

Considerations in calculating flour consumption in a country

Janneke H. Jorgensen, World Bank

Overview

- Why calculate flour consumption
- Factors to be considered
- Potential sources and quality of data
 - ▶ National food consumption data if available!
 - Household income and expenditure surveys
 - Panel survey
 - FRAT
 - FAO food balance sheets



Why calculate flour consumption

To determine the levels of fortification

- to have a public health impact
- without any adverse effects
- To determine the potential coverage of a food fortification programme

- Population groups
- Geographical areas

Factors to be considered

Information is scarce

Not often full information on micronutrient deficiencies - use proxy measures e.g. Vitamin A supplementation coverage

Often lack of information on actual food consumption

But... we cannot let this stop us!

• We can still base programmes on sound evidence

Potential sources and quality of data

- National food consumption data
- Household income and expenditure surveys (HIES)
- Panel survey
- Fortification Rapid Assessment Tool (FRAT)
- FAO food balance sheets

Others: Demographic Health Surveys, industry information

National food consumption data

- Surveys developed specifically to measure food intake and nutritional status of a population
- Nationally representative samples
- Often uses 24 hr recalls to measure actual food intake as well as food frequency questionnaires
- Best source of food consumption data but often not available

Plea	se answer the following questions:			\$	Study I	No:				
1.	Please enter today's date:						13	10	819	3
							Day	Mo	onth '	Year
2.	Which day of the week does this rec	ord? Pl	ease ti Thurs	ck gne	ri 🗖	Sat	-	18 /	NUG 199	33
			THUIS			Gui			-	
3.	Is this a typical day? Please tick one If not, give an example of a typical da	: ay after	yester	day's r	ecord,	if you v	wish.	Yes	N	0
24	HOUR RECORD	21272		1973	144		100		-	12
Tim	e Quantity eaten Details of fo	ood and	drink			_				_
715	Sam I Cup Tea									
-	13 trephone botaite	Cu	ud M	elec	_	_				_
	Thaystrict Dish Rice	Crist	sies.	+ Sli	ad f	Sana	wa			
_	2 teaspoons Whi	te S	inga	c d l	lior					_
10a	m. 1 Mug. Inct	Entr'	Powd	lered	Col	hee.				
	l'ateaspoons lucis	tag	sug	5		V				
-	Figure 0. Everage	f Eas	d En	.a wi				ire		_
	Figure 2. Example c			equer	ICY G	luesi	Ionna	are		
123							_	lths		
			ş	~	~		Duf	Jor 1	ar	
			r we	lee	lee		Ĕ	г. С	r ye	
26		L_	be	er <	er v		be	be	be	-
of		eve	nce	4 4	6 p	aily	nce	LCe	nce	
		ž	0	Ś	μ	Ő	0	0	0	_
60	Milk, yogurt, regular fat		\cap			\cap	\cap		\bigcirc	
ġ.	(i cup)		\cup						\cup	_
	Milk, yogurt, lowfat									
	(1 cup)	$ \bigcirc$	\bigcirc	$ \bigcirc$	$ \bigcirc$	\bigcirc	\bigcirc	$ \bigcirc$	\bigcirc	
931	Spinach, kale, other green		_			-	-		_	\vdash
	leafy vegetables (1/2 cup)	$ \bigcirc$	\bigcirc	$ \bigcirc$	$ \bigcirc$	\bigcirc	\bigcirc	$ \bigcirc$	\bigcirc	
	Carrote (1 medium)									
	Carrois (T medium)	$ \bigcirc$	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
	Beef (3 oz)	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
	Rice white (1 cup)									
	rice, white (reup)	\cup	\bigcirc	\cup	\cup	\bigcirc	\cup	\bigcirc	\bigcirc	
	Rice, brown (1 cup)	$ \bigcirc$	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
	Cookies (2 -2" diameter)									
		\cup	\bigcirc	\cup	\cup	\bigcirc	\bigcirc	\cup	\cup	
	Ice cream, regular fat		\bigcirc	\bigcirc		\bigcirc	\cap		\bigcirc	
	(1/2 cup)		\bigcirc			\cup	\cup		\cup	

The South African National Food Consumption Survey (NFCS)

- Subjects: 3120 Children aged 1–9 years
- Data:
 - socio-demographic status
 - dietary intake (24 hr recall + FFQ)
 - food purchasing practices
 - hunger
 - anthropometric measurements

Uses are many!

