

# Introduction to the US Food System

Public Health, Environment, and Equity

Roni Neff, Editor

Johns Hopkins Center for a Livable Future

**J** JOSSEY-BASS™  
A Wiley Brand

# Contents

List of Figures and Tables	ix
Introduction	xvii
Acknowledgments	xxv
About the Editor	xxvi
Author Affiliations	xxvii
About the Center for a Livable Future	xxxiii
<b>Chapter 1 Food Systems</b>	<b>1</b>
<i>Roni A. Neff and Robert S. Lawrence</i>	
The Food System as a System	2
Focus 1.1. Complex Adaptive Systems	5
Focus 1.2. Food in the Food System	6
Public Health	8
The US Food System: An Overview	9
Perspective 1.1. When Your Boat Rocks, You Want Resilience	
Not Efficiency	12
Focus 1.3. Principles of a Healthy, Sustainable Food System	14
<b>PART 1 OUTCOMES</b>	<b>23</b>
<b>Chapter 2 Food System Public Health Effects</b>	<b>25</b>
<i>Brent F. Kim and Jennifer L. Wilkins</i>	
Dietary Health	26
Perspective 2.1. Gut Bacteria, Diets and Inflammation	28
Occupational and Environmental Health	33
Focus 2.1. Pesticides and Children's Health	35
Focus 2.2. Food System Workers at Risk	39
Food Safety	40
Focus 2.3. Bisphenol-A: A Ubiquitous Food System Contaminant	42
<b>Chapter 3 Ecological Threats to and from Food Systems</b>	<b>51</b>
<i>Molly D. Anderson</i>	
Status of Natural Resources and Ecosystem Services Essential	
to Food Systems	53
Focus 3.1. Assessing Ecological Integrity of Food Systems	54

	Focus 3.2. Farmland Protection	57
	Focus 3.3. Virtual Water and Food Systems	60
	Processes Through Which Ecological Health is Threatened	64
	Moving Toward More Environmentally Sustainable Practices	68
	Perspective 3.1. A Farmer's Thoughts on Defining Sustainable Farming	70
	Perspective 3.2. Consumer Perceptions of Environmentally Sustainable Foods	73
<b>Chapter 4</b>	<b>The Food System and Health Inequities</b>	<b>79</b>
	<i>Roni A. Neff, Anne M. Palmer, Shawn E. McKenzie, and Robert S. Lawrence</i>	
	Health Inequities and Food Systems in the United States	81
	Perspective 4.1. Foodies on a Mission	84
	Elaborating the Pathways	85
	Perspective 4.2. Realizing Justice in Local Food Systems	90
	Perspective 4.3. The People Who Touch Your Food	93
	Perspective 4.4. Contract Chicken Farming	94
	Perspective 4.5. Food, Equity, and Health: Making the Connections in Public Health Practice	97
<b>Chapter 5</b>	<b>Public Health Implications of Household Food Insecurity</b>	<b>107</b>
	<i>Mariana Chilton, Amanda Breen, and Jenny Rabinowich</i>	
	Definition, Distribution, and Determinants of Food Insecurity	108
	Perspective 5.1. Witnesses to Hunger: Participation by Those Who Know Poverty and Hunger Firsthand	112
	Nutrition Assistance Programs	114
	Perspective 5.2. The Wrong Path Forward: Restricting Food Choices in SNAP	118
	Perspective 5.3. A Defense of Excluding Foods of Minimal Nutritional Value from SNAP	119
	Perspective 5.4. The Public Health Case for Universal Free School Meals	121
	Focus 5.1. What Do People Do When They Are Worried about Feeding Their Families?	124
	Broader Perspectives	125
<b>Chapter 6</b>	<b>Community Food Security</b>	<b>135</b>
	<i>Anne M. Palmer, Wei-Ting Chen, and Mark Winne</i>	
	History and Evolution of CFS	137
	Focus 6.1. Food Hubs: Supporting Healthy Farms, Healthy People, Healthy Economy	139
	Measuring Community Food Security	141
	CFS Policies at Multiple Levels	144
	How Does CFS Change Happen?	146
	Focus 6.2. Case Study: Iowa Food Systems Council, a Second-Generation Food Policy Council	147

	CFS and Public Health	148
	Challenges for the CFS Field	148
	Perspective 6.1. The City That Ended Hunger	150
<b>PART 2</b>	<b>DRIVERS OF THE FOOD SYSTEM</b>	<b>157</b>
<b>Chapter 7</b>	<b>Food System Economics</b>	<b>159</b>
	<i>Rebecca Boehm, Sean B. Cash, and Larissa S. Drescher</i>	
	Economics Boiled Down: Models, Optimization, Equilibrium, and Social Optimality	160
	Agriculture and Food Production	163
	Food Manufacturing and the Food Supply Chain	168
	Focus 7.1. Price Transmission in the Distribution System: Retail Responses to Supply Price Changes	170
	Food Consumption	171
	Focus 7.2. US Farm Subsidies Do Not Make Americans Fat	174
	Focus 7.3. Recent Progress in Private Sector Voluntary Initiatives to Promote Healthy Eating	177
<b>Chapter 8</b>	<b>Policies That Shape the US Food System</b>	<b>185</b>
	<i>Mark Muller and David Wallinga</i>	
	Federal Food System Legislation: The Process	189
	Focus 8.1. Turning Policy Ideas into Legislative Realities	190
	How Alliances Shape Policy	190
	Focus 8.2. A Brief Look at Agenda-Setting, Policy Analysis, and Food Systems	192
	The Policy-Making Process and the Role of Stakeholders: The Farm Bill as an Example	193
	The History of US Food and Agriculture Policy: An Overview	194
	Perspective 8.1. Why America's Food is Still Not Safe	198
	Perspective 8.2. Produce Imports	200
	The Politics of Food System Policy: The Farm Bill as an Example	203
	How Policy Drives the Future Food System: The Role of Price State and Local Policy	204
	Focus 8.3. Preemption and Local Food and Agriculture Policies	208
<b>Chapter 9</b>	<b>Food, Culture, and Society</b>	<b>215</b>
	<i>Sarah Chard and Erin G. Roth</i>	
	Culture and Food	217
	Perspective 9.1. Beyond White Bread, a Better Society?	217
	Foodways and Identity	219
	Food As Ritual	221
	Focus 9.1. Food and Faith	222
	Food, Healing, and Health Beliefs	225
	Food and Gender	226
	Food, Power, and Politics: Food Movements	228

	Perspective 9.2. Zombies, Food Writing, and Agribusiness Apocalypse	229
	Implications For Food Systems	232
<b>Chapter 10</b>	<b>Promotional Marketing: A Driver of the Modern Food System</b>	<b>237</b>
	<i>Corinna Hawkes</i>	
	What Are Food Marketing and Promotion?	238
	Types of Food Promotion	239
	Focus 10.1. “Supermarketing” and the Impact on Food Choice	240
	Segmentation and Targeting in Food Promotion	242
	Focus 10.2. POP! Point-of-Purchase Nutrition Labels Are Everywhere: Who Benefits?	244
	Extent of Food Promotion	245
	Where Promotional Marketing Fits Into the Modern Food System	246
	Dietary Effects of Promotional Marketing	250
	Perspective 10.1. Front Groups: Who is Shaping the Conversation about Health and Wellness?	252
	Responses From Government and Industry	253
<b>PART 3</b>	<b>FOOD SUPPLY CHAIN: FROM SEED TO SALES</b>	<b>263</b>
<b>Chapter 11</b>	<b>Crop Production and Food Systems</b>	<b>265</b>
	<i>Charles A. Francis</i>	
	History of Farming Systems—From Local to Industrial	266
	Traditional Systems in the United States	267
	Emergence of an Industrial Agriculture	267
	Perspective 11.1. The Relevance of Genetically Engineered Crops to Sustainable Agriculture	269
	Industrial Crop Farming: An Overview	271
	Focus 11.1. The Proliferation of Corn	273
	Farms Producing for Local and Regional Markets	274
	Perspective 11.2. A Bright Future for Farmers in the “Middle”?	274
	Agroecology and Organic Farming	277
	Crop Production—Impacts on Environment, Food Security, Public Health, and Society	278
<b>Chapter 12</b>	<b>Food Animal Production</b>	<b>289</b>
	<i>Brent F. Kim, Leo Horrigan, David C. Love, and Keeve E. Nachman</i>	
	Focus 12.1. Seafood Harvest and Production	292
	Industrialization of Food Animal Production	294
	Perspective 12.1. Husbandry and Industry: Animal Agriculture, Animal Welfare, and Human Health	294
	Public Health Impacts of IFAP	300
	Focus 12.2. A Case Study in Rural Community Exposures: Yakima Valley, Washington	303
	Perspective 12.2. Living in Duplin County	304

