The role of food systems in improving maternal and child nutrition in challenging African low-income settings

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Sharing passions, shaping futures

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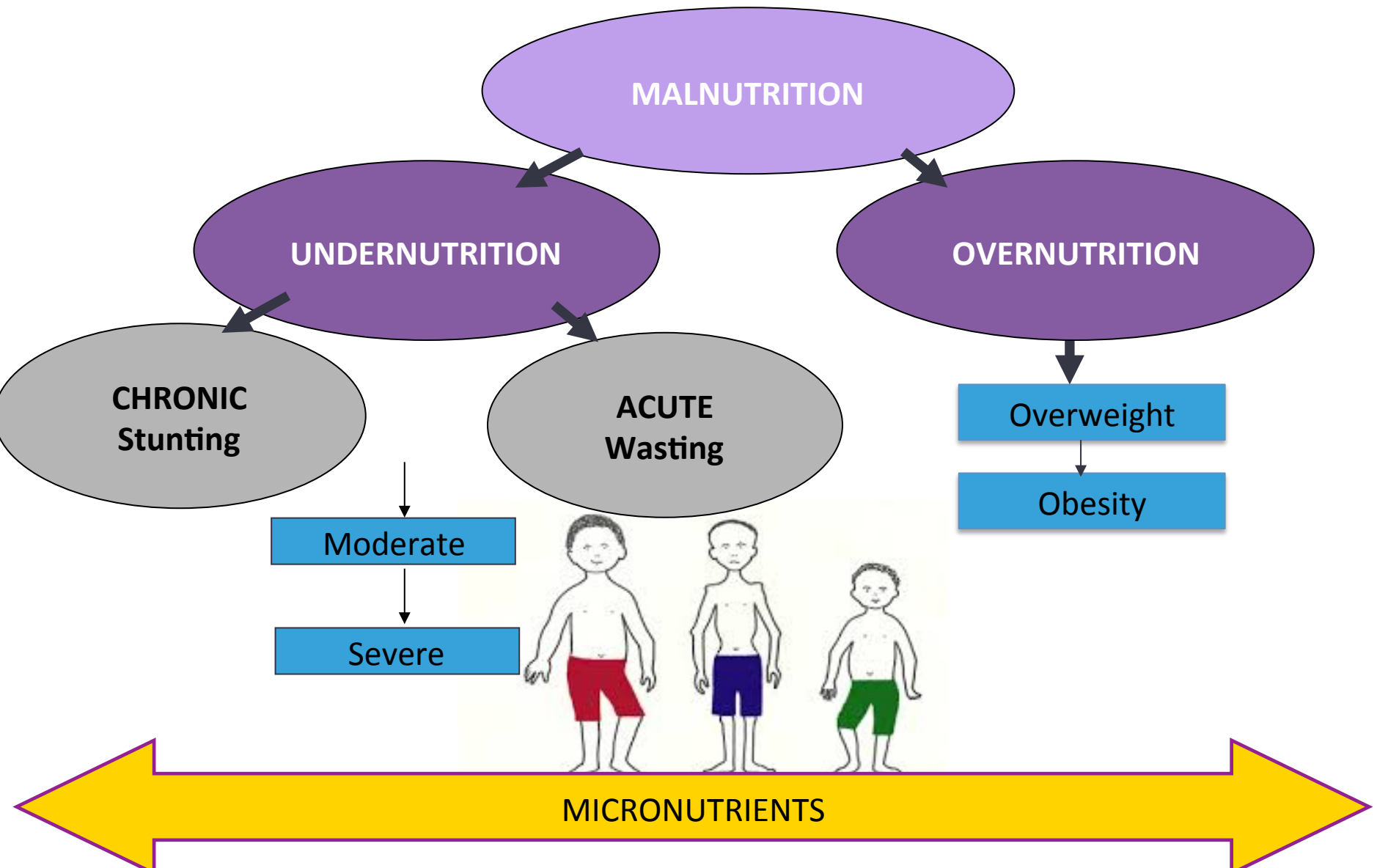
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Sharing passions, shaping futures

Types of malnutrition

Key micronutrients supplied by animal-source foods (ASFs)

