Leveraging food-based recommendations for women and children in Nairobi slums with animal source foods

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Introduction and aim

- Adequate nutrition is key for the achievement of the **Sustainable Development Goals**.
- In Nairobi slums, rapid **urbanisation** is creating a strain on the **food supply**.
- Low intakes of high quality foods, such as **micronutrient-dense animal-source foods** (ASFs), likely contribute to observed high rates of stunting and micronutrient deficiencies
- Enhancing the **accessibility** of ASFs is one strategy that may help to alleviate micronutrient deficiencies of urban poor.
- The aim of this research was to investigate how the use of local ASFs might enhance dietary adequacy, for Nairobi slum dwellers, to inform nutrition-sensitive food systems interventions.

Photo: Street in Korogocho, E. Fèvre

Methodology

- **Cross-sectional survey:** n=205 randomly selected low-income households (HH), from informal settlements (Dagoretti/Korogocho).
- Target: Non-pregnant **women** of reproductive age, **children** of 12-36 m.
- Data collected: **24-h dietary recalls**, **anthropometry** and **haemoglobin level**, ASF **consumption patterns** and **expenditure**.
- Uncompensated **price elasticity** of ASF demand and **expenditure elasticity** of demand were calculated.
- **Linear programming** (in OptiFood) was used to formulate population-specific **food-based recommendations** and identify **micronutrient gaps** that could not be filled using local foods as consumed.

Photos: Household dietary assessment in Dagoretti, G. Giarratana

Preliminary results

- 53 % of the HH reported monthly income <5000 KSH (≈58$)
- Among 1-3 y old children: 41% (CI=35-48%) were stunted, 4% (CI=2-7%) were wasted, and 74% (CI=68-80%) had anaemia.
- Among the women, 7% (CI=4-11%) had low and 29% (CI=23-36%) had high body-mass index (BMI), and 26% (CI=20-32%) had anaemia
- HHs allocated on average 42% of their food expenditure to ASFs, of which 52% were allocated to dairy products and 13% to beef.
- **Key drivers for not consuming** ASFs were price and accessibility, hygiene considerations were also mentioned;
- **Key drivers for consuming** ASF were taste and nutrition.
- Across ASFs, **price demands** for beef and goat were least elastic, whereas the demands for fermented milk were most elastic. A 10% increase in the price of beef would result in a 6.8% decrease in its consumption and in a 18.5% reduction of fermented milk consumption (**Table 1**).

- Fermented milk had highest **expenditure elasticity** and fresh milk lowest (increase in income by 10% would lead to an increase in expenditure on fermented milk by 16.7% and by 8.5% on fresh milk) (**Table 1**).

Demand elasticity/ASF	Beef meat	Offal	Fresh milk	Ferm. milk	Eggs	Goat	Poultry
Own price elasticity	-0.68*	-1.32*	-0.82*	-1.85*	-0.81*	-0.74*	-1.32*
Expenditure elasticity	1.28*	1.03*	0.85*	1.67*	0.89*	-0.98*	0.96*

Table 1: ASF commodities with most and least elastic demands (* significant at least p<0.05). Preliminary results

- The key **micronutrient gaps** were iron in the women's diets and iron and zinc in the children's diets (**Table 2 and Figure 1**).
- Diet modelling predicts food-based recommendations can ensure dietary adequacy for all nutrients except iron for women, and iron and niacin for children, as long as they include 2-3 servings/d of meat, fish or eggs and 3 servings/d of dairy (**Table 2 and Figure 1**).
- The cost relative to incomes to improve dietary adequacy is high (**Table 2**).