Global and Ecological Concerns	307
Agroecological Approaches to Food Animal Production	308
Policy and Dietary Change	309
Focus 12.3. The Pew Commission on IFAP: Policy Recommendations and Barriers to Reform	309
<b>Chapter 13 Food Processing and Packaging</b>	<b>317</b>
<i>George A. Cavender</i>	
Food Processing	318
Perspective 13.1. Food Technology: Equal Partner for a Healthy Future	321
Perspective 13.2. Ten Food Secrets You Need to Know	323
How Do We Process Foods?	324
Focus 13.1. On the History of Freshness	328
Food Packaging	331
Food Processing and Packaging: Challenges	335
Perspective 13.3. Ultra-Processing and a New Classification of Foods	338
Food Processing and the Environment	340
<b>Chapter 14 Food Distribution</b>	<b>345</b>
<i>Edward W. McLaughlin and Miguel I. Gómez</i>	
Primary Segments of the Food Distribution System	348
Evolution of US Food Distribution	352
Perspective 14.1. The Impact of Walmart	353
Perspective 14.2. Walmarting the Food Chain	355
Focus 14.1. The Growth of Private Label Products in the US Supermarket Sector	358
System Trends in Consumer Expenditures	361
Focus 14.2. Regional Food Systems	363
Focus 14.3. Local Food Systems	363
The Future of Retail Food Distribution	365
<b>PART 4 FOOD IN COMMUNITIES AND ON TABLES</b>	<b>371</b>
<b>Chapter 15 Food Consumption in the United States</b>	<b>373</b>
<i>Alanna Moshfegh</i>	
Changing Eating Patterns	376
Focus 15.1. Methods for Assessing Diets of Individuals	377
Focus 15.2. National Dietary Surveys in the United States	378
Perspective 15.1. The Supersizing of America: A Time for Action	381
Meal Patterns—When We Eat	383
What We Eat	387
Focus 15.3. What about the Food That’s Not Eaten? Food Waste in America and Its Ecological Impacts	392

<b>Chapter 16 Nutrition</b>	<b>399</b>
<i>Courtney A. Pinard, Amy L. Yaroch, and Teresa M. Smith</i>	
Perspective 16.1. Consumer Perspectives	401
What Is Nutrition?	403
Nutrients 101	403
Focus 16.1. The Science behind Food and Addiction and the Potential Impact on the Food System	405
Other Nutrients	411
Other Considerations: Additives and Naturally Occurring Chemicals In Food; Organic Food	416
Perspective 16.2. Reasonable Certainty of No Harm?	416
Public Health Nutrition Approaches	418
<b>Chapter 17 Healthy Food Environments</b>	<b>425</b>
<i>Patricia L. Truant and Roni A. Neff</i>	
What Is a Food Environment?	426
Focus 17.1. Measuring the Food Environment	429
Equity	431
Perspective 17.1. Connecting Civil Rights to Contemporary Food Justice	434
Homes, Schools, Workplaces	435
Perspective 17.2. Striving for “Food Service for a Sustainable Future”	439
The Built Food Environment	440
Focus 17.2. Is There a Map for That? Using GIS Maps to Understand Our Food Systems	441
Focus 17.3. Connecting People and Their Food Systems: Why Gardens Matter	447
<b>Chapter 18 Intervening to Change Eating Patterns: How Can Individuals and Societies Effect Lasting Change through Their Eating Patterns?</b>	<b>457</b>
<i>Linden Thayer, Molly DeMarco, Larissa Calancie, Melissa Cunningham Kay, and Alice Ammerman</i>	
Designing Successful Dietary Change Interventions	460
Focus 18.1. Framing Public Health Messages to Improve Diet: Taking Measures to Avoid Weight Stigma	463
Case Studies	466
Focus 18.2. Meatless Monday: A Simple Idea That Sparked a Movement	467
Focus 18.3. Real Food Challenge	470
Perspective 18.1. Building a Better Food Environment	473
Future Directions For Dietary Change Interventions	477
Glossary	483
Photo Credits	501
Index	511

Cover design by Wiley  
Fruit image © littleny | Thinkstock  
Crop Duster image © Brian Brown | Thinkstock  
Sky image © Brian Brown | Thinkstock  
Wheat Field image © Brian Brown | Thinkstock  
Multicultural hands holding fresh potatoes image © Dougal Waters | Getty

Copyright © 2015 by John Wiley & Sons, Inc. All rights reserved.

Published by Jossey-Bass  
A Wiley Brand  
One Montgomery Street, Suite 1200, San Francisco, CA 94104-4594—[www.josseybass.com](http://www.josseybass.com)

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400, fax 978-646-8600, or on the Web at [www.copyright.com](http://www.copyright.com). Requests to the publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, 201-748-6011, fax 201-748-6008, or online at [www.wiley.com/go/permissions](http://www.wiley.com/go/permissions).

**Limit of Liability/Disclaimer of Warranty:** While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor author shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages. Readers should be aware that Internet Web sites offered as citations and/or sources for further information may have changed or disappeared between the time this was written and when it is read.

Jossey-Bass books and products are available through most bookstores. To contact Jossey-Bass directly call our Customer Care Department within the U.S. at 800-956-7739, outside the U.S. at 317-572-3986, or fax 317-572-4002.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at <http://booksupport.wiley.com>. For more information about Wiley products, visit [www.wiley.com](http://www.wiley.com).

**Library of Congress Cataloging-in-Publication Data**

Introduction to the US food system : public health, environment, and equity / Roni Neff, editor.

p. ; cm.

Includes bibliographical references and index.

ISBN 978-1-118-06338-5 (paperback)—ISBN 978-1-118-91306-2 (pdf)—ISBN 978-1-118-91305-5 (epub)

I. Neff, Roni, 1967- editor.

[DNLM: 1. Food supply—United States. 2. Environment—United States. 3. Food Industry—United States. 4. Nutritional Physiological Phenomena—United States. 5. Public Health—United States. WA 695]

RA601

363.80973—dc23

2014015934

Printed in the United States of America  
FIRST EDITION

*PB Printing* 10 9 8 7 6 5 4 3 2 1



## List of Figures and Tables

### Figures

I.1	Center for a Livable Future Concept Model	xviii
I.2	Textbook Concept Model	xix
I.3	Child's Poster about Healthy Food Placed on City Buses	xxii
I.4	Seniors Choosing Vegetables	xxii
I.5	Cows at Albright Farm	xxii
I.6	Students Eating Lunch	xxii
I.7	Lunchables	xxiii
I.8	Baby Eating Spaghetti	xxiii
I.9	Green Buffers, Clean Water	xxiii
I.10	Man with Carrots	xxiii
1.1	The Food System	4
1.2	Industrial Cattle Production Facility	6
1.3	Uniform Apples in Grocery Store	7
1.4	Farmers Market Apples	8
1.5	Meatscape (Reflecting "How the World is Used")	9
1.6	Human Dignity: Workers Standing up for an Increase in the Minimum Wage	16
1.7	Wicked Problems	18
1.8	Even with Its Limitations, Our Food System Provides for Us in Many Ways	20
P.1	Part 1 Concept Model	23
2.1	Clinician's Prescription for Fruits and Vegetables	27
2.2	US Deaths (in Thousands) Attributable to Modifiable Risk Factors, by Disease, in 2005	28
2.3	Obesity Prevalence among US Adults, Children, and Adolescents, 1960–2010	30
2.4	Worker Pouring Roundup for Use	34
2.5	Nearly One in Five Meat Processing Workers Is Injured Each Year	38
2.6	<i>Salmonella</i>	42
2.7	BPA Exposure Framework	44
3.1	Bee Pollination Directly or Indirectly Benefits about One Mouthful in Three of the US Diet	53
3.2	Soybean Monoculture Crop Being Sprayed by Crop Duster	54
3.3	Energy Expended in Producing and Delivering One Food Calorie in the United States	55
3.4	Sustainability Labels	55