- Identified the low micronutrient content of did
- Identified most appropriate food vehicles
 - commonly consumed foods incl. origin (home grown/processed, purchased, "gift")

Ribo

Folic

Vita

Zinc

- extend of consumption
- economic distribution
- Projected impact of fortification programme
- ___<mark>}___Link:</mark><u>http://www.sahealthinfo.org/nutrition/foodconsumption.htm_</u>

7 <u>http://journals.cambridge.org/action/displayFulltext?type=1&fid=631596&jid=PHN&volumeId=8&issueId=05&aid=585180</u>

Vehicles Consuming 1 21.10%
n Consuming n 21.10%
21.10%
21.10%
21.10%
ation
Total Added
is RDA from
38%
36%
36%
45%
37%
40%
71%
22%
39.33%
29.71%
34.10%
43.93%
77.62%
70.71%

- Integrated multi purpose instruments that can be adapted according to needs and priorities
- Vary across countries (quality and content) but all report on staple foods
 - Wheat, maize*, sugar, oil etc.

Country	Survey	Recall period (days)	Expenditure only (X) or food quantity (Q) also reported?	Sample size (no. of HHs)	No. of food items reported
Burundi	Enquete prioritaire (1998)	15	X	6,668	32
Congo, Dem. Rep.	Employment, informal sector and household consumption survey (2005–06)	15	Q	4.715	500
Ethiopia	Household income and expenditure survey (2000)*	7	Q	16,672	224
Ghana	Ghana living standards survey 4 (1998)*	35	X	5,998	104
Madagascar	Enquete permanente aupres des menages (2001)	30	Q	5,078	65
9					

Country	Survey	Recall period (days)	Expenditure only (X) or food quantity (Q) also reported?	Sample size (no. of HHs)	No. of food items reported
Malawi	Malawi second integrated household Survey (2004)	7	Q	11,280	115
Mozambique	QUIBB (questionario de indicadores basicos de bem-estar) (2002)	7	Q	8,700	332
Nigeria	Nigeria living standards survey (2003)	30	X	19,158	134
South Africa	Income and expenditure survey (2000)	30	X	26,263	122
Tanzania	Household budget survey (2000)*	30	Q	22,178	135
Uganda	National household survey 2002/2003*	7	Q	9,711	58
10					

- Integrated multi purpose instruments that can be adapted according to needs and priorities
- Vary across countries (quality and content) but all report on staple foods
 - Wheat, maize*, sugar, oil etc.
- But know that...
 - Expenditure data = apparent (not actual) consumption
 - Based on HH's, not individuals
 - Does not include foods eaten outside the home

However...

Differentiates btw home produced, purchased or gifted foods

- Special uses in respect to flour fortification
 - Assessing coverage of vehicle
 - $\hfill\square$ e.g. wheat flour vs. wheat flour products

Percentage of HH that purchase some of the potential food fortification vehicles

Country	Maize (flour & products)	Wheat flour	Wheat flour staples	Wheat flour based foods	Sugar	Edible oils
DRC		4%	66%	73%	82%	39%
Ethiopia	22%	21%	29%	29%	22%	29%
Madagascar	3%	5%		45%	73%	90%
Malawi	97%	1%	34%	35%	28%	34%
Mozambique	18%	1%	34%	35%	28%	34%
South Africa		48%			96%	79 %
Tanzania	71%	27%			63%	96%

| |3

• However...

- Differentiates btw home produced, purchased or gifted foods
- Special uses in respect to flour fortification
 - Assessing coverage of vehicle
 - $\hfill\square$ e.g. wheat flour vs. wheat flour products
- Mapping and targeting fortification efforts
 - E.g. SES or geographical areas including gaps

 Percentage of HHs that purchase potential food fortification vehicles according to residence and income – Example from the Tanzanian HBS (2001)

Food items	On average	Rural HHs	Urban HHs	Poorest quintile	Richest quintile
Wheat flour	17%	13%	31%	8%	29%
Bread	20%	11%	52%	4%	39%
Wheat flour staples	30%	21%	65%	11%	54%
Wheat flour based foods	62%	55%	90%	38%	81%
Maize flour	66%	59%	89%	56%	77%
Sugar	73%	67%	93%	45%	90%
Salt	86%	86%	83%	81%	88%
Edible oils	45%	40%	63%	31%	55%

However...

- Differentiates btw home produced, purchased or gifted foods
- Special uses in respect to flour fortification
 - Assessing coverage of vehicle
 - $\hfill\square$ e.g. wheat flour vs. wheat flour products
- Mapping and targeting fortification efforts
 - E.g. SES or geographical areas including gaps
- Identifying "new" potential food vehicles
- Setting the fortification level more precisely
 - Especially if multiple vehicles are considered

• But keep in mind, consumption levels varies – example from Tz

Food item	5 th percentile consumption level (g/day)	Median (most common) consumption level (g/day)	Mean (average) consumption level (g/day)	95 th percentile consumption level (g/day)
Wheat flour	3g	18g	40.7g	125g
Maize flour	10g	151.7g	240.7g	768g
Sugar	3g	26.7g	39.7g	113.7g
Edible oils	0.7g	7.7g	16.3g	57g
- 17			mode m	edian mean

Keep in mind...

 Large differences in consumption levels of wheat and maize flour within a country – perhaps even greater than between countries...