Nutrient	ASF source	Consequences of deficits	Availability
Vit A	Dairy Liver Eggs	Blindness, growth faltering, impaired development and immune system increased mortality.	**Preformed vitamin A** (retinol) - almost exclusive of ASFs. Plants contain pro-vitamin A carotenoids, less bioavailable.
Iron	Meat, Fish (Heme iron) Dairy, Eggs (Non-heme iron)	Anaemia; Impaired growth, immune function, child cognitive development and school performance lower work capacity, maternal mortality	**Heme-iron**: higher availability (15-35% absorption) and enhances absorption of non-heme iron **Non-heme iron**: less bioavailable (2-20% absorption) inhibited by phytic acid and fiber of cereal diets.
Calcium	Dairy Fish (with bones)	Nutritional rickets, increased effects of pre-eclampsia	Absorption inhibited by oxalates, phytates and fiber. High calcium (and casein) in milk inhibits absorption non-heme iron.
Vit B2	Dairy Meat and organs Eggs Fish	Stunted growth, skin lesions, cheilosis, angular stomatitis, glossitis, neuropathy,...	
Zinc	Meat and organs Fish. Eggs, Dairy to a lesser extent	Pregnancy complications, low birth weight, impaired immune function, mortality, stunting	ASFs have higher bioavailability than plant sources. Protein increases absorption/ calcium, phytates and fiber inhibit.
Vit B12	All ASFs -only in ASF	Megaloblastic anaemia, demyelinating disorder.	Impaired absorption in elderly

Modified from: Randolph 2007

Livestock value chain analysis

LIVESTOCK VALUE CHAIN ANALYSIS
(Focus group discussions and key informant and individual interviews

Mapping

Governance

Upgrading

Food safety risks

Distribution of benefits

Objectives

Evaluate nutritional status & dietary adequacy

Assess consumer patterns, preferences & demand factors

Investigate determinants of LVC associated with poor nutrition & LVC potential/barriers

MILK BAR

MEAT

Assess potential of ASF in ensuring dietary adequacy

Scale –up research & Intervention design
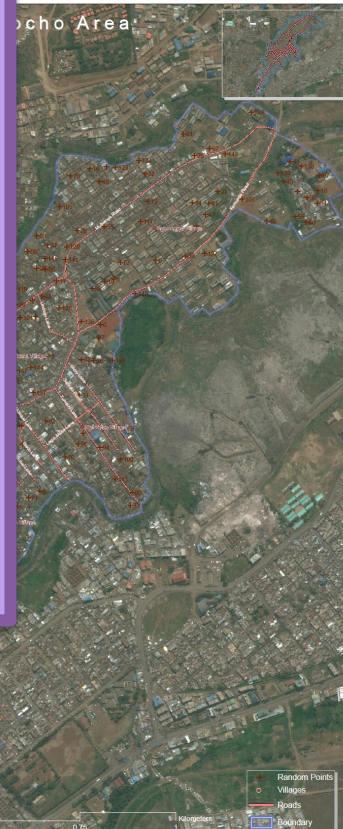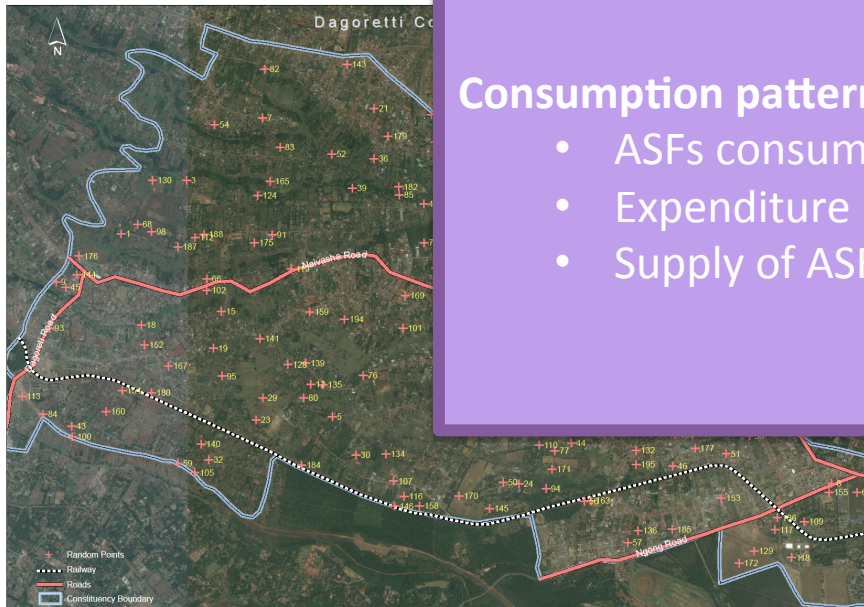
Methods: Cross -sectional

HOUSEHOLD SURVEY

Maternal (non-pregnant women of reproductive age) and child (1-3y) nutrition:
- Anthropometry and hemoglobin
- 24-h recall