Recommendation ¦ Nutrient	VitC%	VitB1%	VitB2%	VitB3%	VitB6%	Fol%	VitB12%	VitA%	Ca%	Fe%	Zn%	Cost	N. req met
Best possible diet	342.6	175.9	221.8	116.3	173.8	218.9	939.7	629.4	100	65.7	301.5	194.7	11
No recomm	13.3	74	79.8	50.6	57	40.7	682.9	45.6	12.7	20.9	133	70.9	4
1. 7 p/wk Fruit	103.9	75.4	82.6	54	74.9	49.2	683	61.8	14.9	20.9	133	82.2	6
2. Rec 1 + 21 p/wk Dairy	109.8	76.2	128.9	54	75	49.2	715.3	90.5	63.8	20.9	138.3	114.9	7
3. Rec 1 + 2 + 28 p/wk Vegetables	204.5	91	141.5	64.2	98.5	58.7	715.6	183.8	69.1	24.3	148.2	126.5	8
4. Rec 1 + 2 + 3 + 21 p /wk Other ASF (7 eggs)	204.5	91	146	76.3	107.7	58.7	746.1	185	69.9	29.9	167.9	150.3	9
5. Rec 1 + 2 + 3 + 4 + 7 p/wk legumes	211	120.2	156.5	76.5	125.6	130	746.1	204.8	76.9	36.2	198.9	154	10
6. Rec 1 +2 + 3 + 5 + 21 p/wk ASF (7 eggs, 4 poultry, 4 red meat)	211	122	162.4	84.5	127.6	130.3	754.6	212.8	76.9	40.8	223	160.2	10

Table 2: Weekly food based recommendations for women of reproductive age (cumulative). Preliminary results.
P/wk= servings per week , N req met= number of micronutrient requirements met

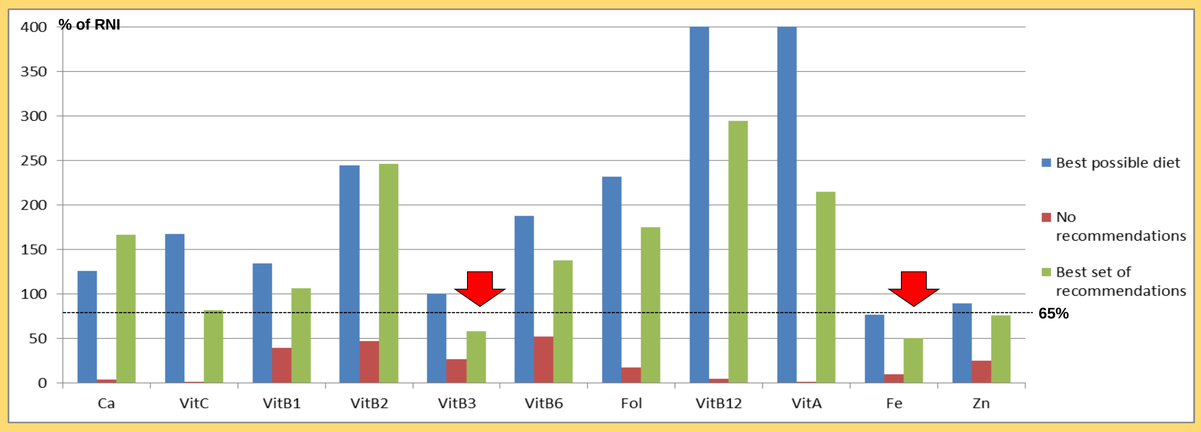

Figure 1: % of the desired micronutrient density (RNI) for non breastfed children 1-3 y (cumulative). Preliminary results. Best set of recommendations included: 28servings/week of vegetables (incl .7 of green leaves), 21 of dairy, 7 of legumes and 21 of Meat, Fish and Eggs (incl. 7 egg, 3 red meat, 2 offal and 4 sausages).

Discussion

- For women and children in Nairobi slums, ASF foods are required to ensure dietary adequacy for most nutrients.
- For iron and niacin, additional strategies might be required (fortification).
- The modelled lowest cost of a diet to improve dietary adequacy, however, exceeds average household food expenditure budgets.
- Livestock value chains present good potential to contribute to safe and sustainable micronutrient supply in Nairobi slums (e.g. increase accessibility through price reduction, better distribution, new product development, etc.).
- Consumer choice in the slums is largely driven by price and accessibility although nutrition education could also play a role because taste and nutrition also influence food choice

Acknowledgments:

The project was supported by CGIAR A4NH research programme, MRC/ BBRC/ ESRC/ NERC through Grant Ref G1100783/1, and LCIRAH.

Optifood is designed by WHO/ LSHTM.
Food Composition Tables and Photo books were compiled by the Micronutrient Initiative & Kenya Medical Research Institute (KEMRI), supported by the Government of Canada.