RECALL from the WHO presentation Day 1

	Range	es of Daily I of Wheat I	Per Capita A Flour (g/day)	vailability
Percentile of Wheat Flour Availability	<75	75-149	150-300	>300¹
5 th	7.5	15	30	60
50 th	50	100	200	400
95 th	150	300	600	800

1Few countries have per capita consumption of >300 grams per day.



Micronutrients Unit

B

Panel Surveys

- Representative samples of households followed with time
 - Surveyed usually on an annual basis
- An integrated survey covering a wide range of socioeconomic factors
 - vs. DHS (only health) and HIES (only income & expenditure)

HHs are revisited over time

• Can track transitions in welfare and changes in the determinants

A variety of questionnaires

- Household Q
- Agricultural Q
- Community Q
- Currently available in: Tanzania, Uganda & Malawi soon also Nigeria, Niger and Ethiopia and possibly more...

http://www.ifpri.org/dataset/malawi-complementary-panel-survey-cps-2000-2002

Link: <u>http://wwww.nbs.go.tz/index.php?option=com_content&view=article&id=92&Itemid=24</u>

Panel Surveys - Uganda

Is being planned

- > 3,200 HH randomly selected
- Representative at national, urban/rural and main regional levels
- Visited for 2 years 2009/2010 & 2010/2011
- Questionnaires:
 - Multi-topic HH Q
 - Agricultural Q
 - Community Q
 - Price Q
- HH will be interviewed twice yearly
- All data will be made publicly available

Link:

http://www.ubos.org/?st=pagerelations2&id=58&p=related%20pages%202:Uganda%20National%20Panel%20Surveys

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Section 15: Household Consumption Expenditure Part A: Number of household members present

On average, how many people were present in the last 7 days? In this section children are defined as less than 18 years.

		Household	d Members							Visitor	s			
Male adults F	emale ad	ults	Male children	Fe	emale child	ren	Male adults		Female ad	dults	Male child	ren F	emale child	Iren
Part B: Food, Beverage,	and loba	cco (During t	the Last / Days	i)		Concurrentia	a out of Durch:		Consum	ation out of	Dessive	d in kind/Eron	Market	Earm
item Description	Code	consume	days was	Unit of City		Consumptio	on out of Furcha	1585	home	produce	Receive	d in-kind/Free	Price	oate
		(ITEM)	ITEMI		Hou	Senoid Value	Away tro	m nome	054	Value	011	Value		price
		1= Yes	consumed		aly	value	Quy	value	Caty	value	Caty	value		
		2= No	out of the											
			last 7 days?											
1	2	3A	3B	3C		5	6	7	8	9	10	11	12	13
Matooke (Bunch)	101													
Matooke (Cluster)	102													
Matooke (Heap)	103													
Matooke (Others)	104													
Sweet Potatoes (Fresh)	105													
Sweet Potatoes (Dry)	106													
Cassava (Fresh)	107													
Cassava (Dry/ Flour)	108													
Irish Potatoes	109													
Rice	110													
Maize (grains)	111													
Maize (cobs)	112													
Maize (flour)	113												>	
Bread	114													
Millet	115													
Sorghum	116													
Beef	117													
Pork	118													
Goat Meat	119													
Other Meat	120													
Chicken	121													
Fresh Fish	122													
Dry/ Smoked fish	123													
Eggs	124													
Fresh Milk	125													
Infant Formula Foods	126													
Cooking oil	127												>	
Ghee	128													
Margarine, Butter, etc	129													
											-			

Panel Surveys

PART B Cont'd: Food Fortification

CHECK WHETHER THE HOUSEHOLD CONSUMED ANY MAIZE FLOUR, SUGAR, SALT OR COOKING OIL DURING THE LAST 7 DAYS

1 2 14 15 16A CODE 16B 17A CODE 17B 18A CODE 18B 19A CODE 19B Maize flour 113	Item Description	Code	Did the household consume [ITEM] 1=Yes 2=No	Is the [ITEM] fortified? 1= Yes 2= No 3= Don't Know CHECK FOR FORTIFICATION LOGO OR SHOW SAMPLE TO RESPONDENT	What Brand of MAIZ was consume SPECIFY	ÆFLOUR ₀d?	What brand of CO was consum	DKING OIL 1ed?	What brand of SU consume	JGAR was d?	What brand of SA consumed	LT was	
Maize flour 113 Image: Cooking oil 127 Image: Cooking oil 127 Image: Cooking oil Image: Cooking oil <td>1</td> <td>2</td> <td>14</td> <td>15</td> <td>16A</td> <td>CODE 16B</td> <td>17A</td> <td>CODE 17B</td> <td>18A</td> <td>CODE 18B</td> <td>19A</td> <td>CODE 19B</td> <td></td>	1	2	14	15	16A	CODE 16B	17A	CODE 17B	18A	CODE 18B	19A	CODE 19B	
Cooking oil 127 Image: Cooking oil of the second s	Maize flour	113											
Sugar 147 Image: Constraint of the second s	Cooking oil	127											
Salt 150	Sugar	147											
	Salt	150											

