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# The dietary diversity, agriculture and nutrition nexus: what are the gaps in knowledge

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CGIAR Science Forum 2013: Breakout session 3: dietary diversification

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- Dietary diversity score is a good indicator but needs refinement
- Can local diets fulfill all nutrient requirements?
- More information on alternatives needed before promoting them

# Overview Dietary Diversity scores

Associated with increase in energy intake and probability of adequacy of micronutrients

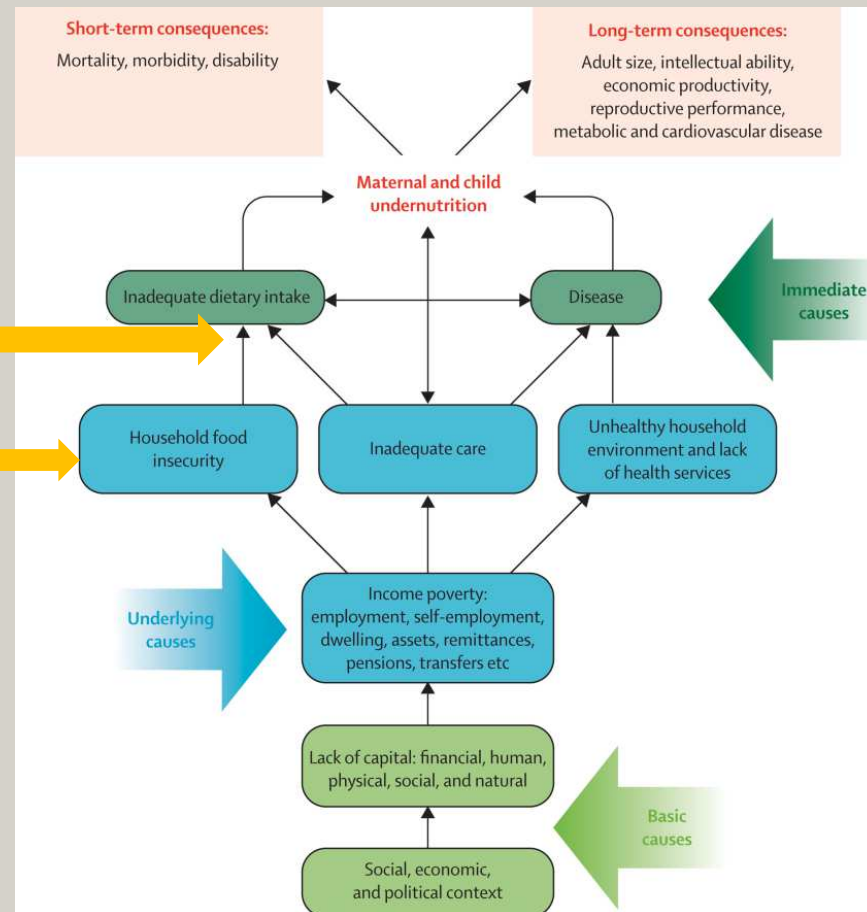
- Individual Dietary Diversity Score
- Minimum Dietary Diversity
- Minimum Meal Frequency

