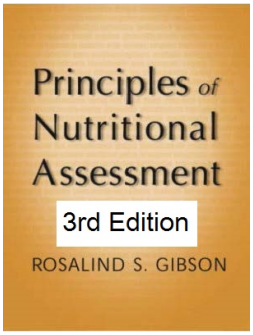


Leclercq C, Troubat N, and Gibson RS[1], Principles of Nutritional Assessment: Estimating Food Available for consumption at the National and Household Levels

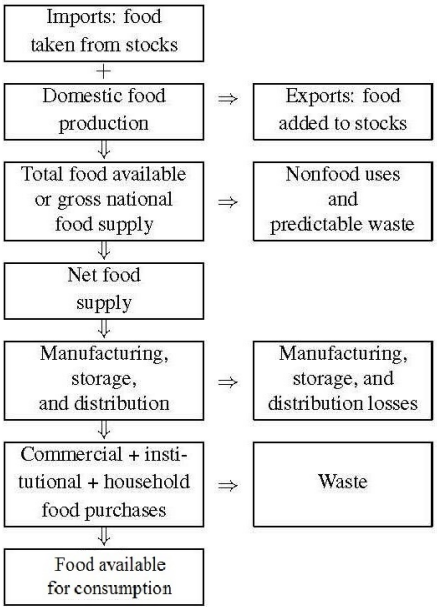
3rd Edition
February, 2023

Abstract

Several indirect *in vivo* laboratory methods are available to assess body composition. Their selection .....

CITE AS: Gibson RS. Principles of Nutritional Assessment. Body Composition: Laboratory Mehods. *https://nutritionalassessment.org/bodylabmethods/*

Email: Rosalind.Gibson@Otago.AC.NZ



Contents:

Figure 2.1. The derivation of food balance sheets. Modified from Nelson (1984)

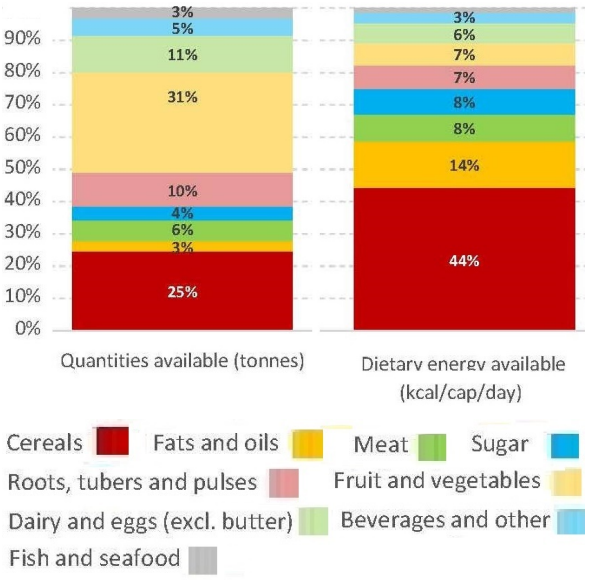


Figure 2.3.

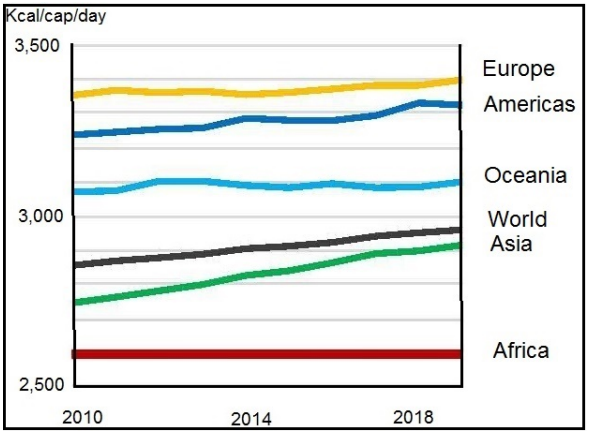


Figure 2.4.