Fortification Rapid Assessment Tool (FRAT)

- Combination of a simplified 24 hr recall and food frequency questionnaire
- Versatile
 - Can be implemented as stand-alone survey
 - Or can be piggybacked onto an existing survey
 e.g. a district health survey
- Collects representative quantitative data from HH level
 - Consumption of potential food vehicles
 - Some qualitative data on the use and availability of food vehicles
 - Children 12-36 months & women aged 16-45
- Note: does NOT measure intake of micronutrients

Link: http://www.micronutrient.org/English/..%5CCMFiles%5CPubLib/FRATguidelines2003_Nov_20081PKE-1222008-1386.pdf

Key questions answered using the FRAT Survey

CONSUMPTION	USE	AVAILABILITY
Effectiveness:	Storage:	Current availability at household
 Do young children and women of child-bearing age consume the fortified food? What is the range of 	 Will there be significant losses of the fortificant as a result of storage method in the household?* 	 What proportion of households have it at the time of the survey?**
consumption levels?		Are there socioeconomic
 Is consumption restricted by low socioeconomic status? 		barriers to its use?
Regional variations:	Food preparation methods:	
 Are there major regional variations in consumption patterns? 	 Is there a possibility of significant losses during processing or food preparation?* 	

* Loss of micronutrients due to storage or cooking methods varies between different foods and micronutrients. For example, iodine loss increases with increasing exposure to air, with temperature having a small effect. Loss of vitamin A from rice (Ultra Rice™) increase with temperature, but exposure to air has little effect.

** In some regions where food is purchased one day at a time and consumed as purchased, the availability in the household will not be meaningful, nor will storage practices be important.

Fortification Rapid Assessment Tool (FRAT)

- Experience from Uganda
 - Kamuli district

 \rightarrow

- II04 children aged I2-36 months
- I 102 mothers/female caretakers aged 16-45



 Level of sugar consumption, (83-96%) common mode (tea, porridge, orange juice) of sugar consumption, common forms of storage

Link: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2141566/pdf/AFHS0201-0011.pdf

Fortification Rapid Assessment Tool (FRAT)

Experience from Tanzania

- Dodoma rural and Arumeru (Arusha) districts, 2007
- Sample size?
- Consumption:
 - Maize flour:
 - □ 301-570 g for women,
 - □ 216-220g for children
 - Wheat flour:
 - □ 121-132g for women
 - □ |||-||6g for children
 - Sugar:
 - □ 13.8-18.3g for women
 - □ 12-14g for children
 - Edible oil:
 - □ 41.6-43.5ml for women
 - □ 24-26ml for children



FAO food balance sheets

- Gives a comprehensive picture of a countries food supply in a given time period
 - Amount of each food item available for human consumption based on supply and utilization
 - Total quantity produced + imported exported used for feeding livestock/seeds losses (storage and transportation) = food available for human consumption
 - Total food available / total population = per capita consumption
- But...
 - Amount actually consumed if often lower due to waste at retails and HHs e.g. during storage, preparation, cooking and "leftovers"
 - Accuracy is also dependent on the reliability of statistics of supply and utilization of food in a population – often a problem in developing countries
 - Non-commercial/ subsistence production, consumption of wild foods, incomplete harvests, unrecorded trade, issues with reliability of export data, quality of crops
- Where basic data is unreliable or incomplete, FBS do not give good estimates of food consumption

