Tanzania HCES Analysis and TFNC Training,

11th December 2023

Using Household Consumption and Expenditure Survey Tools To Understand Diets and Sub-National Micronutrient Intake in Malawi

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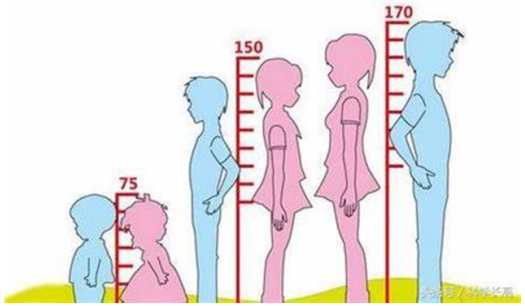
USAID FROM THE AMERICAN PEOPLE

MAPS www.micronutrient.support

Assessment of micronutrient intake and status

Dietary data	Biochemical data	Anthropometric/clinical data
		
Inadequate micronutrient intake	Micronutrient deficiency	Nutritional depletion

✓ Poor quality diets are a main cause of micronutrient deficiencies

Ref. Gibson R. (2005) Principles of nutritional assessment

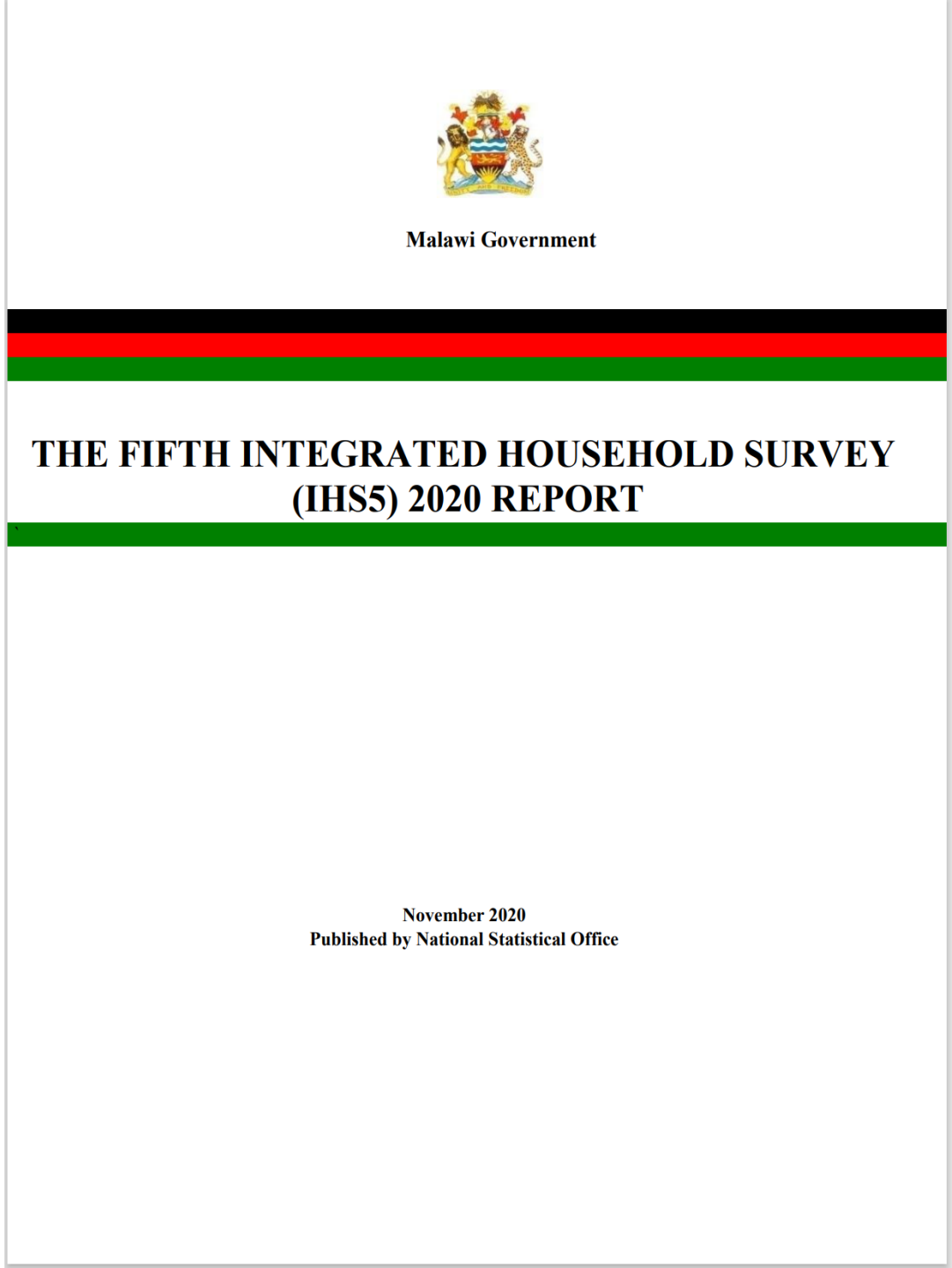
HCES in Malawi

"Integrated Household Survey (IHS)"