---

3.5	Soil Degradation around the World	57
3.6	Farmland Conversion from 1982–2007. Every state lost agricultural land.	57
3.7	Food in the Path of Development, Produced in Counties Subject to Urban Influences	58
3.8	Links between Energy Prices and Food Prices	63
3.9	Lifecycle Greenhouse Gas Emissions from Common Proteins and Vegetables	65
3.10	Extreme Weather Events and Corn Yields	65
3.11	Gulf of Mexico Dead Zone	67
3.12	US Meat and Poultry Availability per Capita	67
3.13	How Much Consumers Think about Food Sustainability	73
3.14	Environmental Sustainability-Related Actions Consumers Take	73
4.1	Life Expectancy at Birth, 2011	81
4.2	Health Inequities Model	82
4.3	Population-Based Interventions May Increase Health Disparities	83
4.4	Cheeseburgers versus Salad: The Importance of Price (poster reflecting quote from focus group participant)	86
4.5	Corner Store	89
4.6	Restaurant Opportunities Center Protest	94
4.7	Carole Morison on her current farm	96
4.8a	Charts from the Hands That Feed Us	96
4.8b	Wages and Working Conditions for Food Chain Workers	97
5.1	Some Families Reduce Their Spending on Food in Order to Pay for Their Medicines	110
5.2	Restaurant	111
5.3	Breakfast	112
5.4	Deep Freezer	113
5.5	My Neighbor’s Kitchen	113
5.6	Number 9,584	113
5.7	Hungry Child Asking Caseworker for Something to Eat	114
5.8	Oodles of Noodles	117
5.9	Child Enjoys a Crisp Apple at Lunch	121
5.10	Comparison of Select Coping Strategies by Food Security Level	125
6.1	Mobile Produce Truck	137
6.2	Local Food Hub Warehouse	140
6.3	Mayor Stephanie Rawlings Blake Announcing SNAP EBT Program at Baltimore Farmers Market	141
6.4	The Role of CFAs in the Design of Strategies for Change	142
6.5	Dynamic Community Food Assessment Process	143
6.6	Rose Street Garden, Baltimore	145
6.7	ABC Bulk Produce Markets: These markets stock the items that the city determines will be sold at a fixed price, about 13 cents a pound	151
6.8	The Line for One of Three “People’s Restaurants” a Half Hour before Opening Time: Meals at these restaurants cost about 50 cents, and diners come from all socioeconomic groups	151
P.2	Part 2 Concept Model	157
7.1	Some shoppers are willing to pay higher prices for healthy or organic food	161
7.2	Underwood Farm Feedlot Runoff, North Dakota	164

7.3	Rominger Brothers Farm	166
7.4	Corn Production	167
7.5	Visualization of the Market Structure of Subsectors of the US Food System	168
7.6	Sugar-Sweetened Beverages	173
8.1	Geographic Distribution of Districts of House (above) and Senate (below) Agriculture Committee Members in the 113th Congress (2013–2014)	194
8.2	Eroded Land During the Dust Bowl	196
8.3	A Poster Advertising “Plenty of Food for Everyone”	197
8.4	Government Inspectors at a Nebraska Meatpacking Plant in 1910	198
8.5	A Sampling of Governmental Agencies with Partial Oversight of US Food Safety	199
8.6	Total US Fresh and Processed Produce Imports (in Billions of Pounds)	201
8.7	“Every Child Needs a Good School Lunch,” 1941–1945	203
8.8	Pesticide Applied to Lettuce in Yuma, Arizona	204
9.1	Bugs and Scorpions in Market, China	217
9.2	“In Homes Where Children Are Well-Cared-For, You Will Usually Find Bond Bread,” 1928 advertisement	219
9.3	Crabs	220
9.4	Halal Food Store, Minneapolis	221
9.5	Seder Plate	222
9.6	Picking up a CSA Share at the Franciscan Center	224
9.7	“Danger—Men Cooking”	226
9.8	Zombie	230
9.9	Waverly Farmers Market	231
10.1	Mikaela Shiffrin Promotes Wheaties	239
10.2	Racecar with Red Bull Advertisement Targets Nascar Fans	243
10.3	Facts Up Front FOP System, a Facts-Based Label	244
10.4	Supermarket “Better for You” Advice	245
10.5	Jell-O Box Provides an Opportunity for Brand Promotion, 1915	247
10.6	The Quaker Oats Mascot Quickly Became a Familiar Face Due to Mass Marketing	247
10.7	As Health Concerns Grew, McDonald’s Introduced Healthy Items, Such as Apple Slices, to Its Menu	249
10.8	Center for Consumer Freedom Advertisement Targets Ban on Large-Size SSBs, Depicts Mayor Michael Bloomberg as “The Nanny”	253
10.9	“More Matters” Social Marketing Campaign Logo	255
P.3	Part 3 Concept Model	263
11.1	Farmer Plowing with Horse for Traction	266
11.2	Moving Westward: Nebraska Farm Family, 1888	267
11.3	Adoption of GE Crops in the United States, 1996–2013	269
11.4	Typical Relations among Farmers and Other Agents in Corn and Soybean Commodity Crop Growing Networks	273
11.5	US Corn Production, 1961–2011	274
11.6	Examples of Agriculture of the Middle Brands	275
11.7	Locally Grown Romanesco Broccoli from Malcolm’s Market Garden in Augusta County, VA	276
11.8	Earthworms are One Sign of Healthy Soil	277

11.9	Frog with Partially Missing Hindlimb	279
12.1	US Beef, Pork, and Chicken Production, Carcass Weight in Billions of Pounds, 1910–2011	290
12.2	Average per Capita Availability of Animal Products, 2009	291
12.3	Average Consumer Prices and Farmers' Share of Retail Value for Selected Animal Products, 1950–2000	292
12.4	Aquaponics	293
12.5	Consolidation in Hog Production	297
12.6	IFAP Operations	297
12.7	Hogs and Pigs Inventory, 2007	298
12.8	Concentration in Animal Slaughter and Processing Industries	299
12.9	Waste Storage Pit for a Nine-Hundred-Head Hog Operation in Georgia	300
12.10	Claggett Farm Produces Grass-Fed Beef and a Variety of Organically Grown Vegetables	308
13.1	Cassava Tuber	319
13.2	When is Beef not Beef?	321
13.3	Honey: Nature's Food Processing	322
13.4	High-Pressure Processing Apparatus	325
13.5	Food Retort	327
13.6	1930 Iceberg Lettuce Advertisement	329
13.7	Many Consumers Prefer to Purchase Foods Wrapped in Protective Packaging	331
13.8	Old Soda Cans	332
13.9	Some Common Polymer Packages	335
13.10	Freezing Can Cause Undesirable Texture Changes in Foods Such as These Frozen Vegetables	337
14.1	Major Distribution Channels for US Food Products and Flows	347
14.2	Large-Scale Wheat Farm	348
14.3	Wholesale Food Warehouse	350
14.4	Subway Is the Largest Fast Food Chain in the US Food Service Sector	351
14.5	Fresh Produce Section in Walmart	354
14.6	Walmart Critics State That Substandard Wages Keep Many Employees below the Poverty Line	354
14.7	Number of Farms and Average Farm Size, 1900–2007	356
14.8	Percent of US Labor Force Working on Farms, 1900–1990	357
14.9	Market Shares for US Grocery Chains, 1929–2008	357
14.10	Private Label Penetration in the US Supermarket Sector	358
14.11	O Organics Is a Private Label of Safeway	359
14.12	Allocation of Food Expenditures by Channel, 1910–2010	359
14.13	Allocation of US Consumer Food Expenditures 1970–2008	361
14.14	US Food Expenditures 1930–2010 (as a Percentage of Disposable Income)	361
14.15	Number of US Farmers Markets, 1994–2011	362
14.16	Seasonal Produce at the Market	362
14.17	CSA Weekly Share Items	364