Link: http://faostat.fao.org/site/368/default.aspx#ancor

Frod Balance drivets Commit	pply States wdity Balances	Food \$	ecurity I	Prices F	lesourc	es F	orestry	Fisherie	5 M	etadata	Support/FA	Q			En	giish Franç	215	Espanol
	count	ry				item					ele	ment	yea	Latest News				
iva bati ea, Democratic People's R ea, Republic of vait qvzstan • People's Democratic Rep via anon eotho	epublic of ublic	 Alco Appl Aqui Aqui Bana Bana Bana Bear Bear Bear Bear Bear Bear Bear 	hol, Non- es atic Anin atic Plan anas ey 15 arages, A arages, F	Food tals, Oth ts lcoholic ermente	ers d	*	Stock V Export Q Domesti Seed Process Other Ut Food Food sup	ed ariatio uantit c supp ed til aply qu	n V dy qu antit	antity y (kg/ca)	pita/yr)		2005 A 2004 2003 2002 2001 2000 1999 1998 1997 1996 V	Updated: 18 Deco	mber 2009			
Y1-axis: country Y2-axis: item X-axis: element its : 21 :	v v v tt⊠ print Fi	1 (t.			a'							sho	v data					
try Item	Total Population - Both sexes (1990)	Productio (1000 tonnes)	n Impo Quant (100 tonne	rt Sto ty Varia 0 (10 s) tonn	ck tion 00 es]	Export Quantity (1000 tonnes)	Domest supply quantit (1000 tonnes	k F V (1) ton	eed 000 nes)	Seed (1000 tonnes)	Processing (1000 tonnes)	Foo (100 tonne	d Other 0 Util s) (1000 tonnes	Food supply quantity (kg/capita/yr) (Kg)	Food supply (kcal/capita/day) (kcal)	Protein sup quantity (g/capita/d	ply / lay)	Fat supp quantit (g/capita/
Reputation	30000															(a)		(0)
L'ODOM COUL																(a)		(4)
Grand Total +															2079 Fc	(a)	R	44.9
Grand Total + Vegetal Products +								u III							2079 Fc 1840 Fc	(a) 57.5 42.5	RI RI	44.9
Grand Total + Vegetal Products + Animal Products +															2079 Fc 1840 Fc 238 Fc	(a) 57.8 42.5 15.3	FC FC FC	44.9 30.0 14.9
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer +		3564	A 1395	A 20	A	36	4943	A 11	12 A	73 A	107	A 4563	A 95	R	2079 Fc 1840 Fc 238 Fc 1095 Fc	(e) 57.8 42.5 15.3 25.7	FC FC FC FC FC	44.9 30.0 14.9 9.2
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat		3564	A 1395 640	A 20 0	A	36	4943	A 10	12 A 0 M	73 A 13	107	A 4563 954	A 98 33		2079 Fe 1840 Fe 238 Fe 1095 Fe 201 Fe	(a) 57.8 42.5 15.3 28.7 5.0		44.9 30.0 14.9 9.2 0.8
Grand Total + Vegetal Products + Animal Products + Cereats - Excluding Beer + Wheat Rice (Milled Equivalent)		3564 369 42	A 1395 640 456	A 20 0 -5	A	36 9	4943 999 492	A 10	12 A 0 M	73 A 13 1	107 0 0	A 4563 954 M 474	A 98 33 17	25.5 F	2079 Fc 1840 Fc 238 Fc 1095 Fc 201 Fc 129 Fc	(a) 57.8 42.5 15.3 28.7 6.0 2.4	R R R R R	44.9 30.0 14.9 9.2 0.8 0.2
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley		3564 389 42 41	A 1395 640 455 11	A 20 0 -5	A	36 9 1 9	4943 999 492 43	A 10	12 A 0 M 0 M	73 A 13 1	107 0 0 40	A 4563 954 M 474	A 98 33 17 1	258 R 258 R 133 R	2079 Fr 1840 Fr 238 Fr 1095 Fr 201 Fr 129 Fr 129 Fr	(a) 57.5 42.5 15.3 25.7 6.0 2.4 0.0	R R R R R R R	44.9 30.0 14.9 9.2 0.8 0.2 0.0
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Maize		3554 369 42 41 2905	A 1395 640 456 11 243	A 20 0 -5 0 25	A	36 9 1 9	4943 999 492 43 3159	A 12	12 A 0 M 0 M 0 M 10 M	73 A 13 1 1 53	107 0 0 40 12	A 4563 954 M 474 1 2994	A 98 33 17 1 21	258 R 258 R 133 R 0.0 R 841 R	2079 Fr 1840 Fr 238 Fr 1095 Fr 201 Fr 129 Fr 0 Fr 732 Fr	(a) 578 425 153 257 60 24 24 00 193		44.9 30.0 14.9 9.2 0.8 0.2 0.2 0.0 7.9
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Maize Rye		3564 389 42 41 2905 0	A 1395 640 456 11 243 M 0	A 20 0 -5 0 25 0	A	36 9 1 9 14 0	4943 999 492 43 3159 0	A 10	12 A 0 M 0 M 0 M 0 M 0 0	73 A 13 1 53 0 M	107 0 40 12 0	A 4563 954 M 474 1 2994 M 0	A 98 33 17 1 21 M 0	255 255 133 0.0 841 841 0.0 7	2079 FC 1840 FC 238 FC 1095 FC 201 FC 201 FC 129 FC 129 FC 129 FC 129 FC 129 FC 129 FC 129 FC	(a) 578 425 153 257 60 24 00 193 00		44.9 30.0 14.9 9.2 0.8 0.2 0.0 7.9 0.0