Individual dietary diversity

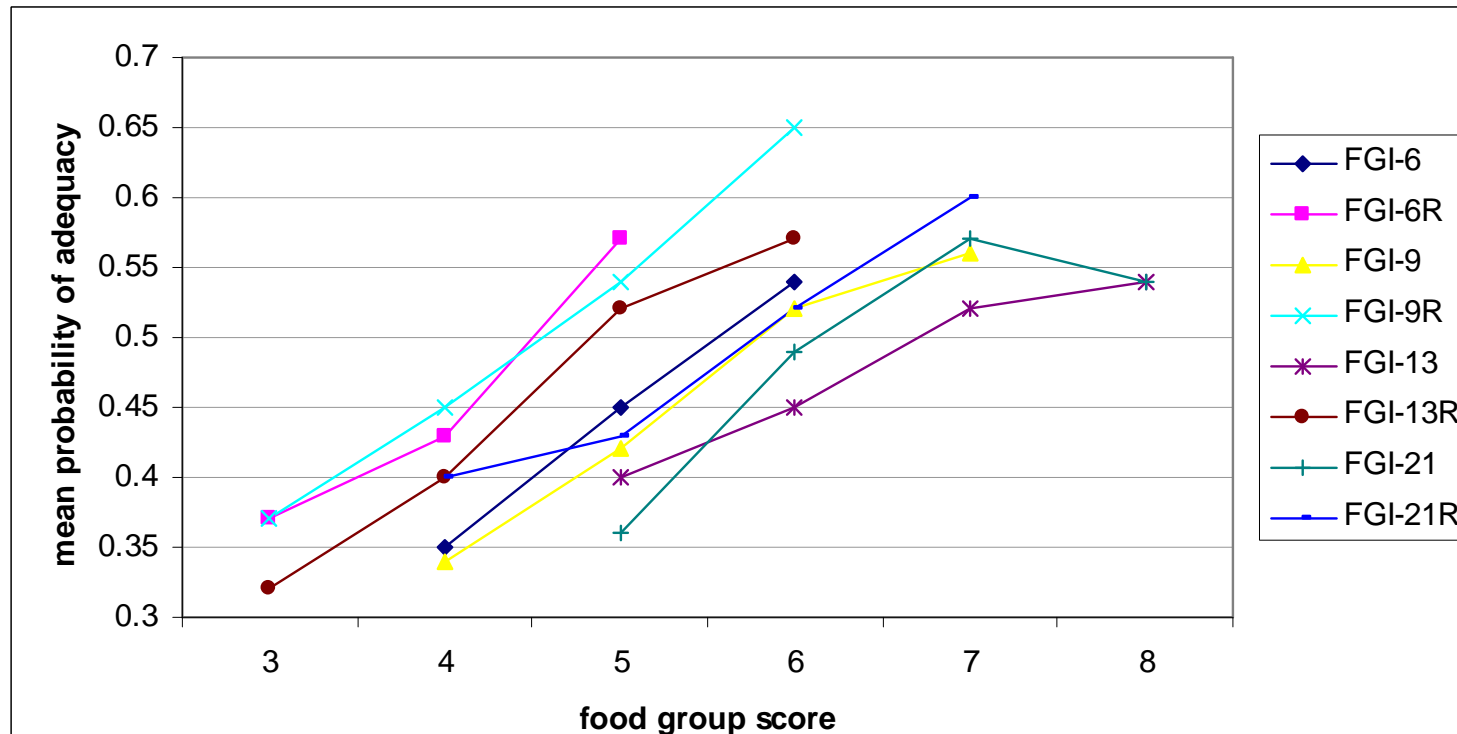
Household dietary diversity

Associated with increase in household per capita daily caloric availability from staples and non-staples

- Household dietary diversity score
- Food consumption score



# Increasing dietary diversity is associated with probability of adequacy of 11 micronutrients



Dietary Diversity Score	Partial correlation	Dietary Diversity Score	Partial correlation
	Adjusted for total energy intake		Adjusted for total energy intake
FGI-6	0.25*	FGI-6R	0.48*
FGI-9	0.33*	FGI-9R	0.48 *
FGI-13	0.27*	FGI-13R	0.38 *
FGI-21	0.32*	FGI-21R	0.41 *



Kennedy et al, 2009

# Limitations of dietary diversity scores

- No cut-off point indicating low or high DDS
- Data on study populations generally low in DDS and MPA
- No consensus on number of food groups to be used in calculating DDS

Association of dietary diversity and mean probability of adequacy in women in 2 seasons, Mbooni District, Kenya

	<b>Post-harvest season</b>	<b>Pre-harvest season</b>
MPA	0.39 ( $\pm$ 0.09)	0.09 ( $\pm$ 0.07)
DDS	4.1 ( $\pm$ 1.2)	3.2 ( $\pm$ 1.3)
Partial correlation MPA - DDS	0.36	0.43


Ngala et al, 2013 (unpublished)



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# Development of food base dietary guidelines based on locally available, acceptable and affordable foods

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- Linear programming: way to select food-based recommendations to determine & to promote optimized diet to fulfill energy and nutrient intakes based on local food habits
- Identification of problem nutrients
- Optifood 
  - Local food habits
    - Foods consumed, portion sizes, frequency, food composition values
  - Constraints
    - Energy requirements, RNIs