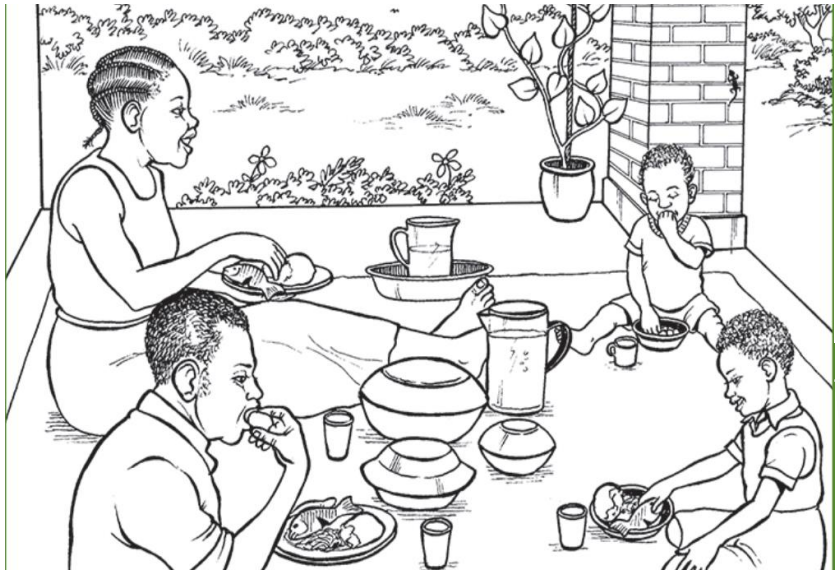
Implemented 5 in total

1) IHS1: 1997/98
2) IHS2: 2004/05
3) IHS3: 2010/11
4) IHS4: 2016/17
5) **IHS5: 2019/20**

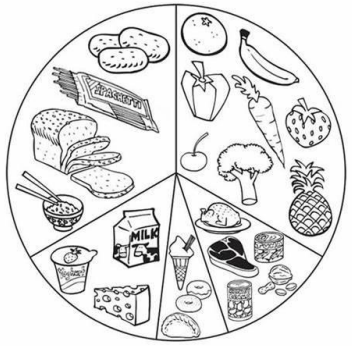
Ref. microdata.worldbank.org



The Nutritional power of HCES

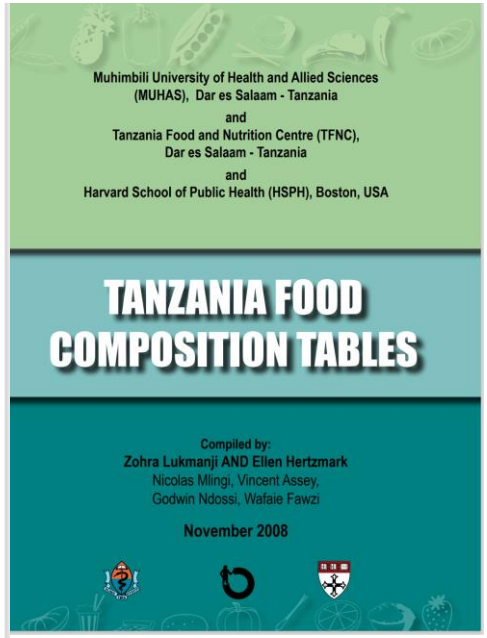


Food consumption data from HCES



Food groups

Food composition data

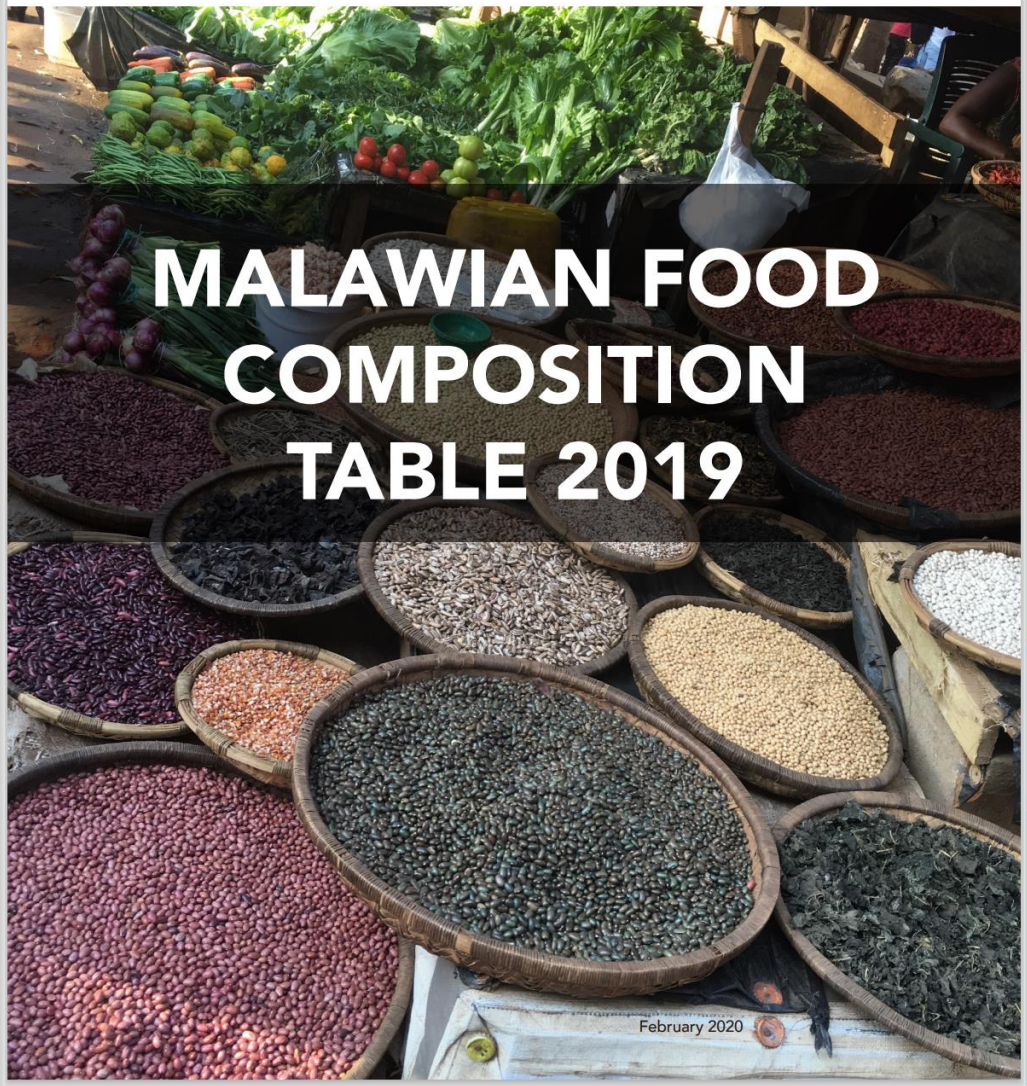


Malawi Government

THE FIFTH INTEGRATED HOUSEHOLD SURVEY (IHS5) 2020 REPORT

November 2020
Published by National Statistical Office

GOVERNMENT OF MALAWI



MALAWIAN FOOD COMPOSITION TABLE 2019

February 2020

West African Food Composition Table

Table de composition des aliments d´Afrique de l´Ouest

2012

Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam - Tanzania
and
Tanzania Food and Nutrition Centre (TFNC), Dar es Salaam - Tanzania
and
Harvard School of Public Health (HSPH), Boston, USA

TANZANIA FOOD COMPOSITION TABLES

Compiled by:
Zohra Lukmanji AND Ellen Hertzmark
Nicolas Mlingi, Vincent Assey, Godwin Ndossi, Wafaie Fawzi