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats		3554 369 42 41 2905 0 4	A 1395 540 455 11 243 M 0 1	A 20 0 -5 0 25 0 0 0	A	36 9 1 9 14 0 0	4 4943 999 492 43 3159 0 5	A 11	12 A 0 M 0 M 0 M 10 1 1	73 A 13 1 1 53 0 M 0	107 0 40 12 0	A 4553 954 M 474 1 2994 M 0 3	A 98 33 17 1 21 M 0 0	255 255 133 0.0 ft 841 ft 0.0 ft 0.1 ft	2079 FF 1840 FF 238 FF 201	(a) 578 425 153 257 60 24 00 193 00 00 00		449 30.0 149 9,2 0,8 0,2 0,0 7,9 0,0 0,0 0,0
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet		3564 389 42 41 2905 0 4 4 53	A 1395 640 455 11 243 M 0 1 1	A 20 0 -5 0 25 0 0 25 0 0 0 0	A	36 9 1 9 14 0 0 0	4 4943 999 492 43 3199 0 5 5	A 11	12 A 0 M 0 M 0 M 50 0 1 1 4	73 A 13 1 1 53 0 M 0 2	107 0 0 40 12 0 0 11	A 4553 954 M 474 1 2994 M 0 3 31	A 98 33 17 1 21 M 0 0 0	255 255 133 0.0 ft 841 ft 0.0 ft 0.1 ft 0.9 ft	2079 FF 1840 FF 238 FF 201	(a) 57.8 42.5 53.7 6.0 2.4 0.0 19.3 0.0 0.0 0.0 0.2		449 300 149 92 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum		3564 389 42 41 2905 0 4 53 150	A 1395 640 455 11 243 M 0 1 1 1 39	A 20 0 -5 0 25 0 0 0 0 0 0 0	A M M M	36 9 1 9 14 0 0 0 0 2	4 4943 999 492 43 3199 0 5 5 54 187		12 A 0 M 0 M 0 M 10 1 1 1 4 15	73 A 13 1 1 53 0 M 0 2 3	107 0 0 40 12 0 0 0 11 45	A 4563 954 M 474 1 2994 M 0 3 31 103	A 98 33 17 1 21 M 0 0 0 6 21	255 255 133 00 841 841 841 00 841 841 841 841 841 841 841 841 841 841	20079 FF 1840 FF 238 FF 201 FF 201 FF 201 FF 201 FF 201 FF 20 FF 129 FF 0 FF 10 FF 1 FF 21 FF 24 FF	(a) 57.8 42.5 51.53 525.7 6.0 52.4 0.0 19.3 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		449 300 149 92 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0 0.1 0.2
Grand Total + Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum Cereals, Other		3564 389 42 41 2905 0 4 53 150 0 0	A 1395 640 455 11 243 M 0 1 1 1 1 39 M 4	A 20 0 -5 0 25 0 0 0 0 0 0 0	A M M	36 9 11 9 14 0 0 0 2 2 0	4943 9999 492 43 3159 0 5 34 187 3		12 A 0 M 0 M 0 M 10 M 11 4 11 1	73 A 13 1 1 53 0 M 0 2 3 0 M	107 0 40 12 0 0 11 45 0	A 4563 954 M 474 1 2994 M 0 3 31 103 M 3	A 98 33 17 1 21 M 0 0 6 21 0	255 255 133 00 R 841 R 00 R 01 R 0.9 R 2.9 R	20079 FF 1840 FF 238 FF 201 FF 201 FF 201 FF 201 FF 20 FF 129 FF 0 FF 1 FF 1 FF 24 FF 1 FF 24 FF 1 FF	(a) 57.8 42.5 15.3 25.7 6.0 2.4 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		449 300 149 92 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0 0.1 0.2 0.0
Grand Total + Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum Cereals, Other Starchy Roots +		3564 389 42 41 2905 0 4 53 150 0 0 1552	A 1395 640 455 11 243 M 0 1 1 1 1 39 M 4 A 3	A 20 0 -5 0 25 0 0 0 0 0 0 0 0 0 0	A M M M	36 9 1 1 9 14 0 0 0 0 2 0 0 0	4 4943 9999 482 43 3159 0 5 5 4 187 3 4 1555		12 A 0 M 0 M 0 M 10 M 10 1 1 1 1 1 1 1 0 A	73 A 13 1 1 53 0 M 0 2 3 3 0 M 97 A	107 0 40 12 0 0 11 45 0 0	A 4563 954 M 474 1 2994 M 0 3 31 103 M 3 A 1352	A 98 33 17 1 21 M 0 0 6 21 0 4 137	A 255 255 133 R 133 R 0.0 R 841 R 0.0 R 0.1 R 0.9 R 2.9 R 0.1 R	20079 FF 1840 FF 238 FF 201 FF 201 FF 201 FF 201 FF 20 FF 129 FF 0 FF 1 FF 1 FF 24 FF 24 FF 1 FF 24 FF 24 FF	(a) 57.8 42.5 15.3 25.7 6.0 2.4 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		449 300 149 92 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0 0.0 0.1