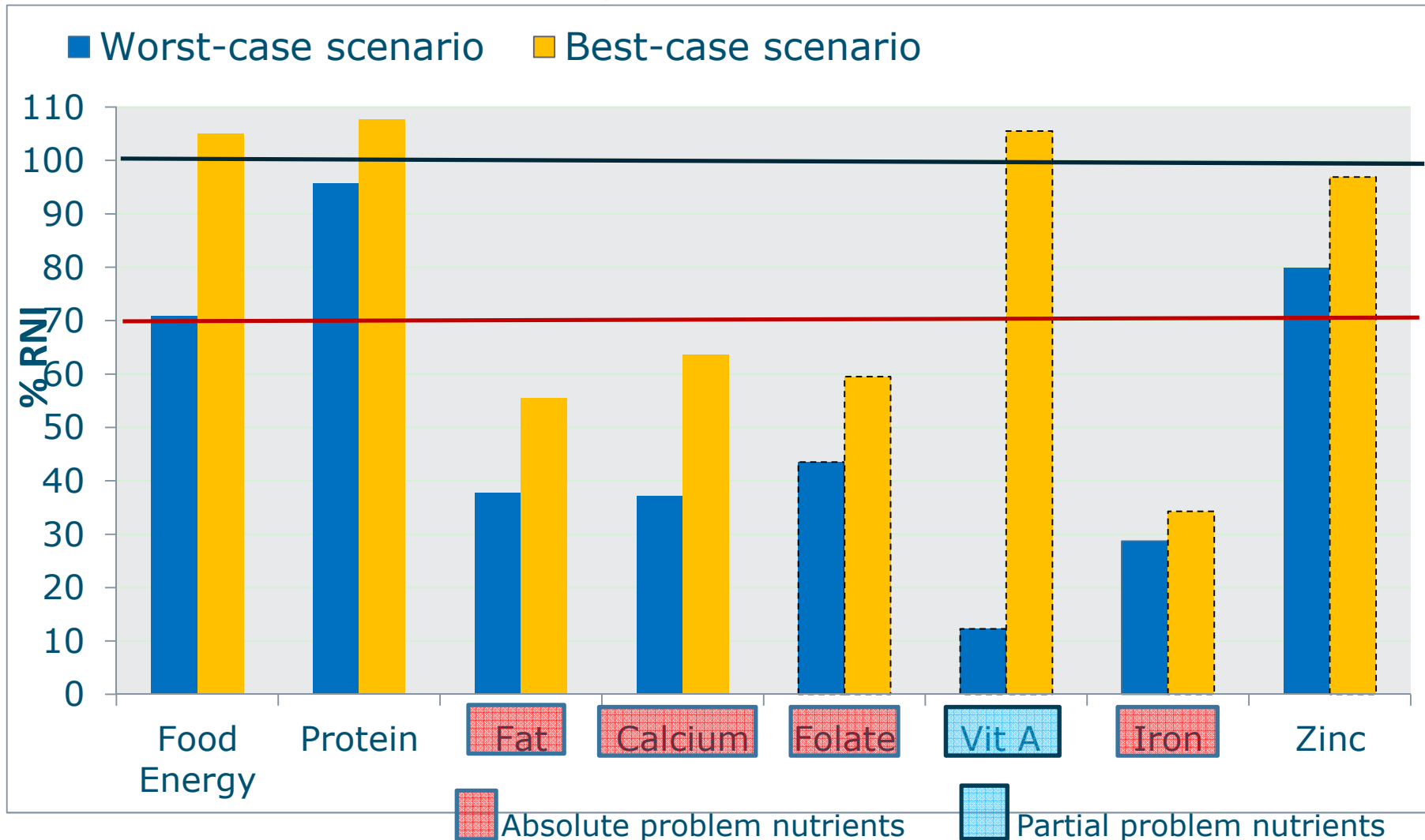


# Food Based Dietary guidelines for women in reproductive age, Kenya

Food groups	# of daily serves/week*		
	Average (50 <sup>th</sup> )	Optimized diet	
Added fats	5	5	+ cooking fat (7)
Added sugars	7	7	
Dairy products	5	5	+ cow milk (7)
Fruits	2	2	
Grains & grain products	14	16	
Legumes, nuts & seeds	5	5	+ beans dry red (5)
Miscellaneous	5	5	
Starchy roots & other starchy plant foods	2	2	
Vegetables	14	18	+ Sukuma Wiki (7)
Snack	5	7	
Starchy Staple	19	23	

Akter et al, 2013 (unpublished)