P.4	Part 4 Concept Model	371
15.1	Bananas: Our Food Choices Shape the Food System	374
15.2	Times Have Changed!	375
15.3	Dole Honduras Ship Unloading Imports in San Diego	376
15.4	Changes in Calories and Sources of Calories in American Diets: 1977–1978 to 2007–2008	379
15.5	Parallel Trends in Rates of Overweight and Obesity, Calories Available in the Food Supply, and Introduction of New Large Size Portions, United States, 1960–2009	382
15.6	Contribution of Meal and Snacks to Energy, Sources of Energy, 2007–2008	384
15.7	McDonald’s McGriddle Is Eggs, Bacon, and Cheese Sandwiched between Two Pancakes	384
15.8	Cereal Label Showing Nutrients	385
15.9	Vending Machines Facilitate Snacking	386
15.10	Change in Percentage Reporting Fruits and Vegetables	390
16.1	(a) Most People Are Thinking about the Healthfulness of Their Food; (b) Most Are Making Efforts to Improve Their Diets; (c) Taste and Price Lead the List of Reasons for Food Choices, but Healthfulness Is Third; Over One-Third of Respondents Count Sustainability as an Important Factor; (d) Although Consumers Do Take Some Control over Their Weight, They Describe Numerous Barriers, within and outside of Themselves; (e) Consumers Express Confusion about How Best to Eat Healthfully	401
16.2	Grains Are a Main Source of Carbohydrates	404
16.3	Spaghetti Sauce Label Featuring Organic Evaporated Cane Juice (Sugar)	407
16.4	Meats and Cheese Contain Saturated Fats	408
16.5	Trans Fats Levels Decline	409
16.6	Quinoa Contains All of the Essential Amino Acids	410
16.7	Supply Chain: Production to Consumption and Potential Points of Intervention	419
17.1	Socioecological Model	427
17.2	Farmer’s Fridge Healthy Vending Kiosks	428
17.3	The Contiguous United States as Visualized by Distance to Nearest McDonald’s	429
17.4	USDA Food Environment Atlas	430
17.5	Family Cigarette Grocery Store	431
17.6	2012 Baltimore City Food Environment Map	433
17.7	Bowl of Fruit on the Counter	435
17.8	Newer Supermarkets with Parking Areas Gained in Popularity Compared to Older, More Urban Ones without Them	443
17.9	Shuttered Supermarket in a Small Town	443
17.10	The Type and Quality of Food, the Atmosphere, and the Convenience of a Restaurant May Entice a Family to Eat out Instead of Eating In	445
17.11	Baltimore’s Virtual Supermarket Program Delivers Groceries to Libraries, Senior Centers, and Other Community Sites	447
17.12	Volunteers at Atlantis Community Garden	448
17.13	Mentors and Youth at Youth Farmers Market	449
18.1	Diagram of the Socioecological Model	459

18.2	Meatless Monday Encourages Consumers to Cut Out Meat Every Monday	467
18.3	Students Picking Greens from Their School Garden	470
18.4	Real Food Wheel	471
18.5	Scene from a Corner Store Intervention: Fresh, Healthy Options Next to Snack Foods	473

## Tables

1.1	Key Food System Challenges	11
2.1	Direct Medical Costs Associated with Diet-Related Disease in the United States	33
2.2	Work-Related Injuries and Fatalities Associated with Selected Food System Industries	38
2.3	Selected Pathogens Commonly Responsible for Food-borne Illness in the United States, 2000–2008	41
2.4	The Twelve Conventionally Grown Fruits and Vegetables Most Contaminated with Pesticides	45
3.1	Causes of Soil Degradation	56
3.2	Major Agricultural Impacts on Water Quality	61
5.1	Categorizations of Food Security Status as Measured by the USDA	109
5.2	Nutrition Assistance Programs Administered by the USDA FNS	115
5.3	Percentage of People Using Select Coping Strategies When Concerned about Food Sufficiency	124
7.1	Types of Market Structure in the US Food System	169
7.2	CR4 Scores for Food Manufacturing Industries	169
7.3	Estimates of Price Elasticities for Major Food and Beverage Categories	173
8.1	Examples of Food System Policies That Could Potentially Advance Public Health	187
9.1	Faith Traditions and Selected Food-Related Texts	223
10.1	Communications Channels and Marketing Techniques Commonly Used by Leading US Food and Beverage Companies	240
10.2	The Three Leading Food Categories Marketed to Children and Youth in the United States, 2006	246
10.3	Examples of Studies of the Nutritional Content of Food Advertisements, 1970s–2010s	250
10.4	Findings of the IOM Committee on Food Marketing and the Diets of Children and Youth	251
12.1	Percentage of US Food-Producing Animals from Large-Scale Operations, 2012	297
13.1	Selected Physical Unit Operations	325
13.2	Selected Thermal Unit Operations	326
13.3	Selected Temperature-Lowering Operations	327
13.4	Common Additives and Their Functions	331
13.5	Common Packaging Materials in the United States Today	333
14.1	US Food Distribution System, 1954–2007: Establishments, Sales, and Employment	346
14.2	Distribution of Employment in Food Manufacturing	349
14.3	Retail Store Numbers, Dollar Share and Sales, Grocery and Consumables, 2011	350
14.4	2011 US Food Service Industry Retail Sales	351
14.5	2012 Food Industry Forecast (Percentage of Food Executive Respondents)	366

---

15.1	Mean Daily Intakes of Energy and Selected Nutrients by Age and Gender, Race and Ethnicity, and Income Status in the United States, 2007–2008	380
15.2	Percent of Daily Mean Intakes of Select Nutrients Provided by Meals and Snacks in the United States, 2007–2008	385
15.3	Daily Mean Food Intakes and Their Contribution to Daily Energy and Sources of Energy in the United States, 2007–2008	387
15.4	Daily Mean Beverage and Water Intakes and Their Contribution to Daily Energy in the United States, 2007–2008	388
16.1	Carbohydrate Types	404
16.2	Types of Protein Sources, and Total Fat and Saturated Fat Content	411
16.3	Vitamins	412
16.4	Minerals	414
17.1	Examples of Interventions in Home, School, and Workplace Environments	437
17.2	Examples of Food Environment Interventions in Retail and Restaurants	446
18.1	Individual-Level Health Behavior Theories	462
18.2	Interpersonal-Level Theory	463
18.3	Comparing Impact of Interventions Targeted to Different Levels of the Socioecological Model (SEM)	465



## Dedication

### *Bob Lawrence*

*Bob Lawrence founded the Center for a Livable Future in 1996 and led its development into the thriving interdisciplinary academic center it is today. We all owe so much to his mentorship, vision, and personal example. As this book goes to press, Bob has announced his retirement; we will miss him greatly.*



### *Helaine and Sid Lerner*

*The Lerner have been dedicated advocates for measures to improve our food system and supporters of the Center for a Livable Future's mission since its inception.*



### *Andy Pasternack*

*Andy Pasternack of Jossey-Bass reached out initially about developing this book and stewarded its initial phases with kindness, thought, and patience. Sadly, he passed away before the book was completed.*



### *Educators and students of the food system*

*Finally, the book is dedicated to the educators and students who will read it. Your enthusiasm for creating a better food system inspires us all. We hope this book gives you the tools you need to make it happen!*



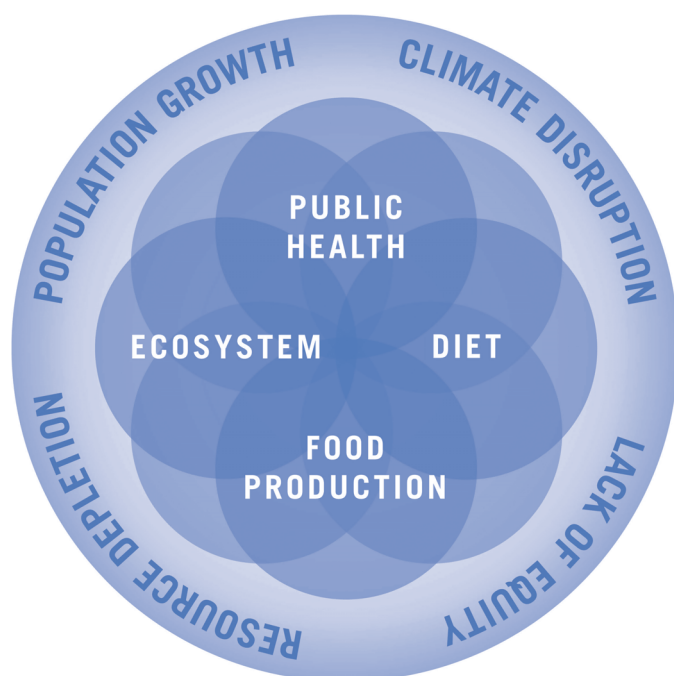
## Introduction

This textbook provides an overview of the US food system, with particular focus on the food system's interrelationships with public health, the environment, equity, and society. Through eighteen chapters and seventy-four focus and perspective boxes, authored altogether by one hundred and six food system experts, this book brings together information and perspectives reflecting the breadth of issues and ideas important to understanding today's US food system and to shaping its future. The readings highlight issues of public health, ecological impact, and implications for communities, equity and society more broadly; they address as well supply, demand, cost, stakeholder interests, history, power, politics and policy, ethics, and culture.