November 2008

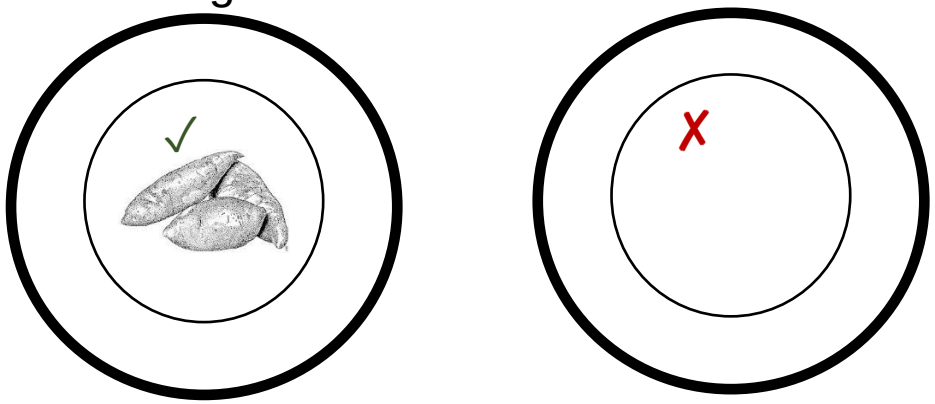
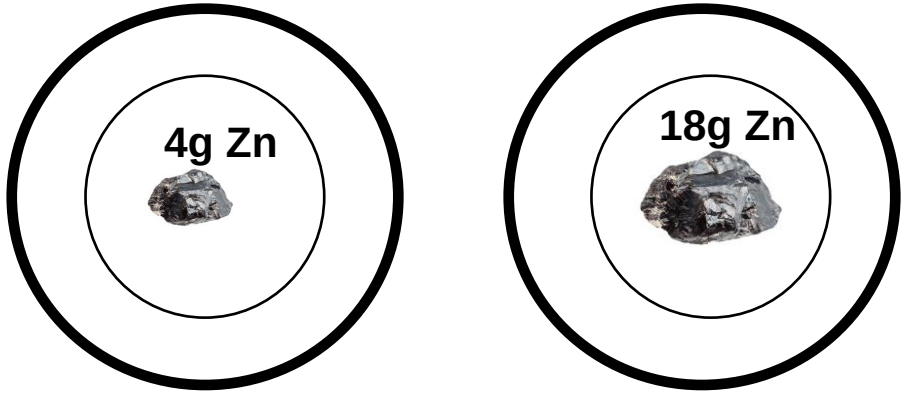
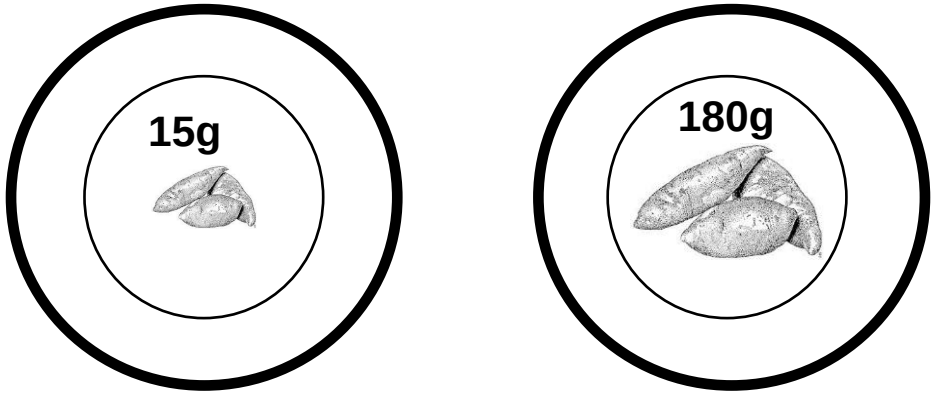
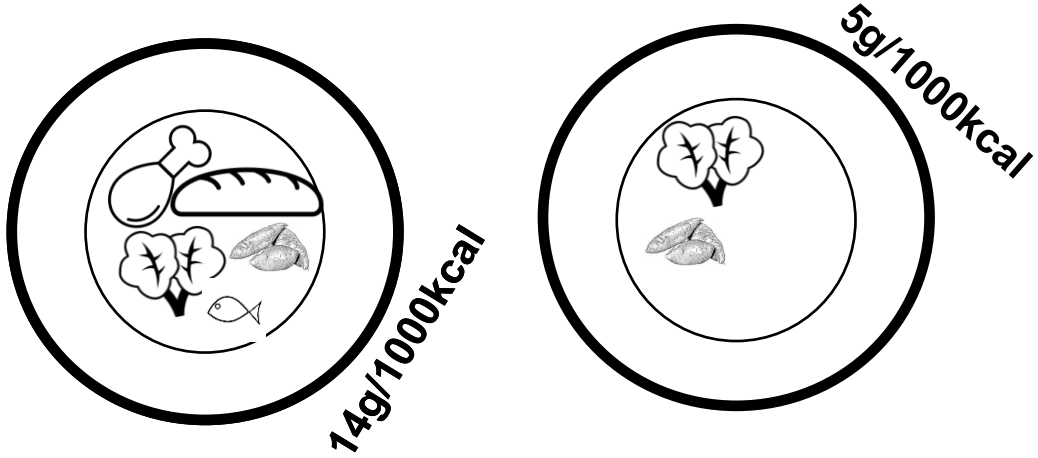
Base data: Food consumption data

Malawi's Fifth Integrated Household Survey (IHS5)

Time horizon	April 2019 – April 2020
Enumeration areas	717 (x16 households)
Households (N)	11,434
Items on food item list	142
Dietary recall unit	Household
Dietary recall period	7 days

Ref. microdata.worldbank.org

Micronutrient Metrics Derived from HCES

Assess the food vehicle [Food-Based]	Predict the contribution of intervention [Micronutrient-Based]
1. Coverage 	3. Apparent micronutrient intake 
2. Apparent food consumption quantity 	4. Micronutrient density [**MN supply: Energy supply**] 

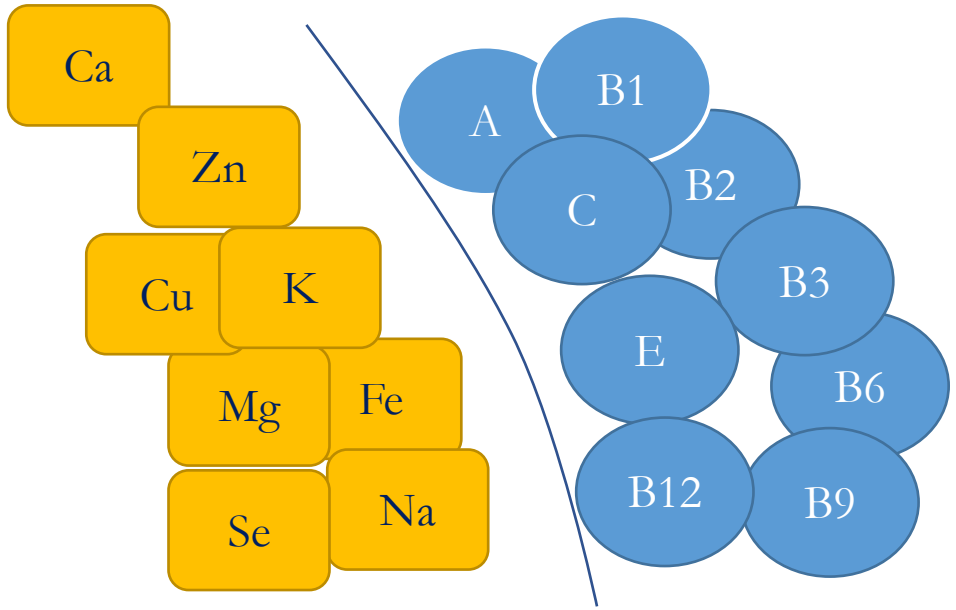
Tang et al. (2021)

What useful insights about micronutrients supplied through diet can be derived from HCES?

What useful insights about micronutrients supplied through diet can be derived from HCES

✓ We estimated deficiency risks for 17 micronutrients due to inadequate dietary intakes in Malawi, estimated from household consumption and expenditure survey data (IHS5)

8 Minerals **9 Vitamins**



Application of HCES

Percentage of households with inadequate apparent intake and micronutrient density for 17 micronutrients, Malawi (n=11,432)

Micronutrient	Inadequate apparent intake %	Inadequate nutrient density %
Vitamin		
Vitamin A	48.4	40.8
Vitamin C	57.8	52.2
Vitamin E	64.1	61.3
Vitamin B-1	21.6	8.7
Vitamin B-2	92.2	99.0
Vitamin B-3	63.3	61.5
Vitamin B-6	39.4	22.1
Vitamin B-9	42.0	28.0
Vitamin B-12	78.3	77.7
Mineral		
Calcium (mg)	80.6	80.8
Copper (µg)	12.4	0.5
Iron (mg)	77.2	74.7
Magnesium (mg)	18.7	3.5
Potassium (mg)	51.7	41.5
Sodium (mg)	5.6	0
Selenium (µg)	54.6	37.9
Zinc (mg)	72.8	73.1

✓ Estimating the prevalence of micronutrient inadequacy

Osman et al., [In prep]