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum Cereals, Other Starchy Roots + Cassava		3564 389 42 41 2905 0 4 4 53 150 0 0 1552 348	A 1395 640 455 11 243 M 0 1 1 1 39 M 4 A 3 2	A 20 0 -5 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A M M M	36 9 1 1 9 14 0 0 0 2 1 0 0 0 0 0 0 0 0 0 0	4 4943 9999 492 43 3199 0 5 5 4 187 3 4 1585 350		12 A 0 M 0 M 0 M 10 1 1 1 1 0 A 0 M	73 A 13 1 53 0 M 0 2 3 0 M 97 A 0 M	107 0 40 12 0 0 11 45 0 0 0	A 4563 954 M 474 1 2994 M 0 3 3 1 103 M 3 4 1352 M 337	A 98 33 17 1 21 M 0 0 6 21 0 4 21 0 0 4 33 13	A 255 255 133 R 0.0 R 841 R 0.0 R 0.1 R 0.9 R 0.1 R 0.1 R 0.1 R 0.9 R	20079 FF 1840 FF 238 FF 201 FF 201 FF 201 FF 201 FF 20 FF 20 FF 129 FF 0 FF 1 FF 24 FF 24 FF 24 FF 24 FF 28 FF 28 FF 28 FF 28 FF 28 FF 28 FF 28 FF 28 FF 20 FF	(a) 57.8 42.5 15.3 25.7 6.0 24 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		449 300 149 92 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum Cereals, Other Starchy Roots + Cassava Potatoes		3564 389 42 41 2905 0 4 4 33 150 0 1582 348 980	A 1395 640 455 11 243 M 0 1 1 1 39 M 4 A 3 2 2 1	A 20 0 -5 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A A M M M	36 9 1 1 9 14 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 4943 9999 492 43 3159 0 5 4 3259 0 5 4 1555 350 981		2 A 0 M 0 M 0 M 0 M 0 1 1 1 4 5 0 A 0 M 0 M	73 A 13 1 53 0 M 0 2 3 0 M 97 A 97 A	107 0 40 12 0 0 11 45 0 0 0 0 0 0 0	A 4563 954 M 474 1 2994 M 0 31 103 M 33 A 1352 M 337 M 785	A 98 333 17 1 21 M 0 0 6 21 0 4 21 0 0 4 137 13 99	A 255 255 133 R 133 R 00 R 841 R 00 R 841 R 00 R 01 R 0.9 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R	20079 FC 1840 FC 238 FC 238 FC 201	(a) 57.8 42.5 15.3 25.7 6.0 24 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		449 300 149 92 0.8 0.2 0.0 79 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum Cereals, Other Starchy Roots + Cassava Potatoes Sweet Potatoes		3564 389 42 41 2905 0 4 33 150 0 4 53 150 0 1582 348 980 231	A 1395 640 455 11 243 M 0 1 1 1 39 M 4 A 3 2 2 1 1 0	A 20 0 -5 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A A M M M	36 9 1 1 9 14 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 4943 9999 492 43 3199 0 5 4 3159 0 5 4 187 3 4 1585 350 981 4 231		2 A 0 M 0 M 0 M 0 M 1 4 1 4 1 1 1 1 1 0 A 0 M 0 M 0 M	73 A 13 1 53 0 M 0 2 3 0 M 97 A 97 A 97 0 M	107 0 40 12 0 11 45 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A 4563 954 M 474 1 2994 M 0 31 103 M 31 103 A 1352 M 337 M 785 M 208	A 98 333 17 1 21 M 0 0 0 4 21 0 0 4 137 13 99 23	A 255 255 133 R 0.0 R 841 R 0.0 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R 9.5 R 0.1 R	20079 FC 1840 FC 238 FC 238 FC 201	(a) 57.8 42.5 15.3 25.7 6.0 24 0.0 19.3 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		449 300 149 92 0.8 0.2 0.0 79 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rye Oats Millet Sorghum Cereals, Other Starchy Roots + Cassava Potatoes Sweet Potatoes Yams		3564 369 42 41 2905 0 4 53 150 0 4 53 150 0 1582 348 980 231 7	A 1395 640 455 11 243 M 0 1 1 1 1 39 M 4 A 3 2 2 1 1 0 0 0	A 20 0 -5 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A A M M M M M	36 9 11 35 14 0 14 0 14 0 14 0 14 0 10 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1	4 4943 9999 492 43 3159 0 5 4 359 0 5 5 4 1555 350 981 6 231 6 7		A Constant of the second secon	73 A 13 1 53 0 M 0 2 3 3 0 M 97 A 97 A 97 A 0 M 97 0 M	107 0 40 12 0 0 11 45 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A 4563 954 M 474 1 2994 M 0 31 103 M 31 103 M 337 M 337 M 785 M 208 M 7	A 98 333 17 1 21 M 0 0 6 21 0 4 21 0 0 4 137 13 99 23 0	A 255 133 R 133 R 00 R 841 R 00 R 841 R 00 R 01 R 0.9 R 0.1 R 0.9 R 0.1 R 9.5 R 0.1 R 9.5 R 0.2 R	20079 FC 1840 FC 238 