	Prevalence of undernourishment (percent)								
	2005	2010	2015	2016	2017	2018	2019	2020*	2021*
WORLD	**12.3**	**8.6**	**8.0**	**7.8**	**7.6**	**7.7**	**8.0**	**9.3**	**9.8**
AFRICA	**20.7**	**16.5**	**15.8**	**16.3**	**16.4**	**17.0**	**17.4**	**19.6**	**20.2**
Northern Africa	8.4	6.4	5.2	5.4	5.6	5.5	5.4	5.9	6.9
Sub-Saharan Africa	23.9	18.9	18.3	18.9	18.8	19.6	20.1	22.7	23.2
Eastern Africa	33.8	26.5	24.4	25.2	25.4	26.6	27.5	30.2	29.8
Middle Africa	34.9	26.0	26.3	27.4	26.6	27.3	28.1	30.4	32.8
Southern Africa	4.9	5.8	7.4	7.4	7.5	7.4	7.9	9.1	9.2
Western Africa	12.2	9.9	10.1	10.1	10.0	10.6	10.4	13.2	13.9
ASIA	**13.9**	**9.1**	**8.0**	**7.5**	**7.1**	**7.1**	**7.4**	**8.6**	**9.1**
Central Asia	14.0	6.0	3.8	3.5	3.2	2.9	2.6	3.1	3.1
Eastern Asia	6.8	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
South-eastern Asia	17.2	10.9	7.8	6.7	6.0	5.9	5.6	5.8	6.3
Southern Asia	20.5	15.3	14.1	13.1	12.4	12.3	13.2	15.9	16.9
Western Asia	7.8	5.9	9.6	10.4	10.2	10.3	10.0	10.1	10.0
Western Asia and Northern Africa	*8.1*	*6.1*	*7.6*	*8.1*	*8.1*	*8.1*	*7.9*	*8.2*	*8.6*
LATIN AMERICA AND THE CARIBBEAN	**9.3**	**6.6**	**5.8**	**6.7**	**6.4**	**6.6**	**6.7**	**8.0**	**8.6**
Caribbean	18.7	15.2	14.2	14.5	14.4	15.2	15.2	16.5	16.4
Latin America	8.6	6.0	5.1	6.2	5.8	6.0	6.1	7.4	8.0
Central America	8.0	7.3	7.5	8.1	7.9	7.9	7.6	8.0	8.4
South America	8.8	5.5	4.2	5.4	5.0	5.2	5.4	7.1	7.9
OCEANIA	**6.8**	**6.2**	**5.7**	**5.8**	**5.8**	**5.7**	**5.6**	**5.4**	**5.8**
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**

NOTES: * Projected values based on the middle of the projected range. The full ranges of the 2020 and 2021 values can be found in Annex 2. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables inside the back cover.
SOURCE: FAO.

Figure 2.5.

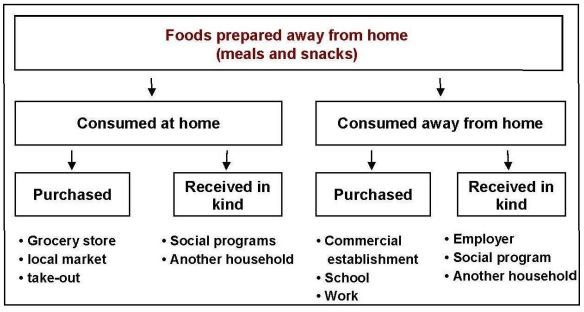


Figure 2.6.