Consumption patterns of ASF
- ASFs consumption (what, when, why, who?)
- Expenditure in ASFs (how much)
- Supply of ASFs (from where and why)

Nairobi Slums malnutrition key findings:
- Underweight- Children: Stunting 41%; Wasting: 4%
- Overweight -Women: Overweight: 19%; Obesity: 10%
- Anaemia: Children 74%; Women: 26%

Population-based diet recommendations -women

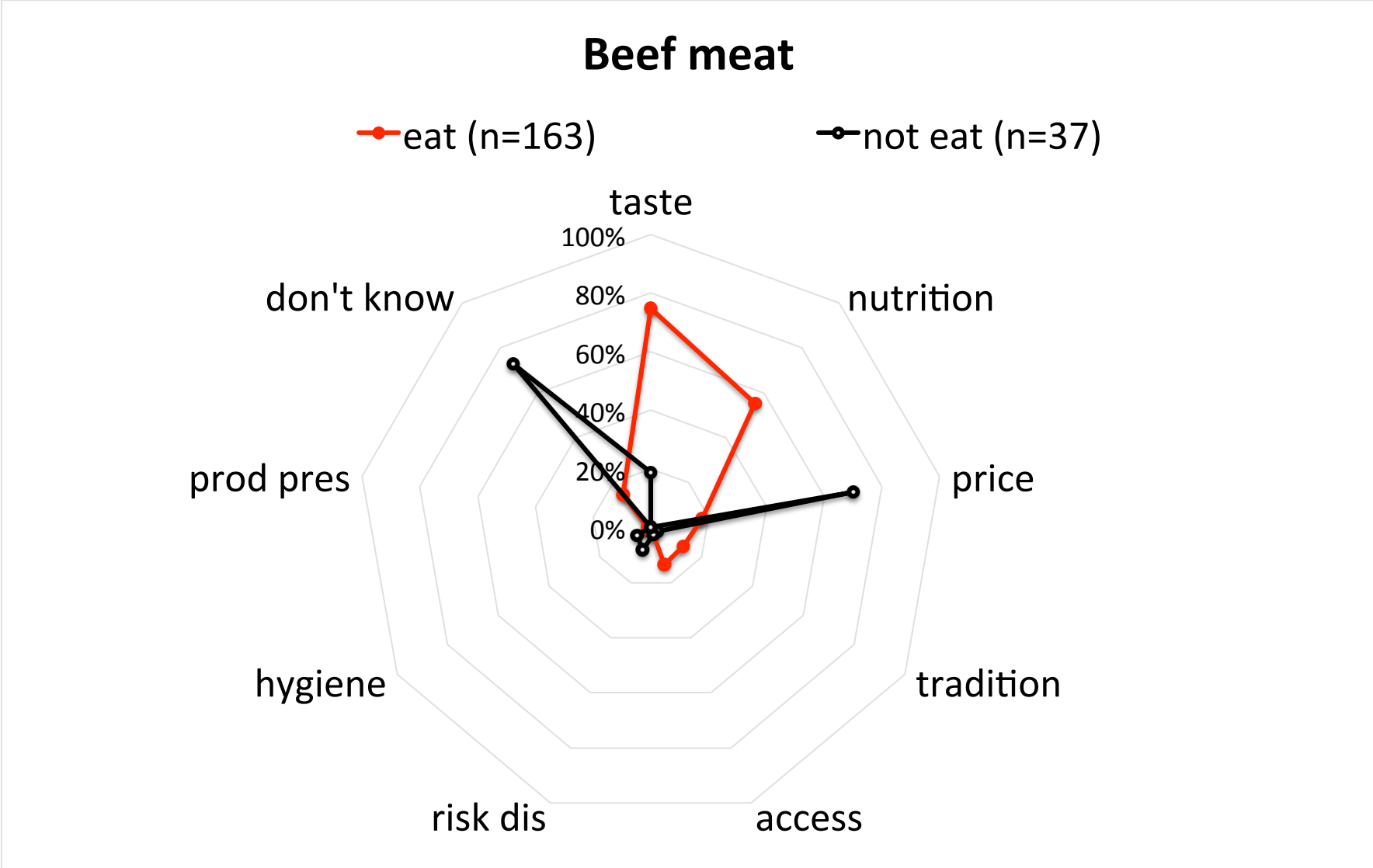| Nutrient % covered by the recommendations	Vit C	B1	B2	B3	B6	Fol	B12	Vit A	Ca	Fe	Zn	Cost/day [KES]	N
Best possible individual diet	273.4	166.8	238.5	145.5	192	220.7	869.9	847.7	100	81	427.6	229.2	11
No recommendations	9	69.3	79.3	54	62.1	33	336.1	30.2	12	21.7	150.6	80.1	3
1. 7p/wk Fruit	99.6	70.7	81.9	57	79.8	41.4	336.1	46	14.2	21.7	150.6	87.1	5
2. Rec 1 + 28p/wk Vegetables	186.2	81.9	91.9	64.4	98.8	50	336.1	130.9	18.9	24.3	154.2	91.9	7
3. Rec 1 +2 + 7 p/wk Pulses	193.9	114.5	94.8	64.4	109.5	130.5	336.1	130.9	24.8	30	163.5	91.9	8
4. Rec 1 + 2+ 3 + 28 p/wk Dairy	198.4	116	144.4	64.4	109.7	132.3	379.9	177.5	81.6	30	176.1	125.4	9
5. Rec 1 + 2+ 3 + 4 + 21 p/wk ASF	198.4	116	148.7	70.8	114.4	132.3	404.5	177.9	81.8	34.1	186.6	141.6	10
6. Rec 1 + 2+ 3 + 4 + 21 p/wk ASF (7 egg- 4 red meat- 4 poultry- 3 sausage)	198.4	126.8	172.3	89.8	140.7	146.4	1273.6	227.2	83.6	46.6	300	172.9	10

