; H(s) = Shannon entropy; Mean = Mean value; STD = standard deviation; pr>F = P-value; α = 5 %

4b. Results farm inventory

Figure 2: Summed Dominance Ratio of species grouped into seven food groups, produced on 30 farms in 3 different AEZ during the dry season

- Vegetables were equally important in UM1 and LM2 and of most importance in LM4
- Importance of fruits increases from UM1 to LM4
- Staples were of major importance in LM4

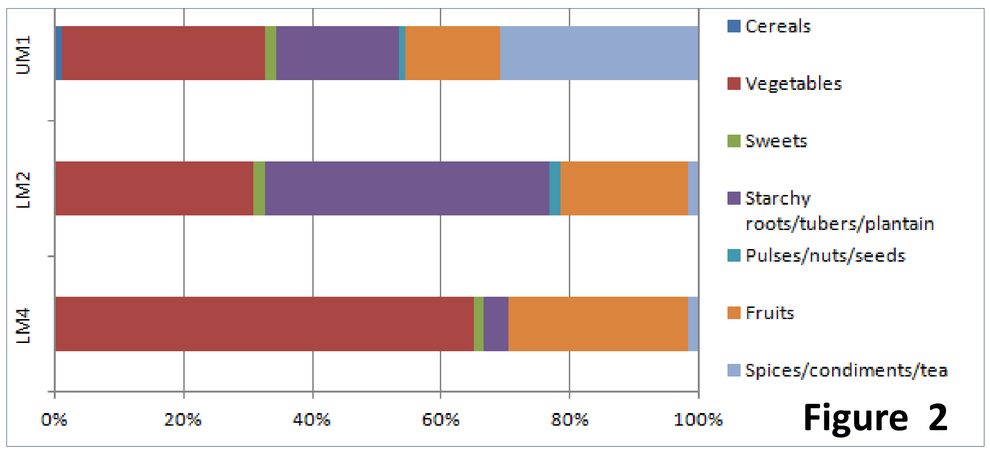


Figure 2

4c. Results farm inventory

Table 2: Differences in diversity between AEZ

- On farm shannon entropy shows significant differences between UM1 and LM4
- On farm species richness is decreasing significantly from the more humid (UM1) to the least humid (LM4) agro-ecological zone

Table 2	UM1 *n = 10*		LM2 *n = 10*		LM4 *n = 10*		GLM procedure	
	Mean	STD	Mean	STD	Mean	STD	F Value	pr>F
on farm								
H(s)	0.945	+/- 0.609	0.644	+/- 0.561	0.774	+/- 0.734	3.25	.042
Species richness	15.4	+/- 5.4	8.7	+/- 4.8	4.0	+/- 2.9	16.10	<.001
wild								
H(s)	0.635	+/- 0.458	0.518	+/- 0.441	0.502	+/- 0.534	0.28	.759
Species richness	3.8	+/- 2.0	4.1	+/- 2.7	4.0	+/- 3.8	0.02	.981

Remarks: Species richness measured in number; H(s) = Shannon entropy; Mean = Mean value; STD = standard deviation; pr>F = P-value; α = 5 %

5. Conclusion / Outlook

- Seasonal changing fruit diversity on markets suggests that challenges with year round fruit availability exist
- Different food groups dominate markets in different AEZs
- ABD differs with changing climatic conditions
- Wild plants are contributing to diets especially, in drier areas where agriculture is more challenging

UM1: Young farmer during field work

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LM4: Variety of pulses sold on the market

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LM2: Typical appearance of a farm during the dry season

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Poster presented at the Tropentag 2014 from 17th – 19th September in Prague, Czech Republic; Field work in Kenya was supported by the GIZ and the CG Research Programme A4NH;

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