Student interest in the food system has grown dramatically since the new millennium, and academic courses and programs addressing the food system have proliferated. This book is intended to address the need for textbook material covering broad food system issues, and focusing on the food system's relationship with the public's health more specifically. Our aims are for the book to provide a resource to educators from a variety of disciplines, support their efforts to meet growing student demand for course work on food system topics, engage students, stimulate critical thinking, and, overall, to help students better understand our food system.

The book is a project of the Johns Hopkins Center for a Livable Future (CLF), an academic center founded in 1996 with the mission to “examine the complex interrelationships among diet, food production, environment and human health, to advance an ecological perspective in reducing threats to the health of the public, and to promote policies that protect health, the global environment and the ability to sustain life for future generations.” Figure I.1 presents the concept model that frames our activities ([www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/about](http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/about)). Based at the Johns Hopkins Bloomberg School of Public Health, the CLF engages in research, education, policy, practice, and communications activities on diverse issues at the intersection of food systems and public health. This book advances the CLF's educational mission and builds on our experience as an interdisciplinary, food-system–focused academic center within a school of public health and within the Johns Hopkins University. The book reflects input from many CLF faculty members, staff, CLF-Lerner Fellows, research assistants, and colleagues across the public health school and the university, as well as many external colleagues.

This textbook is designed for use in food-system courses taught in many types of departments or schools, for example, public health, nutrition, environment, policy, planning, geography, nursing, business, and sociology, as well as in interdepartmental offerings. We expect it will be used in introductory courses at the advanced undergraduate and graduate levels. The book's chapters cover the core content of the food system and are presented with enough explanations to make it useful for those with little background in the food system, and it also shares the complexities stimulating to those with more knowledge and experience. The focus and perspective boxes add depth and fodder to enrich discussions

**FIGURE I.1** Center for a Livable Future Concept Model

most of the core competency areas for public health—all of which have relevance for other fields as well: analytical and assessment skills, policy development and program planning skills, communication skills, cultural competency skills, community dimensions of practice skills, ethical analysis skills, and leadership and systems thinking skills (Council on Linkages Between Academia and Public Health Practice, 2010).

Another strength of the book is the diversity of the chapter and focus and perspective authors, many of whom are leaders in their fields. The contributors approach their material from within a variety of disciplinary perspectives and languages. In some chapters, public health is emphasized throughout, in others, the authors approach the topic from their own lenses and encourage students to connect the information back to public health, environment, equity, and systems issues. This diversity of approaches can help strengthen students' understanding and can provide a foundation to help them interface with the range of food-system stakeholders and approaches.

This textbook aims to be comprehensive in the sense of addressing the major food-system topics, but it cannot possibly be comprehensive in the sense of covering every process, project, idea, and issue, not only because of the sheer number of these but also because this is a vibrant and growing field. Additionally, although the US food system is intimately intertwined with global food systems, this book would be many times longer if it sought to do justice to global issues as well as domestic ones.

and assignments. We also intend for the book to be useful to those outside of academia seeking a solid introduction to food-system issues.

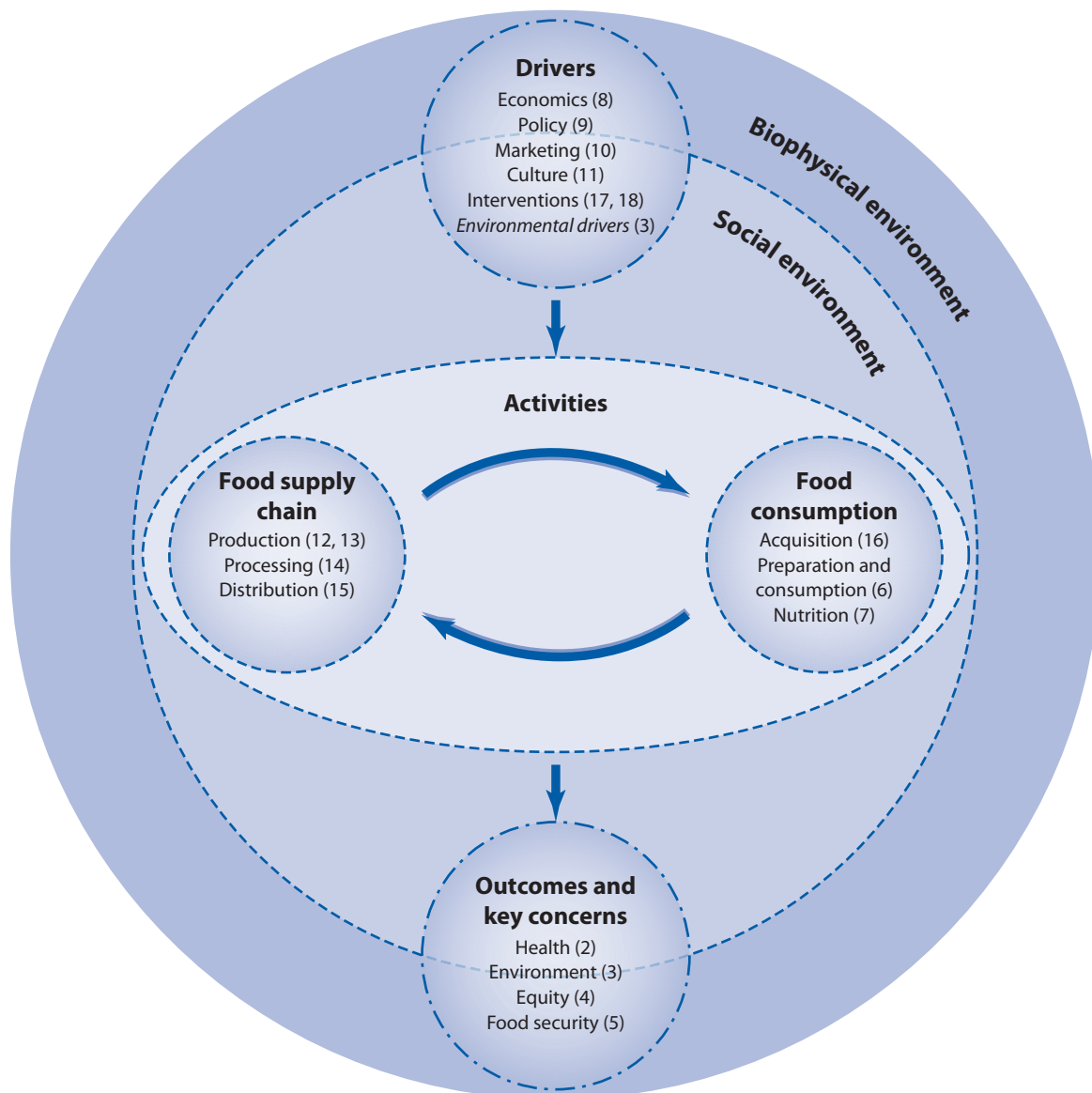
For many students, learning about food systems goes beyond the academic. This book and its associated discussion questions and online instructional activities present content and exercises that engage students personally and professionally. Students are encouraged to leave the classroom and computer to supplement their learning in the real world—at the table, in the store, at farms or gardens, and in sites throughout their communities. Additionally, through sometimes provocative content, the book pushes students to think critically and to question popular assumptions—as well as the ideas put forward by the authors.

While challenging students, the activities and discussion questions also target

## WHAT'S INSIDE

What is the best way to organize a textbook about a system? By definition, all the parts interact and overlap. Figure I.2 provides a simplified visual organizing framework indicating primary ways in which the chapter content interrelates. Activities, drivers, and outcomes are numbered to reflect chapters in this book. Selected examples are shown for each category in the outer ring. We will return to this

**FIGURE I.2** Textbook Concept Model



Note: Numbers refer to Chapters

model in each section overview, highlighting the section's connection to the whole. Throughout the chapters, and the focus and perspective features, we have sought to minimize repetition, referring the reader to discussion elsewhere in the book. Nonetheless, some repetition is necessary in order to provide appropriate overviews within the context of particular chapters, and different authors often approach topics from quite different angles.

## PARTS

**Introduction.** Chapter 1, the introduction, begins by explaining food systems, systems approaches more generally, and what is meant by a “public health approach.” It then provides a broad overview of the US food system including its key dimensions, components, and challenges. Finally, it examines approaches to food-system change from the perspectives of public health and the human right to adequate food, and provides examples of changes underway.