Application of HCES

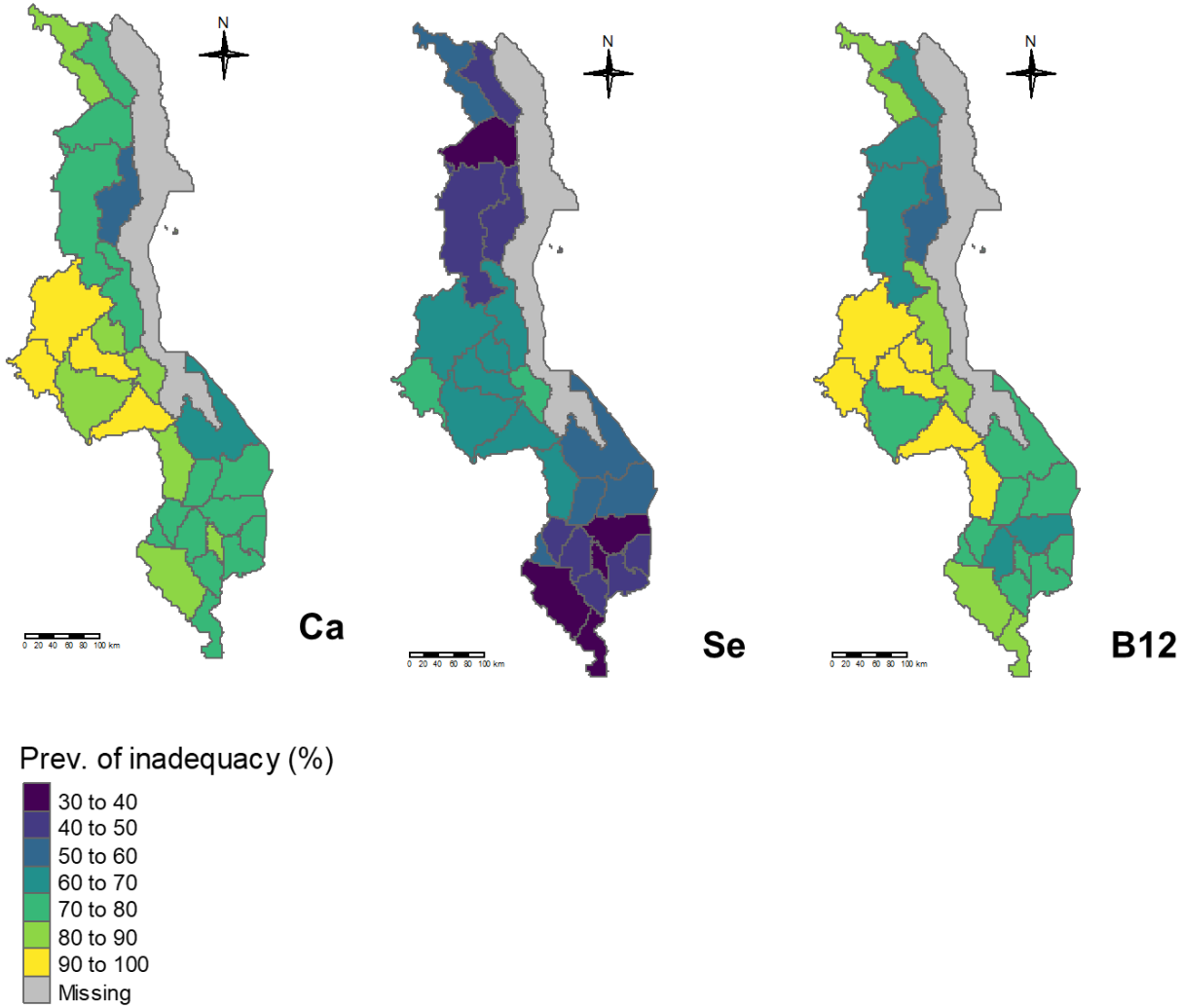
Median apparent consumption of Ca, Fe, Zn, and Se among consumers per adult female equivalent (AFE) per day

Population	Households (n)	Calcium (mg)	Iron (mg)	Selenium (µg)	Zinc (mg)
		Median/AFE/d			
National (total)	**11,432**	434.0	17.0	42.0	7.3
Administrative region					
North	**2176**	461.8	16.9	45.1	7.1
Central	**3951**	340.3	14.3	36.4	6.3
South	**5305**	521.7	20.0	47.4	8.2
Residence & socioeconomic position (SEP) by quintile of total annual household expenditure per capita					
Rural	9342	421.9	17.1	41.0	7.2
Lowest SEP	1869	232.9	11.2	24.3	4.6
Lower Middle SEP	1869	329.1	15.0	34.5	6.3
Middle SEP	1868	405.6	18.2	42.3	7.6
Higher Middle SEP	1868	508.3	20.8	52.3	9.0
Highest SEP	1868	750.1	27.4	75.5	12.1
Urban	2090	498.7	16.5	47.2	7.6
Lowest SEP	418	289.0	11.8	29.8	5.2
Lower Middle SEP	419	419.0	14.6	40.4	6.5
Middle SEP	418	500.4	16.2	49.1	7.4
Upper Middle SEP	417	594.0	19.5	57.4	8.9
Highest SEP	418	843.0	25.9	80.4	12.2

✓ *Estimating nutrient intake levels e.g., Zinc in mg/day/AFE*

Osman et al., [In prep]

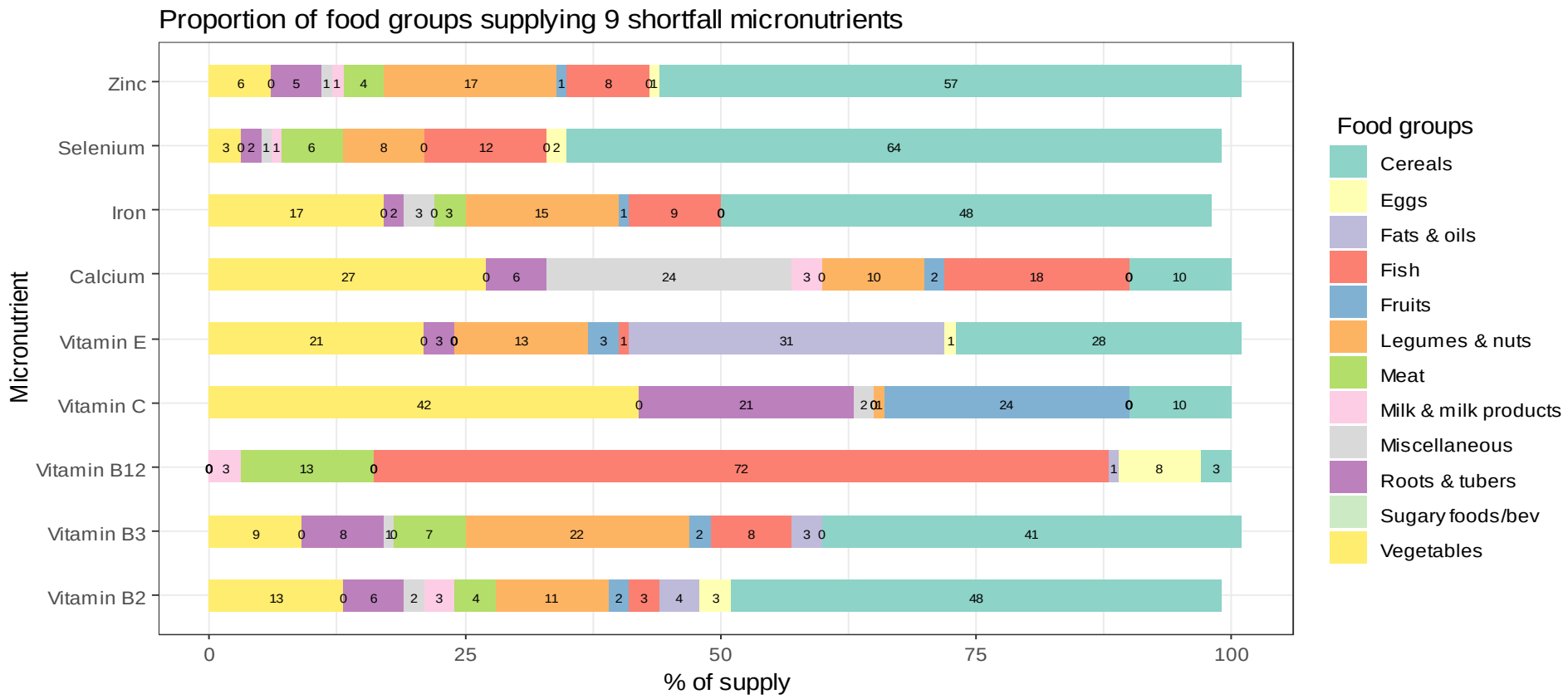
Application of HCES



- ✓ Identify spatial variation in the populations that are potentially at risk due to inadequate diets