ASF own-price and income elasticities

ASF own-/ cross- price elasticities	Beef meat	Offal	Processed meat	Fresh milk	Fermented milk	Eggs	Fish	Other meats	Broiler chicken
Beef meat	**-0.95****	-0.38**	0.22	-0.19*	0.18	-0.15	-0.30**	0.27	-0.01
Offal	-0.56**	**-1.62****	0.09	0.07	0.43	0.52**	-0.03	0.17	-0.24
Processed meat	0.5	0.16	**-1.34***	0.06	0.01	0.93**	-0.09	0.82*	-0.24
Fresh milk	0.009	0.11*	-0.003	**-1.08****	0.15	0.03	0.1**	-0.09	0.15*
Fermented milk	0.47	0.65	0.03	0.85**	**-2.4****	0.19	0.09	0.44	-0.06
Eggs	-0.26	0.76**	0.88**	-0.04	0.25	**0.22**	-0.14	0.82*	0.20
Fish	-0.20*	0.03	-0.04	0.38**	0.03	0.02	**-1.09****	-0.44**	0.21
Other meats	0.29	0.14	0.41*	-0.19	0.21	0.44*	-0.49*	**-0.81***	0.22
Broiler chicken	-0.05	-0.19	-0.15	0.07	-0.06	-0.14	0.16	0.49	**-1.90****
Expenditure elasticities	**1.35****	**1.38****	**0.81****	**0.82****	**0.28**	**1.17****	**0.52****	**0.98****	**1.47****

HHs allocated on average 42% of their food expenditure to ASFs, of which 52% were allocated to dairy products and 13% to beef.

*significant at least p<0.1; **p<0.05

ASF choice drivers: Why is it (not) consumed?

Beef meat

eat (n=163)   not eat (n=37)

Radar chart axes (clockwise from top): taste, nutrition, price, tradition, access, risk dis, hygiene, prod pres, don't know. Scale: 0%, 20%, 40%, 60%, 80%, 100%.

Dairy demand-supply considerations

Consumption → 98.5% of HHs
5.5 times/week/HH

Why YES

Nutrition: 68%
Taste: 65%

Why NOT

Access: 73%
Price: 40%

Elasticity

-1.08 own-price

Value chain issues

- Key **retailers**:
  - Milk bars (raw, informal traders),
  - Kiosks (mainly processed, large companies),
  - Slum producers (raw).
- In some slums, factories sell milk about to expire at a cheaper price.
- Mainly women-dominated chain.

- **Processed milk** is controlled by few large companies.
- Important **wastage** in large companies
- Informal sector: Food safety risks due to **adulteration**, lack of **cold chain**, inadequate transport, **poor hygiene**, **antimicrobial use**, lack of licensing, regulation and training.

Final remarks

- **'Triple burden'** of malnutrition → think food systems backwards from consumer's nutrition gaps/problems

- Importance of ASFs in malnutrition → **nutrition-sensitive** livestock value chain approaches are necessary

- **Food choice drivers** influence ASF strategies success: economic (price, income), biological (taste, health), physical (access, appearance), cultural (religion, peer)

- This supply-demand approach allows to identify safe **entry points in the livestock value chains** that optimise nutrition

THANK YOU!!

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