FC 238 FC 201 FC 201 FC 201 FC 201 FC 201 FC 201 FC 201 FC 201 FC 204 FC 24 FC 25 FC 26 FC 26 FC 27 FC 27 FC 27 FC 27 FC 27 FC 28 FC 28 FC 20 FC 29 FC 20 FC	(a) 57.8 42.5 15.3 25.7 6.0 24 0.0 19.3 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		44.9 300 149 9.2 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Milled Equivalent) Barley Matze Rys Qats Millet Sorghum Cereals, Other Starchy Roots + Cassava Potatoes Sweet Potatoes Yams Root2 Pier		3564 369 42 41 2905 0 4 53 150 0 4 53 150 0 1552 348 980 231 7 7 16	A 1395 640 455 11 243 M 0 1 1 1 39 M 4 A 3 2 4 4 3 2 1 1 0 0 0 0	A 20 -5 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0	A M M M M M	36 9 11 9 14 0 14 0 14 0 14 0 14 0 14 0 10 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 0 1 0 1 0 1	4 4943 9999 492 43 3199 0 5 4 3159 0 5 4 1585 350 981 6 231 6 7 16		A Control Cont	73 A 13 1 53 0 M 0 2 3 3 0 M 97 A 0 M 97 0 M 97 0 M 0 97	107 0 40 12 0 12 0 0 11 45 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A 4563 954 M 474 1 2994 M 00 31 103 M 31 103 M 337 M 1352 M 208 M 77 M 15	A 98 33 127 1 21 M 0 0 4 21 0 0 4 21 0 0 4 21 0 0 4 33 0 0 23 0 0 23 0 0 23	A 255 13.3 R 255 R 13.3 R 0.0 R 84.1 R 0.0 R 84.1 R 0.0 R 0.1 R 0.0 R 0.1 R 0.0 R 0.1 R 0.0 R 0.1 R 0.0	20079 FC 1840 FC 238 FC 238 FC 201 FC 201 FC 201 FC 201 FC 201 FC 201 FC 201 FC 201 FC 204 FC 24 FC 25 FC 26 FC 26 FC 27 FC 27 FC 27 FC 27 FC 28 FC 28 FC 20 FC	(a) (a) (b) (c) (c) (c) (c) (c) (c) (c) (c		44.9 300 14.9 9.2 0.8 0.2 0.0 7.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
Fragmention Grand Total + Vegetal Products + Animal Products + Cereals - Excluding Beer + Wheat Rice (Miled Equivalent) Barley Maltee Ryce Oats Miliet Sorghum Cereals, Other Starchy Roots + Cassava Potatoes Sweet Potatoes Yams Root Desr Sugarcrops +		3564 389 42 41 2905 0 4 4 33 190 0 4 53 190 0 0 1552 348 380 231 7 7 16 4801	A 1335 640 455 11 243 M 0 1 1 1 1 39 M 4 A 3 2 2 1 1 0 0 0 0 A 0	A 20 0 -5 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A A M M M M M	36 9 1 1 9 14 0 0 2 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0	A 4943 999 492 43 3159 0 5 4 3159 0 5 4 157 3 4 1555 350 981 4 231 6 7 16 4 4901		2 A 4 M 4 M 5 M 6 M 6 M 6 M 6 M 6 M 7 M 7 M 7 M 7 M 7 M 7 M 7 M 7	73 A 13 1 53 0 M 0 2 3 3 0 M 97 A 57 0 M 97 M 0 M 97 M 0 M 0 M 0 M 0 M	107 0 40 12 0 0 0 11 45 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A 4563 954 M 474 1 2994 M 00 33 31 103 M 33 A 1952 M 337 M 785 M 208 M 77 A 51	A 98 33 17 1 21 M 0 0 0 4 21 0 0 4 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 21 0 0 0 21 0 0 0 0	A 1953 255 133 R 133 R 0.0 R 841 R 0.0 R 841 R 0.0 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R 0.9 R 0.1 R 0.0 R 0.1 R 0.0 R 0.1 R 0.0 R 0.0 R 0.1 R 0.0	20079 F6 1840 F6 238 F6 201 F6 201 F6 201 F6 201 F6 201 F6 20 F6	(a) 57.8 42.5 15.3 25.7 6.0 24 0.0 19.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0		44.5 30.6 144.5 9.3 0.4 0.3 0.4 7.5 0.6 0.3 0.0 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0

In summary...

- There are various methods available to obtain food consumption levels
- May not seem that straight forward but it is possible to obtain the data



- Get development partners to give technical assistance
 - e.g. analyze household income and expenditure surveys (HIES)

In summary...

 We can NOT let the information gaps stop us from making nutritious foods available to the population



We need to accelerate the pace of development of evidence-based fortification programs



Thank you!!

Janneke H. Jorgensen, World Bank