Osman et al., [In prep]

Application of HCES

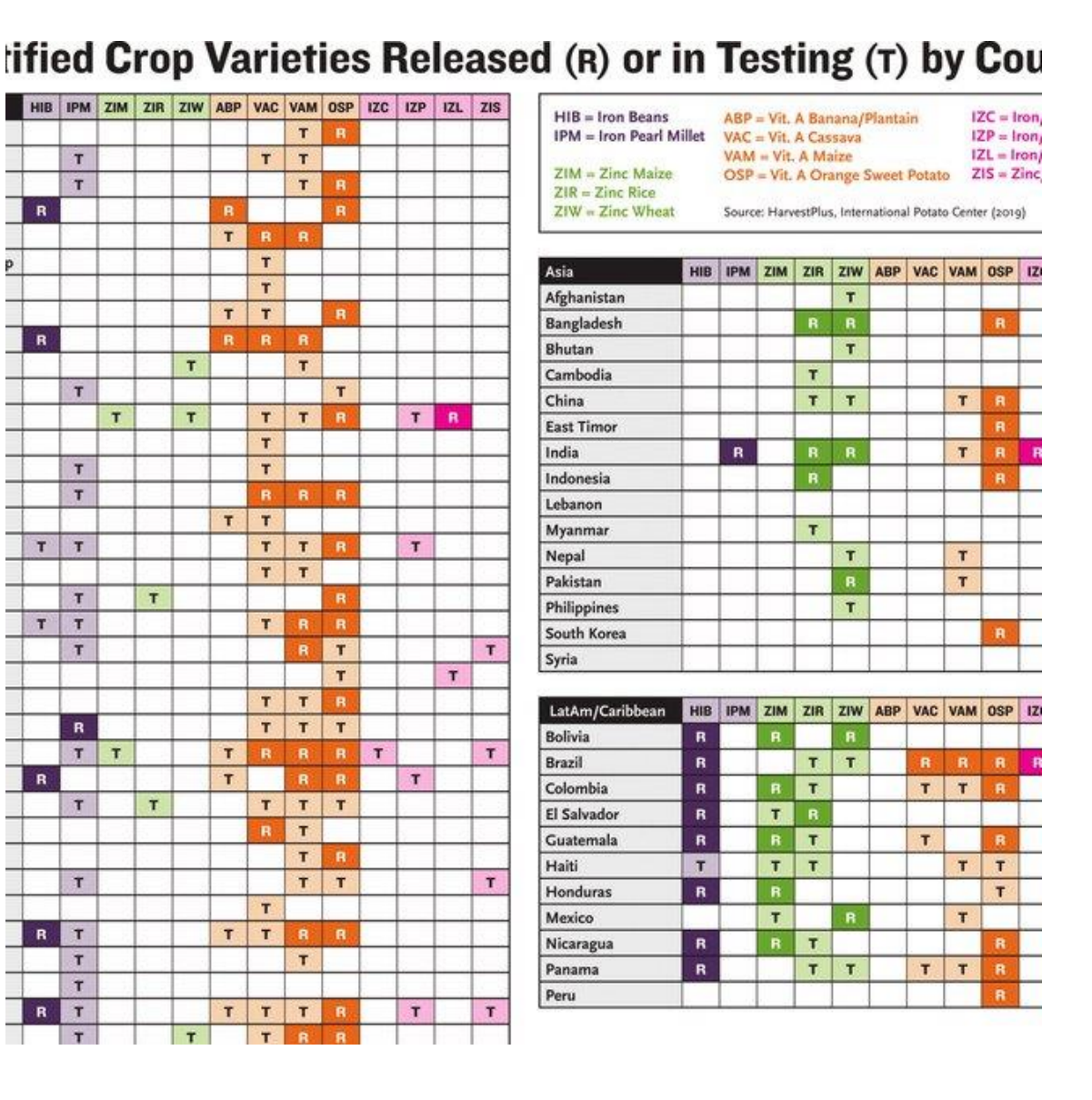


- ✓ Identify key food sources of nutrients
- ✓ Dietary diversity/patterns

Osman et al., [In prep]

What useful insights about micronutrients supplied through diet can be derived from HCES

- ✓ Modelling the potential contribution of biofortified crop interventions in Malawi



tified Crop Varieties Released (R) or in Testing (T) by Cou

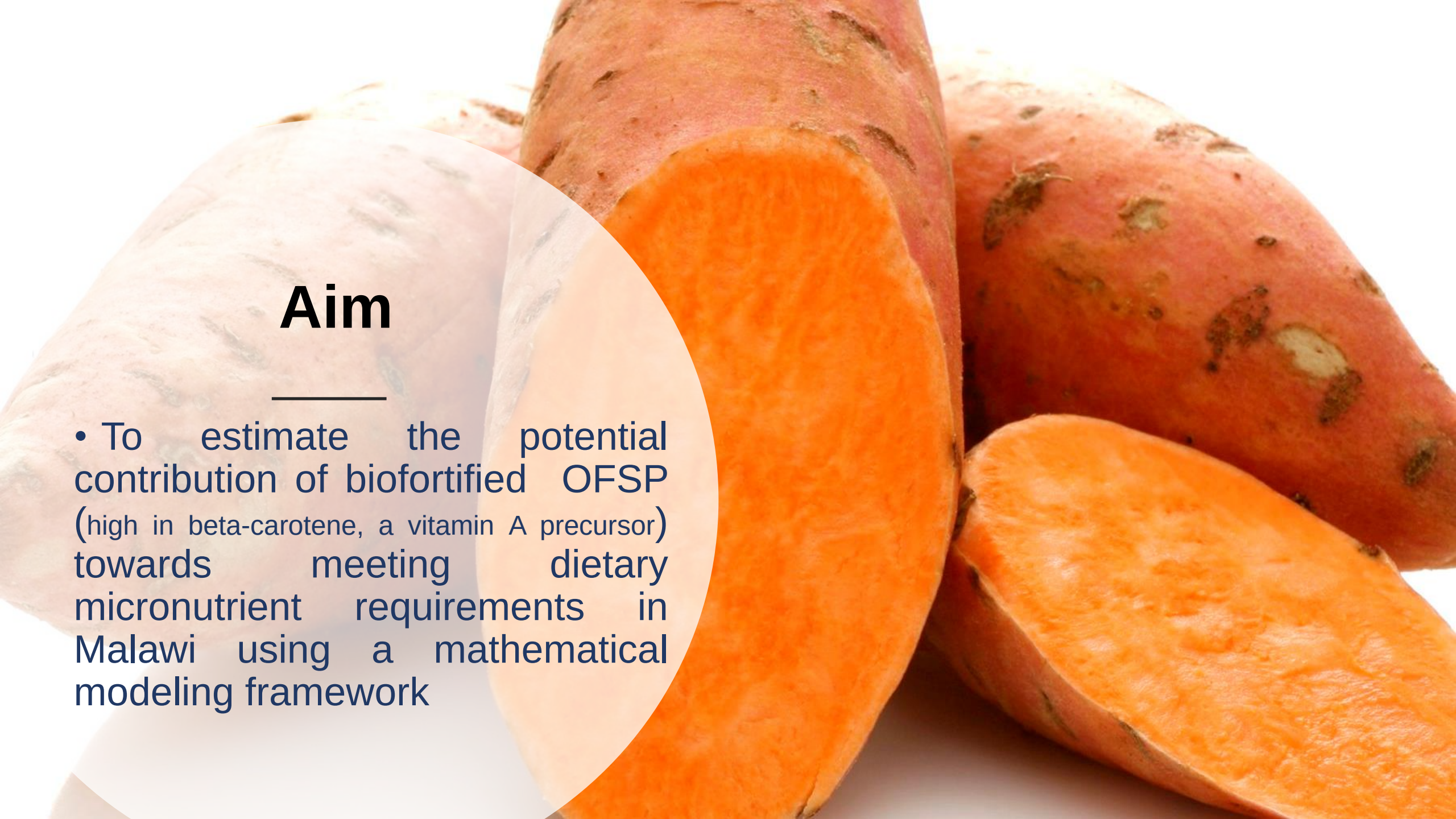
HIB = Iron Beans
IPM = Iron Pearl Millet
ZIM = Zinc Maize
ZIR = Zinc Rice
ZIW = Zinc Wheat
ABP = Vit. A Banana/Plantain
VAC = Vit. A Cassava
VAM = Vit. A Maize
OSP = Vit. A Orange Sweet Potato
IZC = Iron
IZP = Iron
IZL = Iron
ZIS = Zinc