**Part 1: Outcomes.** Part 1 provides the book's orientation and motivation by describing how the food system affects public health (chapter 2), the environment (chapter 3), equity (chapter 4), food insecurity (chapter 5), and community food security (chapter 6). (The last two, of course, are linked to the former three, but given their centrality, they merited their own chapters.) These chapters describe a wide variety of food-system impacts, both salutary and not, and help the reader understand that many of these impacts are not inevitable but rather are products of the specific ways in which our food system has evolved. Alternatives to the mainstream food system and their ramifications are also discussed. The food system also affects many other aspects of our world beyond these four, from the economy to community life. Such topics also appear in this part and are threaded through the rest of the book.

**Part 2: Drivers of the Food System.** Part 2 orients readers by discussing four of the major drivers (entities that exert force) that shape our modern food system and its potential alternatives: economics, policy, culture, and marketing. The food system's biophysical environment is also a driver, as shown in figure I.2, however, we opted to place the environment chapter (chapter 3) in the “Outcomes” part, given its dual role. Many of the later chapters return to these drivers, helping readers consider ways to use them to shape change.

The economics chapter (chapter 7) uses a set of case study examples to illustrate key economics concepts and in particular to describe some of the important market failures in our food system, for example, situations in which the food system does not provide optimal outcomes, and ways economics tools can be used to assess and address these problems. Turning to focus on government more directly, the policy chapter (chapter 8) describes the major food-system–related policies and how they operate, as well as explaining how modern food-system policy evolved, with an emphasis on the US Farm Bill. The culture chapter (chapter 9) discusses the cultural aspects of our relationship to food. Such factors undergird our food choices, our reactions to existing food-system offerings, and our openness to marketing and interventions to change our choices. Marketing by those seeking to convince us to buy their products (chapter 10) drives our food choices and even options. The chapter describes the marketing industry and efforts to bring about positive change.

**Part 3: Food Supply Chain: from Seed to Sales.** With part 3, the book begins a sequential journey through the major activities in the food chain up to the point when food enters consumers' hands.

Chapters provide overviews of crop production (chapter 11), food animal production (chapter 12), food processing and packaging (chapter 13), and food distribution (chapter 14). The chapters describe sector history, structure, and operations, including discussion of policy, economic, and industry drivers, as well as impacts on public health, environment, and equity.

**Part 4: Food in Communities and on Tables.** Part 4 continues along the food chain with four chapters discussing what we eat and what happens when food reaches our tables and communities. We begin with an overview of the contours of current US diets (chapter 15), covering not only the “what” but also the “when” and “where,” and some of the population diversity in diets—“who.” The nutrition chapter (chapter 16) then explains what happens to this food inside our bodies, what we “ought” to be eating from a health standpoint and why. This nuts-and-bolts overview discusses key macronutrients and micronutrients as well as total diet and whole food approaches, and introduces the reader to the field of public health nutrition. The food environments chapter (chapter 17) reviews literature on how food availability within various environments affects our eating behaviors and how environments could be changed to help make the healthy choice (broadly defined) the easy choice. The preceding chapters have made clear that our current food system is profoundly unhealthy for people and the planet. Although some changes in our diets will occur naturally as the food system’s problems lead to changed costs and incentives, it is not always clear that those changes will come in the desired time frame or will lead us in the desired direction. Chapter 18 focuses on interventions to change eating behaviors in desired directions. This concluding chapter provides a review of important theories that can guide intervention development and then provides example interventions targeting change from the individual to societal levels.

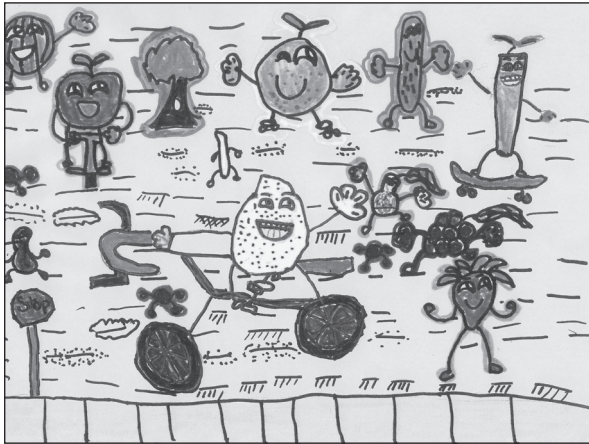
### FOCUS AND PERSPECTIVES FEATURES

The book’s main chapters are complemented and in some cases balanced by focus and perspectives features authored by experts in research, policy, and practice. The focus features are intended to provide additional interest and to help bring food-system issues alive for readers. They include articles digging deeper into topics of interest, case study examples, tables, and graphics. Perspectives pieces present analyses or viewpoints rooted in evidence (including lived experience in some cases). These are used to demonstrate some of the existing views among those working on food-system issues. We expect readers will disagree with some, many will make them think, some will inspire them, and some might even make them angry. In some cases the distinction is subjective between what should be categorized as a focus or perspective, and you might disagree with our choices. Note that because of page limits and the desire to present a variety of ideas and content, we did not attempt to balance each piece with a counterargument from a different author. **We emphasize that the perspectives present their authors’ views, not those of the chapter authors or editor.**

Together, these chapters and the focus and perspectives features present a broad view of today’s US food system in all its complexity (figures I.3 to I.10). They highlight the challenges we face and provide reasons to be hopeful as well. The textbook also provides opportunities for students to examine the food system’s (nay, the world’s) stickiest problems and think critically about solutions.



**FIGURE I.3** Child's Poster about Healthy Food Placed on City Buses



Source: Shydi Griffin, Baltimore City.

**FIGURE I.4** Seniors Choosing Vegetables



Source: Local Food Hub.

**FIGURE I.5** Cows at Albright Farm



Source: Mia Cellucci, CLF.

**FIGURE I.6** Students Eating Lunch



Source: Johns Hopkins, Diversity Leadership Council

**FIGURE I.7 Lunchables**



Source: Michael Milli, CLS.

**FIGURE I.8 Baby Eating Spaghetti**



Source: istockphoto.

**FIGURE I.9 Green Buffers, Clean Water**



Source: USDA.

**FIGURE I.10 Man with Carrots**



Source: Local Food Hub.

An instructor's supplement is available at [www.wiley.com/go/neff](http://www.wiley.com/go/neff). Additional materials, such as videos, podcasts, and readings, can be found at [www.josseybasspublichealth.com](http://www.josseybasspublichealth.com). Comments about this book are invited and can be sent to [publichealth@wiley.com](mailto:publichealth@wiley.com).

## REFERENCE

Council on Linkages Between Academia and Public Health Practice. (2010). *Core competencies for public health professionals*. Retrieved from [www.phf.org/resourcestools/pages/core\\_public\\_health\\_competencies.aspx](http://www.phf.org/resourcestools/pages/core_public_health_competencies.aspx)



## Acknowledgments

This book is a project of the Johns Hopkins Center for a Livable Future (CLF). We would like to thank the board and staff of the GRACE Communications Foundation for their help and encouragement.

The book builds on CLF's legacy of contribution and is a direct extension of its mission. It was developed with the collective effort and expertise of many on staff. In particular, thanks go to Pam Rhubart Berg for her extensive help with graphics and the online supplement, Brent Kim for many and varied contributions, Christine Grillo for rewrites and edits, Shawn McKenzie for ongoing support and wisdom, and Bob Lawrence for oversight and mentorship. Thanks also to other CLF staff members including Amanda Behrens, Dave Love, Jillian Fry, Leo Horrigan, Bob Martin, Shawnel McLendon, Mike Milli, Keeve Nachman, Anne Palmer, Joci Raynor, Allison Righter, Angela Smith, and Chris Stevens.

We have been so fortunate to work with the experts who provided the content for the book. In particular, we thank the chapter authors for choosing to contribute their time to develop and edit their chapters and supplementary materials. Much appreciation also goes to the focus and perspective authors, particularly those who developed new content for the book.

We owe much gratitude to the center's talented student research assistants and CLF-Lerner Fellows, in particular, Patti Truant, Susie DiMauro, and Kate Johnson, who served at different times as my "right hand" on the project. Others who contributed substantial effort include Ruthie Burrows, Karina Christiansen, Linnea Laestadius, Kathryn Rees, David Robinson, and Faith Tandoc.