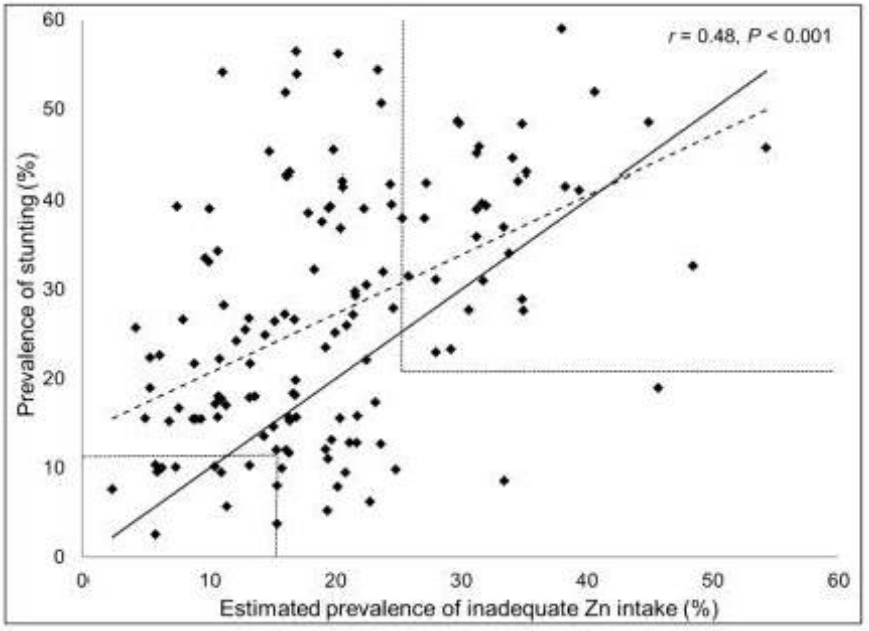


Figure 24c.7 Relationship between the estimated prevalence of inadequate zinc intake and the prevalence of childhood stunting. Stunting data (low height-for-age) are for children less than 5y in138 low- and middle-income countries. The solid line represents the line of identity (intercept=0, slope=1). The dashed line represents the best-fit regression line. Dotted lines demarcate countries with a high risk of inadequate zinc intake and where the prevalence of stunting is > 20%. From Wessells & Brown (2012).

Box 17.1. FAFH: Measurement issues to consider

- Recall period
- Respondent
- What information to collect (frequency, quantity, cost)
- Location (restaurant, school)
- Events (lunch, dinner, snack)
- Uniformity of content (not all meals are created equal)
- Seasonality

Modified from FAO WorldBank, 2018

	Domestic Supply (1000 tonnes)					Domestic Utilisation (1000 tonnes)								*Per capita* Supply		
Item	**Prod.**	**Imp.**	**Stock Var.**	**Exp.**	**Total**	**Food**	**Proc.**	**Feed**	**Seed**	**Losses**	**Oth. Use**	**Tourist**	**Resid.**	**Total Kg/y**	**Prot. KCal/d**	**Fat g/d**
Grand Total														3,540	101	126
Vegetal Products														3,002	65	92

	Domestic Supply (1000 tonnes)					Domestic Utilisation (1000 tonnes)								*Per capita* Supply		
Item	**Prod.**	**Imp.**	**Stock Var.**	**Exp.**	**Total**	**Food**	**Proc.**	**Feed**	**Seed**	**Losses**	**Oth. Use**	**Tourist**	**Resid.**	**Total Kg/y**	**Prot. KCal/d**	**Fat g/d**
Animal Products														538	36	34
Cereals - Excl. Beer	**36,178**	**8,590**	**2,629**	**7,298**	**34,840**	**14,791**	**510**	**12,899**	**2,000**	**2,621**	**2,018**	**0**	**182**	**1,366**	**42**	**5**
Wheat & products	21,500	5,178	2,599	6,449	17,630	11,655	20	2,093	1,380	1,205	1,276	0	144	1,086	36	4
Rice & products	900	448	-88	93	1,343	1,294		1	14	33	1	0	16	98	2	0
Barley & products	7,100	460	147	9	7,404		174	5,608	520	1,065	38	0				
Maize & products	5,900	2,492	-39	694	7,737	1,643	221	4,898	47	224	704	0	20	162	4	1
Rye & products	320		15	0	305	198		39	20	48		0	2	20	1	0
Oats	250	1	0	0	251	1	95	103	15	37		0	0	0	0	0
Millet & products	5	7	0	0	11			11	0	0		0				
Sorghum & products	0		0	0	0					0		0				
Cereals, Other	203	4	-5	54	159	0		146	4	9		0	0	0	0	0
Starchy Roots	**4,801**	**305**	**1**	**285**	**4,820**	**3,801**	**0**	**259**	**264**	**486**	**10**	**0**	**47**	**91**	**2**	**0**
Cassava & products		259		0	259	0		259			0	0	0	0	0	0
Potatoes & products	4,800	46	1	285	4,560	3,800	0	0	264	486	10	0	47	91	2	0
Sweet potatoes	0	0	0		0			0		0		0				
Roots, Other	1	0	0	0	1	1		0		0		0	0	0	0	0