Source: HarvestPlus, International Potato Center (2019)

Asia	HIB	IPM	ZIM	ZIR	ZIW	ABP	VAC	VAM	OSP	IZ
Afghanistan					T					
Bangladesh				R	R				R	
Bhutan					T					
Cambodia				T						
China				T	T			T	R	
East Timor									R	
India		R		R	R			T	R	R
Indonesia				R					R	
Lebanon										
Myanmar				T						
Nepal					T			T		
Pakistan					R			T		
Philippines					T					
South Korea									R	
Syria										

LatAm/Caribbean	HIB	IPM	ZIM	ZIR	ZIW	ABP	VAC	VAM	OSP	IZ
Bolivia	R		R		R					
Brazil	R			T	T		R	R	R	R
Colombia	R		R	T			T	T	R	
El Salvador	R		T	R						
Guatemala	R		R	T			T		R	
Haiti	T		T	T				T	T	
Honduras	R		R						T	
Mexico			T		R			T		
Nicaragua	R		R	T					R	
Panama	R			T	T		T	T	R	
Peru									R	

Aim



- To estimate the potential contribution of biofortified OFSP (high in beta-carotene, a vitamin A precursor) towards meeting dietary micronutrient requirements in Malawi using a mathematical modeling framework

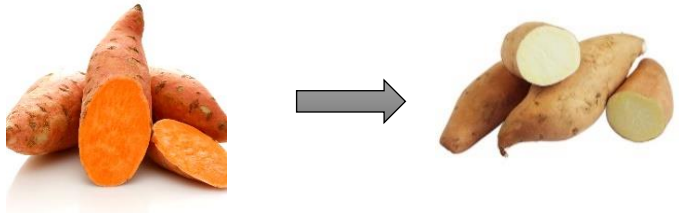
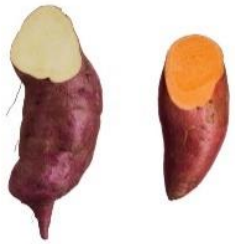
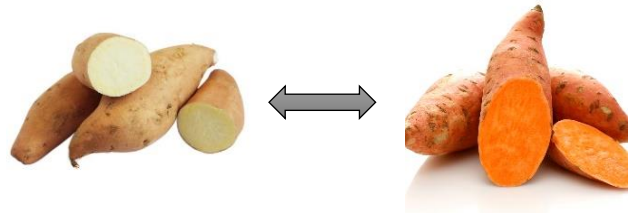
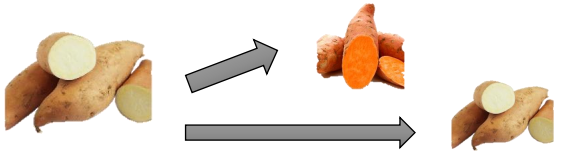
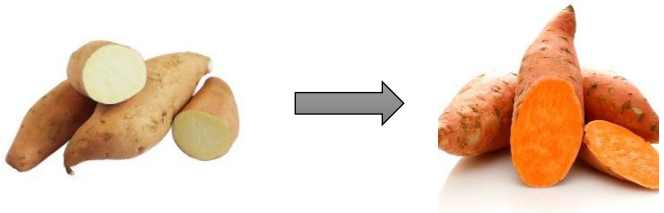
Base data: Food consumption data

Malawi's Fifth Integrated Household Survey (IHS5)

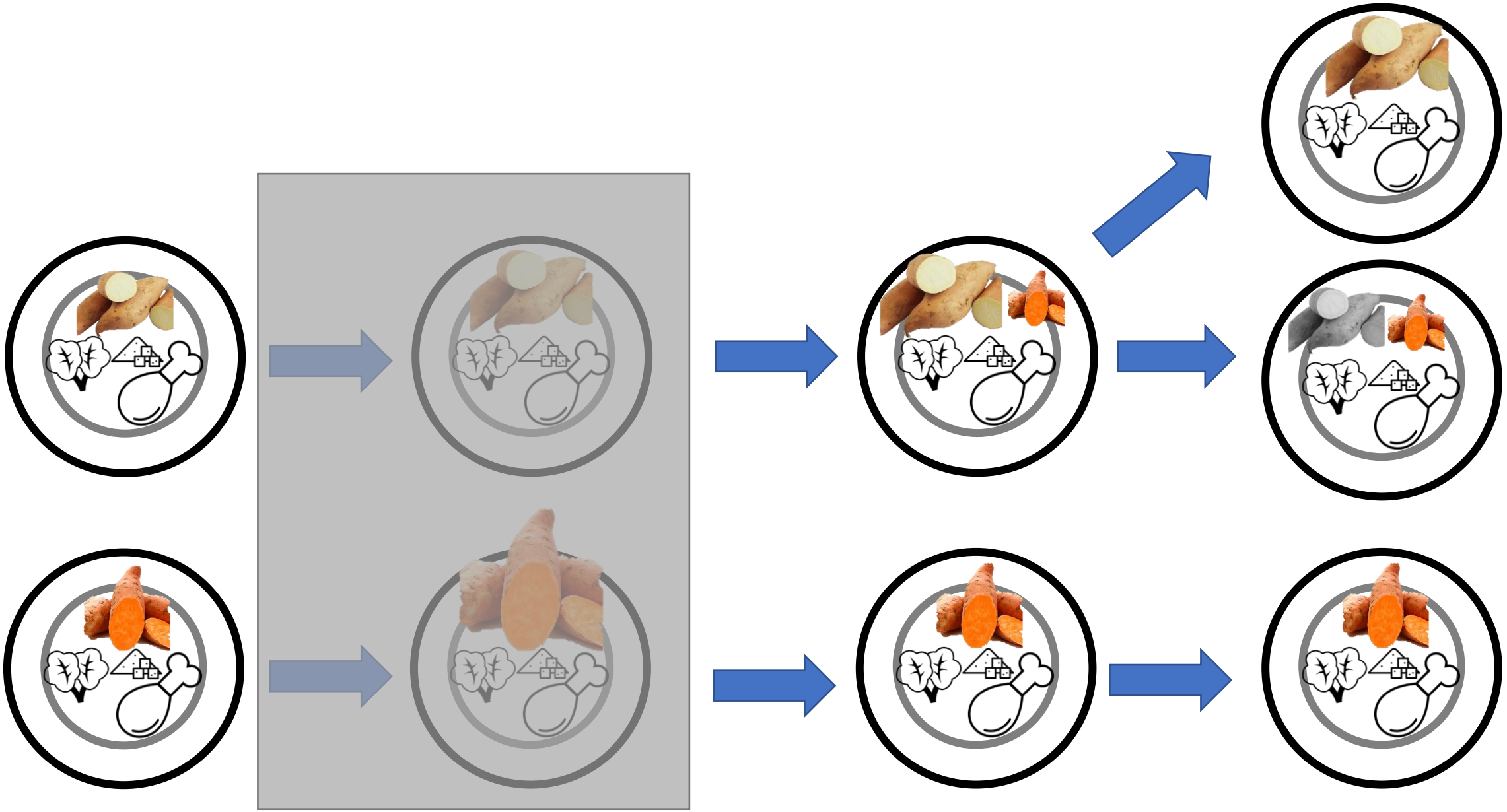
Time horizon	April 2019 – April 2020
Enumeration areas	717 (x16 Households)
Households(N)	11434
Items on food item list	142
Dietary recall unit	Household
Dietary recall period	7 days