# Food Based Dietary guidelines for women in reproductive age, Kenya

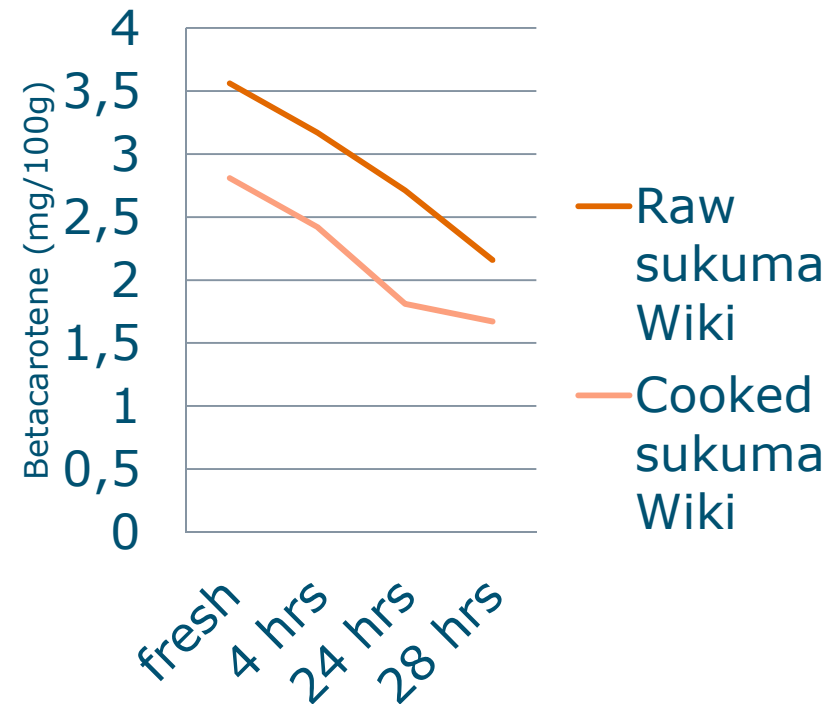




# Can non or under-utilized, wild foods be an alternative solution?

- Quality of food composition tables
  - Varieties/species
  - Nutrient values
  - Retention during processing
- Bioavailability

**Betacarotene retention during storage of fresh and cooked Sukuma Wiki**



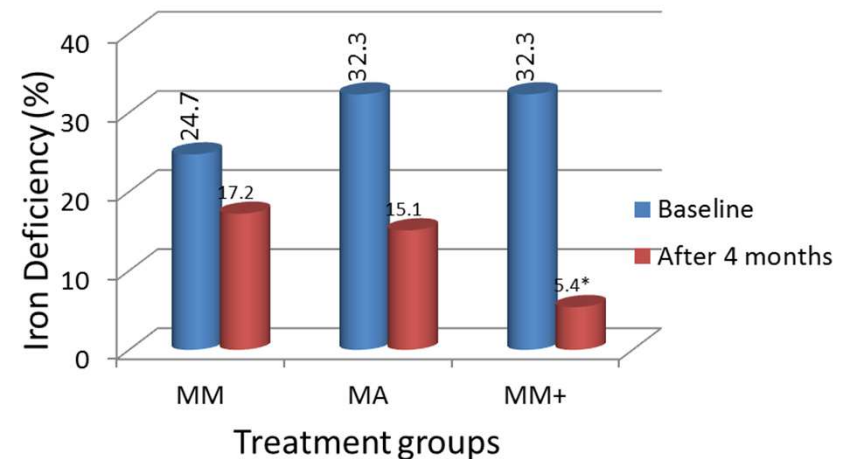
# Can non or under utilized, wild foods be an alternative solution?

- Quality of food composition tables
  - Varieties/species
  - Nutrient values
  - Retention during processing
- Bioavailability?
- Sufficient availability?



- Children 12-59 months, Kenya
- MM=maize porridge, 4.1 mg iron/meal
- MA=maize/amaranth porridge, 23 mg iron/meal
- MM+=maize porridge with MNP, 6.6 mg iron/meal, 2.5 mg as NaFeEDTA

Prevalence of iron deficiency before and after intervention



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# Discussion points

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- Dietary diversity is a good indicator for effect of agriculture interventions on composition of diet and adequacy of intake
  - Need for more refinement of dietary diversity scores
- Improvement of diet with locally available foods may not fulfill all nutrient requirements (Fe, Ca, Zn)
- In search for alternatives, there is need for
  - Improved food composition tables (varieties, species, retention during processing)
  - Information on bioavailability of nutrients
  - Agriculture-sensitive nutrition



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# Thank you

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