We would like to thank proposal reviewers Molly Anderson, Frank J. Chaloupka, Kate Clancy, Hugh Joseph, Leslie Mikkelsen, Marion Nestle, Tasha Peart, and Angie Tagtow, who provided valuable feedback on the original book proposal. Jill K. Clark, Ardyth Harris Gillespie, and Hugh Joseph provided thoughtful and constructive comments on the complete draft manuscript. Feedback from these reviewers convened by Jossey-Bass was invaluable in improving the manuscript. Thanks also to Kate Clancy, Jessica Goldberger, Fred Kirschenmann, Jeffrey O'Hara, and Mary Story for review of particular content and for their helpful suggestions.

For many years, CLF had considered developing a textbook. The spark that got this project started came when Andy Pasternack of Jossey-Bass reached out to me. In turn, his interest in developing a food system and public health textbook was sparked by a conversation with food system leader Angie Tagtow. Seth Schwartz of Jossey-Bass was a wonderful steward for this project. He was responsive and patient as I figured out how to edit and format a book and provided wisdom to guide the project throughout. Justin Frahm and Susan Geraghty were supportive and helpful in the production phases.

Personally, I thank my husband, John McGready, and sons, Micah and Emmet, for their support, for taking on extra roles during crunch times, and for keeping me laughing. And, I thank my parents, Joanne and Martin Neff, for their ongoing support and encouragement.

—Roni Neff, editor, on behalf of the Johns Hopkins  
Center for a Livable Future

## About the Editor

**Roni Neff** is an assistant professor in the Johns Hopkins Bloomberg School of Public Health, Department of Environmental Health Sciences, with a joint appointment in Health Policy and Management. She directs the Food System Sustainability and Public Health program at the Johns Hopkins Center for a Livable Future (CLF), where she has worked since 2006.

Roni has worked in food systems and in public health research, policy, and practice throughout her career. She has played a significant role in advancing the public health voice in food and agriculture policy and research, including through research, speaking engagements, and leadership work with the American Public Health Association. Her academic interests include food waste, food and agriculture policy, and food system workers.

She teaches two courses, “Baltimore Food Systems: A Case Study in Urban Food Environments” and “Food System Sustainability Practicum,” and lectures frequently in other classes and around the country. She has been recognized for excellence in teaching annually since developing the Baltimore class and received the Faculty Excellence in Service-Learning Award from Johns Hopkins’ SOURCE program in 2014.

She received her PhD from the Johns Hopkins Bloomberg School of Public Health, MS from the Harvard School of Public Health, and AB from Brown University.

## Author Affiliations

- Patricia Allen, PhD, chair and professor, Department of Food Systems & Society, Marylhurst University, Marylhurst, Oregon
- Julian M. Alston, PhD, professor, Department of Agricultural and Resource Economics; director Robert Mondavi Institute Center for Wine Economics, University of California, Davis
- Alice Ammerman, DrPH, RD, director, Center for Health Promotion and Disease Prevention; professor, Department of Nutrition, Gillings School of Global Public Health and School of Medicine, University of North Carolina at Chapel Hill
- Andrea S. Anater, PhD, MPH, MA, public health nutrition researcher, RTI International, Research Triangle Park, North Carolina
- Molly D. Anderson, PhD, Partridge Chair in Food and Sustainable Agriculture Systems, College of the Atlantic, Bar Harbor, Maine
- Anne Barnhill, PhD, assistant professor, Department of Medical Ethics and Health Policy, University of Pennsylvania, Philadelphia
- Fedele Bauccio, chief executive officer and cofounder, Bon Appétit Management Company
- Amanda Behrens, MS, MPH, senior program officer, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Renata Bertazzi Levy, PhD, associate researcher, Department of Preventive Medicine, Faculty of Medicine, University of São Paulo Medical School; researcher, Center for Epidemiological Studies in Health and Nutrition, School of Public Health, University of São Paulo
- Aaron Bobrow-Strain, PhD, associate professor, Politics Department, Whitman College, Walla Walla, Washington
- Rebecca L. Boehm, doctoral candidate, Department of Food and Nutrition Policy, Tufts Friedman School of Nutrition Science and Policy, Boston
- Amanda B. Breen, PhD, MPH, assistant professor of psychology, Neumann University, Aston, Pennsylvania
- Michael Buchenau, executive director, Denver Urban Gardens
- Larissa Calancie, doctoral candidate, Gillings School of Global Public Health and the Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill
- Geoffrey Cannon, senior visiting research scholar, Centre for Epidemiological Studies in Health and Nutrition, School of Public Health, University of São Paulo
- Sean B. Cash, PhD, associate professor, Department of Food and Nutrition Policy, Tufts Friedman School of Nutrition Science and Policy, Boston
- George A. Cavender, PhD, research assistant professor, The Food Processing Center, University of Nebraska, Lincoln

Sarah Chard, PhD, associate professor, Department of Sociology and Anthropology, University of Maryland Baltimore County, Baltimore

Wei-Ting Chen, MA, doctoral candidate, Department of Sociology, Johns Hopkins University, Baltimore

Mariana Chilton, PhD, MPH, associate professor, Department of Health Management and Policy, Drexel University School of Public Health, Philadelphia

Kate Clancy, PhD, senior fellow, MISA, visiting scholar, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore

Rafael Moreira Claro, PhD, professor, Department of Nutrition, Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil; researcher, Center for Epidemiological Studies in Health and Nutrition, School of Public Health, University of São Paulo

Megan Clayton, CLF-Lerner Fellow, doctoral candidate, Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore

Fergus M. Clydesdale, PhD, distinguished professor, Department of Food Science, University of Massachusetts Amherst and director of the Food Science and Policy Alliance, Amherst, Massachusetts

Melissa Cunningham Kay, MS, MPH, RD, doctoral student, Gillings School of Global Public Health and School of Medicine, University of North Carolina at Chapel Hill

Meghan F. Davis, DVM, MPH, PhD, assistant professor, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore

Molly DeMarco, PhD, MPH, research scientist, Center for Health Promotion & Disease Prevention, instructor, Department of Nutrition, Gillings School of Global Public Health and School of Medicine, University of North Carolina at Chapel Hill

Larissa S. Drescher, PhD, Marketing and Consumer Research, TUM Business School, Technische Universität München, Germany

John Fisk, PhD, director, Wallace Center, Winrock International, Arlington, Virginia

Charles A. Francis, PhD, professor of agronomy, University of Nebraska—Lincoln

Julia Freedgood, managing director, farmland and community initiatives, American Farmland Trust, Northampton, MA

Susanne Freidberg, PhD, professor of geography, Dartmouth College, Hanover, New Hampshire

Tianna Gaines-Turner, Witnesses to Hunger Participant, Philadelphia

Ashley N. Gearhardt, PhD, assistant professor of psychology, University of Michigan, Ann Arbor

Joel Gittelsohn, MS, PhD, professor, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore

Alan M. Goldberg, PhD, professor of toxicology, chairman of the board, Center for Alternatives to Animal Testing, Bloomberg School of Public Health; principal, Global Food Ethics Project, Bloomberg School of Public Health, Johns Hopkins University, Baltimore

Miguel I. Gómez, PhD; Ruth and William Morgan Assistant Professor of Applied Economics and Management, Charles H. Dyson School of Applied Economics and Management, Cornell University, Ithaca, New York

Dana Gunders, MS, staff scientist in food and agriculture, Natural Resources Defense Council, San Francisco

Doug Gurian-Sherman, PhD, director of sustainable agriculture and senior scientist, Center for Food Safety, Washington, DC

Julie Guthman, PhD, professor, Division of Social Sciences, University of California, Santa Cruz

James Hale, PhD candidate, Colorado State University, Department of Sociology, Fort Collins