Food group	**Food item**
Roots/tubers/plantains	White sweet potato Orange sweet potato
Cooked foods from vendors	Boiled sweet potato Roasted sweet potato

Biofortification scenarios

Scenario	Description	Scenario analysis
1. No biofortification		
2. Status quo		
3. Intermediate scenario		
4. Improved biofortification		

Intermediate scenario: Design an illustrative “switching” scenario



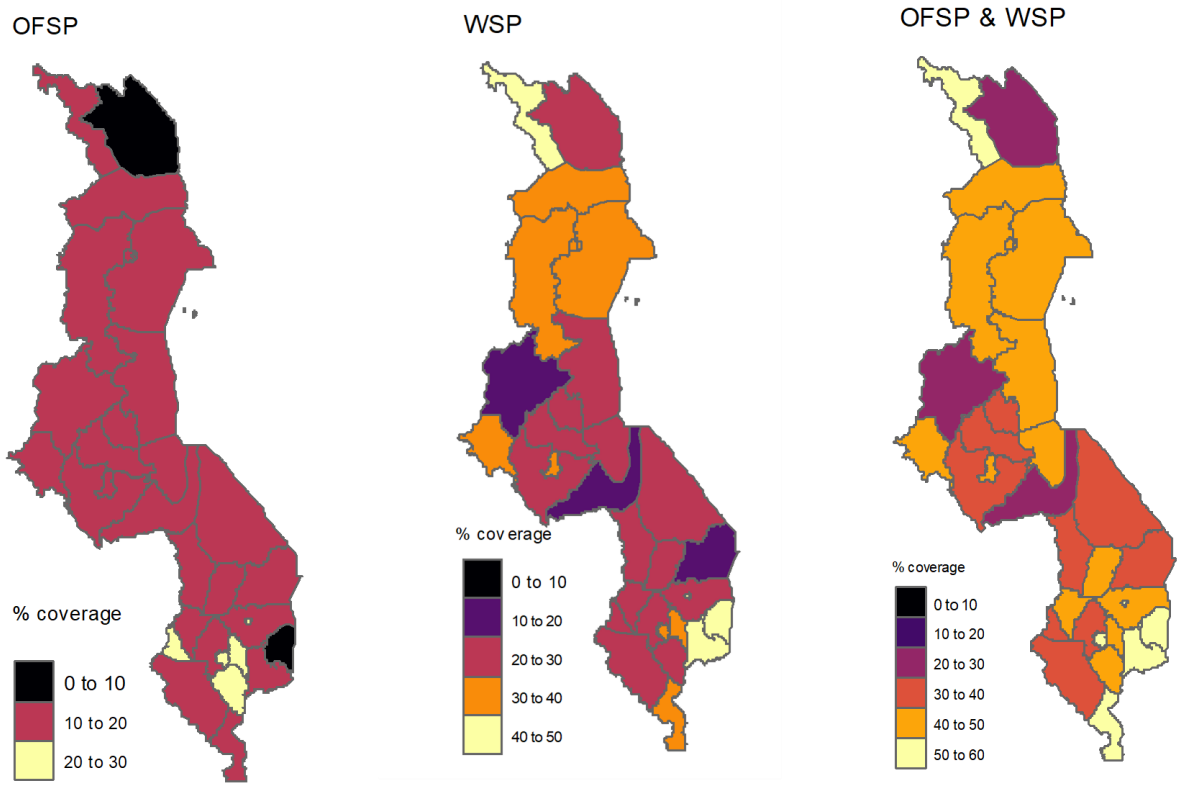
Application of HCES

Distribution of sweet potato sources, Malawi (n=11,432)

FOOD ITEM	#HH CONSUMING PURCHASED FOOD	#HH CONSUMING GIFTED FOOD	#HH CONSUMING OWN PRODUCED FOOD	TOTAL #HH	% PURCHASED||% GIFTED||% OWNPRODUCED
White sweet potato	2326	500	568	3394	
Orange sweet potato	1253	287	310	1850	
Roasted sweet potatoes	77	0	0	77	
Boiled sweet potatoes	52	0	0	52	