Table 2.1

Crops	Servings[b]	Grams	Vit. A (µg RAE)	Vit. C (mg)	Ribofl. (mg)	Folate (µg)	Calcium (mg)	Zinc (mg)	% crop land
Barley	0.50	23	0	0	0.07	4	8	0.6	1.8
Broccoli	0.50	39	30	25	0.05	42	16	0.2	1.0
Cabbage	0.50	38	2	14	0.01	11	18	0.1	0.4
Carrots	0.40	18	157	1	0.01	3	6	<0.1	0.3
Groundnuts	0.50	14	0	0	0.02	27	10	0.5	3.8
Okra	0.50	40	6	7	0.02	18	31	0.2	0.8
Pumpkin	0.25	31	90	1	0.02	3	5	0.1	0.4
Spinach	0.25	23	118	2	0.05	33	31	0.2	0.6
Total	3.40	226	403	50	0.25	141	123	1.8	9.0
%adequate intakes	—	—	81	%95	%85	%84	<1%	%80	—

Table 2.2 Optimal set of crops to address micronutrient gaps in Senegal while minimizing land requirements[a]

[a] The amounts are additional amounts needed to achieve target levels of all nutrients so that the food supply provides sufficient amounts of nutrients (except calcium) for at least 80 % prevalence of adequate intakes in the population

[b] Serving sizes are in edible form, i.e., all vegetables are cooked, grains are dry but nutrients adjusted for cooking losses

Data from Arsenault et al. (2015)

	Interview surveys (%)	Diary surveys (%)	All (%)
Whether any data collected on food consumed away from home[a]	83.3	100.0	90.0
Detail of data collection[b]			
Only one line item (e.g., "Restaurant food")	36.0	7.9	23.9
Data collected for multiple places of consumption	14.0	35.0	23.3
Data collected on food received in-kind	46.0	65.0	54.4
Data collected on specific food items	28.0	40.0	32.9
Snacks explicitly referred to	26.0	35.1	29.9
Alcoholic beverages explicitly referred to	36.0	32.4	34.5
Data collected at the individual level	12.0	23.7	17.0
Recall period [b]			
Less than one week	6.0	100.0	47.8
One week	48.0	0.0	26.7
Two weeks	12.0	0.0	6.7
One month	14.0	0.0	7.8
Greater than one month	20.0	0.0	11.1

Table 2.3 Food away from home data collection.
[a] N= 100 surveys.
[b] Calculations are only for surveys for which any data are collected on food consumed away from home (N=90).
Data from Smith et al. (2014)

	Food Balance Sheets	Household Surveys
Objective	Assessment of food available for human consumption	Assessment of food actually consumed
Advantages	• Not expensive • Snapshot of overall agri-food situation • Annual basis (comparable over time)	• Attempts measuring actual consumption • More detailed in sub-national, gender, economic-strata breakdown
Disadvantages	• Sub-national level & population groups not taken into account • Doesn't measure actual consumption	• Relatively expensive • Not frequently conducted/readily available • Need to have institutional capacity and trained personnel • Data may not be fully captured (e.g. food consumed outside the house omitted) • Data may not be representative • Frequently are expenditure surveys

Table 2.4 Comparison to household surveys

	Fruit and vegetable consumption (Income Quintile — edible g/capita/day)				
	Lowest	**2**	**3**	**4**	**Highest**
Country 2	220	360	471	603	674

	Fruit and vegetable consumption (Income Quintile — edible g/capita/day)				
	Lowest	**2**	**3**	**4**	**Highest**
Country 3	123	148	163	194	258
Country 4	127	202	248	295	349
Country 5	116	173	173	205	261
Country 6	58	75	86	98	119

Table 2.5 Fruit and vegetable consumption by income quintile in Countries 2, 3, 4, 5, and 6.

Box 17.2 Domains and their accompanying recommendations

Recall versus diary and length of reference period

- Low-income countries are advised to adopt recall interviews and a seven-day period

Seasonality, number of visits

- Conduct one visit per household, spreading the sample over 12 months of fieldwork or
- Conduct two visits per household, when the timing of the visits is scheduled to capture seasonal variation

Acquisition versus consumption

- All surveys should collect data on all main modes of food acquisition, namely: purchases; household's own production; received in kind
- For consumption, it should be clear whether the questions concern food intended for consumption (including food waste) or food actually consumed (net of food waste).

Meal participation

- Preferably include an individual household member-based meal module.

Food away from home

- Design a separate module, based on a clear definition of food away from home, with data collection around meal events including snacks and drinks

List of food items

- Preferably adopt a standard food classification system for survey harmonisation e.g., food groups for COICOP classification list

Non-standard units of measurement

- Report on standard units and non-standard units with related conversion factors, where feasible for households

Acknowledgments

RSG is grateful to Michael Jory for the HTML design and his tireless work in directing the transition to this HTML version.