- Devon J. Hall Sr., program manager, Rural Empowerment Association for Community Help (REACH), Warsaw, North Carolina
- Michael W. Hamm, PhD, C.S. Mott Professor of Sustainable Agriculture and director, Center for Regional Food Systems, Michigan State University, East Lansing
- Ross A. Hammond, PhD, senior fellow, Economic Studies Program director, Center on Social Dynamics and Policy, The Brookings Institution, Washington, DC
- Jennifer C. E. Hartle, DrPH, MHS, CIH, Stanford Prevention Research Center, Stanford University School of Medicine, Stanford, California; former CLF-Lerner Fellow
- Heather Hartline-Grafton, DrPH, RD, senior nutrition policy and research analyst, Food Research and Action Center, Washington, DC
- Wenonah Hauter, executive director, Food & Water Watch, Washington, DC
- Corinna Hawkes, PhD, head of policy and public affairs, World Cancer Research Fund International, London
- Michael Heller, grass farmer, Claggett Farm, Chesapeake Bay Foundation, Upper Marlboro, Maryland
- Leo Horrigan, MHS, food system correspondent, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Laura Jackson, PhD, director, Tallgrass Prairie Center, professor of Biology, University of Northern Iowa, Cedar Falls
- Michael F. Jacobson, PhD, executive director, Center for Science in the Public Interest, Washington, DC
- Saru Jayaraman, co-founder and co-director, Restaurant Opportunities Centers United; director, Food Labor Research Center, University of California, Berkeley; and author, *Behind the Kitchen Door* (Cornell University Press, 2013)
- Katherine Abowd Johnson, MS, CLF-Lerner Fellow; doctoral candidate, Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Brent F. Kim, MHS, project officer, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Frederick Kirschenmann, PhD, distinguished fellow and former director, Leopold Center for Sustainable Agriculture, Iowa State University, Ames; president, Stone Barns Center for Food and Agriculture, Pocantico Hills, New York
- Linnea Laestadius, PhD, MPP, assistant professor, Department of Public Health Policy & Administration, Joseph J. Zilber School of Public Health, University of Wisconsin-Milwaukee; former CLF-Lerner Fellow
- Anna Lappé, co-founder, Small Planet Institute and Small Planet Fund; director, Real Food Media Project, Oakland, CA; author, *Diet for a Hot Planet: The Climate Crisis at the End of Your Fork and What You can Do about It*
- Frances Moore Lappé, Small Planet Institute, Cambridge, Massachusetts
- Robert S. Lawrence, MD, director, Center for a Livable Future, professor, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Jill S. Litt, PhD, associate professor, Department of Environmental & Occupational Health, University of Colorado School of Public Health, Aurora
- David C. Love, PhD, MSPH, project director Public Health and Sustainable Aquaculture Project, Center for a Livable Future, assistant scientist, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore

- Luke H. MacDonald, PhD, assistant scientist, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, assistant director, Johns Hopkins University Global Water Program, Baltimore
- Robert P. Martin, director, Food System Policy, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Shawn E. McKenzie, MPH, associate director, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Edward W. McLaughlin, Robert G. Tobin Professor of Marketing; director, undergraduate program, Dyson School of Applied Economics and Management, Cornell University, Ithaca, New York
- Carlos Augusto Monteiro, MD, PhD, professor of nutrition and public health and head, Center for Epidemiological Studies in Health and Nutrition, School of Public Health, University of São Paulo
- Carole Morison, farmer-agricultural consultant, Bird's Eye View Farm, Pokomoke City, Maryland
- Alanna Moshfegh, research leader, Food Surveys Research Group, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland
- Michael Moss, investigative reporter, *New York Times*; author, *Salt, Sugar, Fat: How the Food Giants Hooked Us*
- Jean-Claude Moubarac, PhD, postdoctoral research fellow at Center for Epidemiological Studies in Health and Nutrition, School of Public Health, University of São Paulo
- Mark Muller, director, Food and Justice Program, Institute for Agriculture and Trade Policy, Minneapolis
- Keeve E. Nachman, PhD, MHS, assistant professor, Departments of Environmental Health Sciences and Health Policy and Management; program director, Food Production and Public Health, Center for a Livable Future, assistant scientist, Department of Environmental Health Sciences, Baltimore
- Michael Newbury, PhD, professor of American studies and English and American literatures, Fletcher D. Proctor Professor of American History, Middlebury College, Middlebury, Vermont
- Anne M. Palmer, MAIA, program director, Food Communities and Public Health, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Courtney A. Pinard, PhD, research scientist, Gretchen Swanson Center for Nutrition; assistant professor, Department of Health Promotion, Social & Behavioral Health, College of Public Health, University of Nebraska Medical Center, Omaha
- Richard Pirog, PhD, senior academic specialist and senior associate director, Center for Regional Food Systems, Michigan State University, East Lansing
- Jennifer L. Pomeranz, JD, MPH, assistant professor, Department of Public Health, Temple University, College of Health Professions and Social Work, Philadelphia
- Janet E. Poppendieck, PhD, policy director, New York City Food Policy Center at Hunter College, New York.
- Rebecca M. Puhl, PhD, deputy director of research, Yale University Rudd Center for Food Policy & Obesity, New Haven, Connecticut
- Jenny Rabinowich, MPH, deputy country director for programs, Last Mile Health, Tiyatien Health, Liberia
- LaDonna Sanders-Redmond, founder, lead organizer, Campaign for Food Justice Now, Minneapolis
- Bradley J. Rickard, PhD, assistant professor, Charles H. Dyson School of Applied Economics and Management, Cornell University, Ithaca, New York
- Allison Righter, MSPH, RD, program officer, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore



- Wayne Roberts, PhD, food policy analyst and writer, Toronto
- Bernard E. Rollin, PhD, University Distinguished Professor; professor of philosophy, animal sciences, and biomedical sciences; university bioethicist, Department of Philosophy, Colorado State University, Fort Collins
- Erin G. Roth, senior ethnographer, Center for Aging Studies, University of Maryland, Baltimore County, Baltimore
- Lainie Rutkow, PhD, JD, MPH, assistant professor, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Kristin S. Schafer, MA, policy and communications director, Pesticide Action Network, Oakland, California
- Kellogg J. Schwab, PhD, professor, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Adam Sheingate, PhD, associate professor, Department of Political Science, Johns Hopkins University, Baltimore
- Jared Simon, MPH, MBA, director of marketing, Hain Celestial, Lake Success, New York
- Angela Smith, MA, project advisor, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Oronoco, Minnesota
- Teresa M. Smith, MS, graduate research assistant, doctoral candidate, Department of Health Promotion, Social & Behavioral Health, College of Public Health, University of Nebraska Medical Center; consultant, Gretchen Swanson Center for Nutrition, Omaha
- Anim Steel, executive director, Real Food Generation Challenge
- Angie Tagtow, MS, RD, LD, director, USDA Center for Nutrition Policy and Promotion; co-founder, Iowa Food Systems Council; owner, Environmental Nutrition Solutions, LLC
- Linden Thayer, doctoral student, Gillings School of Global Public Health and School of Medicine, Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill
- Patricia L. Truant, MPH, CLF-Lerner Fellow; doctoral candidate, Department of Health Policy & Management, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Moises Velasquez, journalist and author, *An Epidemic of Absence: A New Way of Understanding Allergies and Autoimmune Diseases*. Berkeley, California
- David Wallinga, MD, MPA, director and founder, Healthy Food Action, Minneapolis.
- Jennifer L. Wilkins, PhD, RD, senior associate extension officer and lecturer, Division of Nutritional Sciences, Cornell University, Ithaca, New York
- D'Ann L. Williams, DrPH, MS, research associate, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore; former CLF-Lerner Fellow
- Mark Winne, senior advisor, Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore
- Derek Yach, MBChB MPH, executive director, The Vitality Institute; past senior vice president, PepsiCo for Global Health and Agriculture Policy, New York
- Amy L. Yaroch, PhD, executive director, Gretchen Swanson Center for Nutrition; professor, Department of Health Promotion, Social & Behavioral Health, College of Public Health, University of Nebraska Medical Center, Omaha
- Lisa R. Young, PhD, RD, adjunct professor, Department of Nutrition, Food Studies, and Public Health, New York University; author, *The Portion Teller Plan*





## About the Center for a Livable Future

Founded in 1996, the Johns Hopkins Center for a Livable Future (CLF) is an interdisciplinary academic center dedicated to conducting research on the public health implications of our food system, educating a wide range of students, and advocating for evidence-based policy reform. The center is based within the Bloomberg School of Public Health, and collaborates with faculty members, staff, and students throughout Johns Hopkins University—and beyond.

CLF's core program areas apply a public health lens to issues surrounding: food production, food communities, food system sustainability, and food system policy. The center's education initiatives include the CLF-Lerner Fellows Program, which was awarded 133 doctoral fellowships to 62 individuals since 2003; "Teaching the Food System," a free, downloadable curriculum and set of resources for educators; a certificate program in "Food System, Environment, and Public Health" offering graduate students specialized knowledge and understanding of the relevance of the food system to many different competencies in public health; online courses available at the Bloomberg School, Coursera; and more.

The CLF explores the interrelationships among health, environment, diet, and food production—and works to improve those systems to ensure food security for present and future generations. In a livable future, all systems that sustain us operate in balance to support human and ecosystem health, equity, and resilience.