✓ Identifying sources of food items

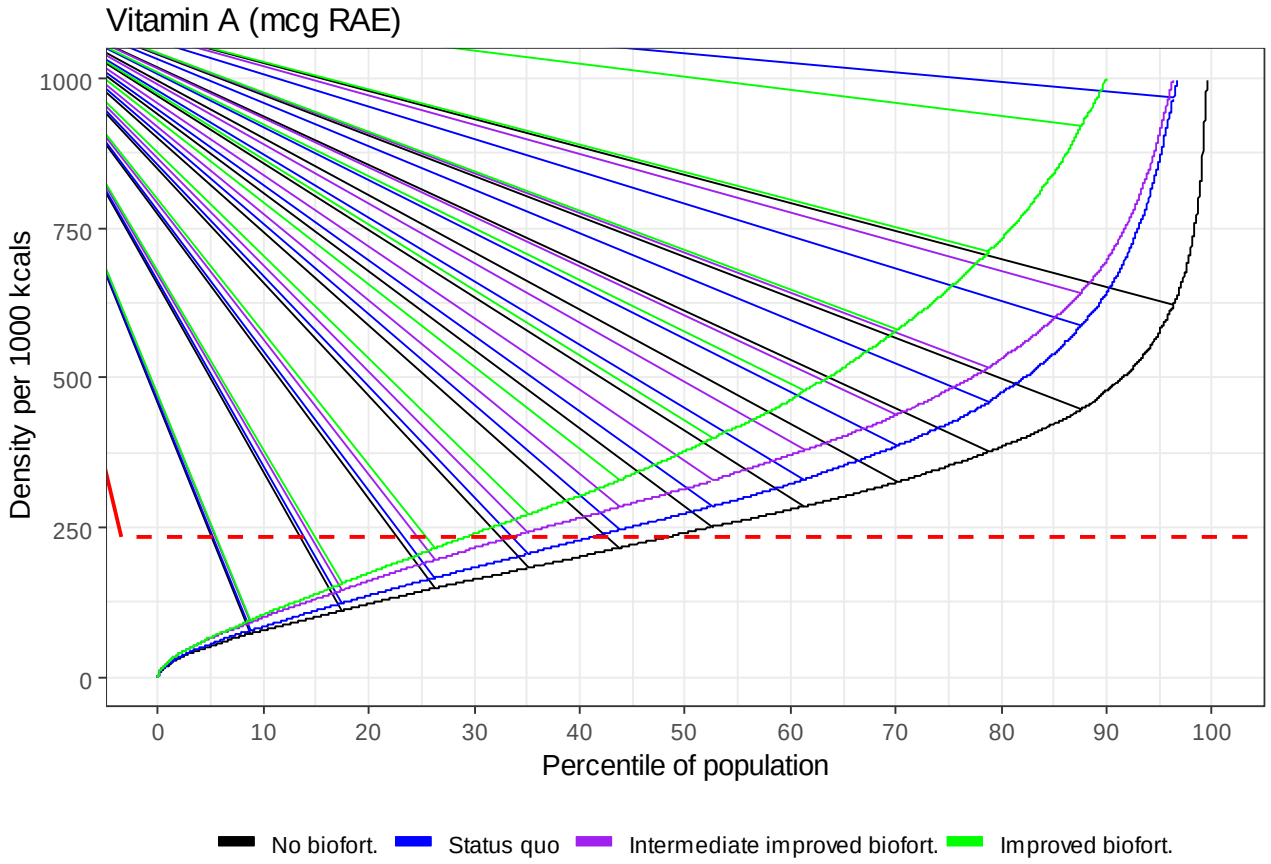
Application of HCES



Coverage of sweet potatoes by district

- ✓ Comparing coverage of biofortified/fortified food vehicles
- ✓ Within-country variation

Application of HCES



- ✓ Predicting the contributions of nutrition interventions e.g. biofortified crop

Osman et al., [In prep]

Application of HCES

Vitamin A inadequacy by subpopulation

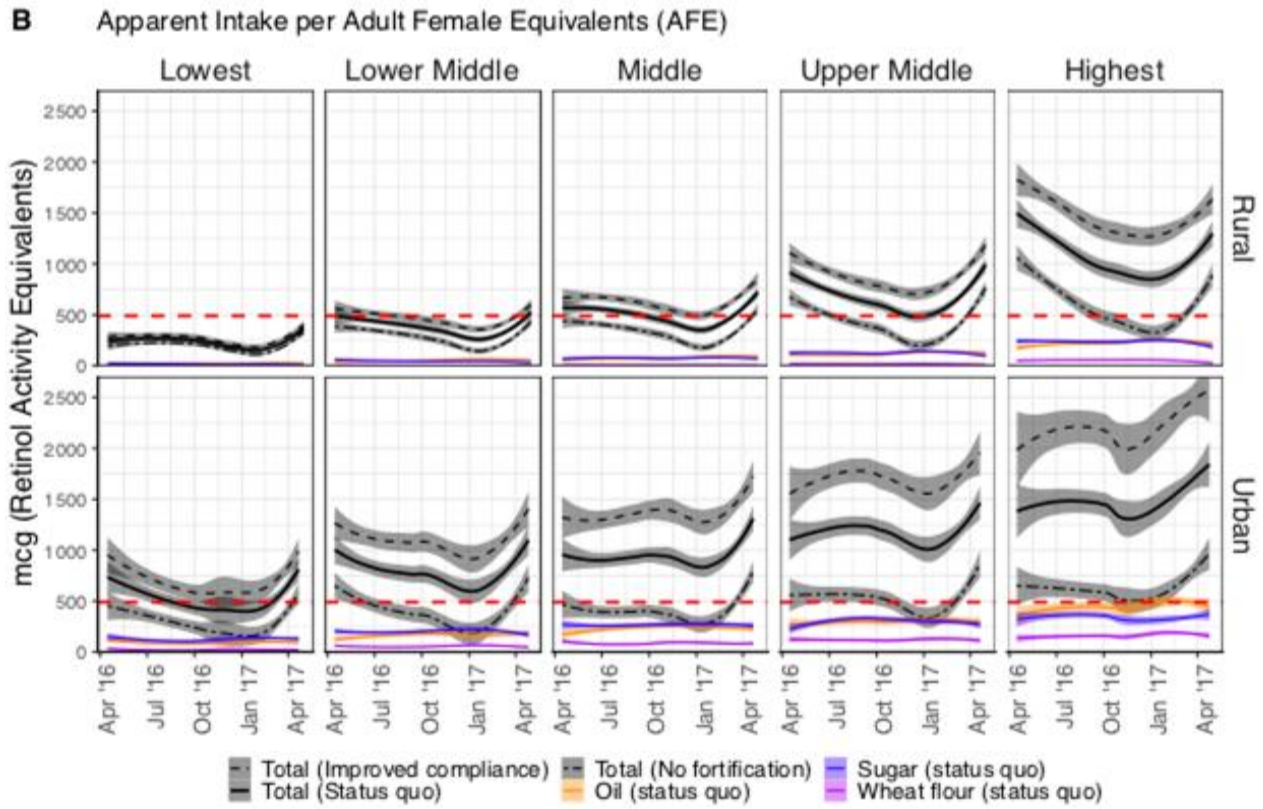
0-19%	20-39%	40-59%	60-79%	80-100%

		Apparent intake				Nutrient density			
Population	Households (n)	No biofortification	Status quo	Intermediate improved biofort.	Improved biofortification	No biofortification	Status quo	Intermediate improved biofort.	Improved biofortification
National (total)	**11,432**	53.7	47.1	40.9	35.4	48.2	41.1	33.6	29.1
Residence & socioeconomic position (SEP) by quintile of total annual household expenditure per capita									
Rural	**9342**	59.8	52.4	47.2	39.7	54.0	46.3	39.4	33.0
Lowest SEP	1869	91.8	86.0	85.8	73.7	64.6	59.3	56.7	48.3
Lower Middle SEP	1869	81.4	71.4	63.2	54.0	61.1	53.3	44.1	38.6
Middle SEP	1868	65.7	55.5	45.8	38.4	55.9	47.4	38.6	32.3
Higher Middle SEP	1868	45.2	37.2	28.4	24.7	51.0	41.9	31.9	27.3
Highest SEP	1868	15.0	12.0	9.6	7.7	37.6	29.7	25.0	18.6
Urban	**2090**	26.4	23.3	18.5	16.1	22.1	17.6	12.7	11.4
Lowest SEP	418	75.1	68.7	68.7	49.8	45.2	38.3	38.3	27.5
Lower Middle SEP	419	33.4	28.4	26.0	18.6	25.1	19.3	18.9	12.2
Middle SEP	418	16.7	14.4	9.6	8.4	20.8	16.5	10.5	8.9
Upper Middle SEP	417	5.8	4.3	3.1	3.1	12.0	8.6	6.2	5.8
Highest SEP	418	1.0	0.7	0.7	0.7	7.4	5.3	2.9	2.6

✓ Identifying differences in apparent intake and Micronutrient density in urban and rural residences and between SEPs

Osman et al., [In prep]

Application of HCES



✓ Seasonal variation in diet

Tang, K., K.P. Adams, E.L. Ferguson, M. Woldt, A.A. Kalimbira, Blessings Likoswe,Jennifer Yourkavitch, et al. 2021. "Modeling Food Fortification Contributions to Micronutrient Requirements in Malawi Using Household Consumption and Expenditure Surveys." 1508(1):105–122 *Annals of the N.Y. Academies of Science.* https://doi.org/10.1111/nyas.14697

Conclusion

- ✓ HCES data provide valuable insights into the diets of populations, capturing aspects of sub-national **geographic, socioeconomic and seasonal fluctuations** in inadequacy.
- ✓ Estimates of dietary micronutrient supplies derived from HCES food consumption data can be used to explore and inform evidence-based nutrition interventions and policies.

AHSANTE SANA!