

GLOBAL
EDITION



Introduction to Agricultural Economics

SIXTH EDITION

John B. Penson, Jr. • Oral Capps, Jr.
C. Parr Rosson III • Richard T. Woodward

ALWAYS LEARNING

PEARSON

INTRODUCTION TO AGRICULTURAL ECONOMICS

INTRODUCTION TO AGRICULTURAL ECONOMICS

SIXTH EDITION

GLOBAL EDITION

John B. Penson, Jr.
Texas A&M University

Oral Capps, Jr.
Texas A&M University

C. Parr Rosson III
Texas A&M University

Richard T. Woodward
Texas A&M University

PEARSON

Boston Columbus Indianapolis New York San Francisco Upper Saddle River
Amsterdam Cape Town Dubai London Madrid Milan Munich Paris Montréal Toronto
Delhi Mexico City São Paulo Sydney Hong Kong Seoul Singapore Taipei Tokyo

Editorial Director: Vernon R. Anthony
Head of Learning Asset Acquisition, Global Editions: Laura Dent
Acquisitions Editor, Global Editions: Vrinda Malik
Senior Acquisitions Editor: William Lawrensen
Editorial Assistant: Lara Dimmick
Assistant Project Editor, Global Editions: Paromita Banerjee
Director of Marketing: Dave Gesell
Marketing Manager: Stacey Martinez
Senior Marketing Coordinator: Alicia Wozniak
Marketing Assistant: Les Roberts

Program Manager: Alexis Duffy
Senior Managing Editor: JoEllen Gohr
Production Project Manager: Susan Hannahs
Senior Production Manufacturing Controller, Global Editions: Trudy Kimber
Senior Operations Supervisor: Vince Scelta
Operations Specialist: Deidra Skahill
Senior Art Director: Jayne Conte
Cover Designer: Lumina Datamatics, Inc.
Cover Art: © isak55/Shutterstock
Full-Service Project Management: Lumina Datamatics, Inc.

Credits and acknowledgments borrowed from other sources and reproduced, with permission, in this textbook appear on the appropriate page within the text.

Pearson Education Limited
Edinburgh Gate
Harlow
Essex CM20 2JE
England

and Associated Companies throughout the world

Visit us on the World Wide Web at: www.pearsonglobaleditions.com

© Pearson Education Limited 2015

The rights of John B. Penson, Jr., Oral Capps, Jr., C. Parr Rosson III, and Richard T. Woodard to be identified as authors of this work have been asserted by them in accordance with the Copyright, Designs and Patents Act 1988.

Authorized adaptation from the United States edition, entitled Introduction to Agricultural Economics, 6th Edition, ISBN 978-0-13-337948-8 by John B. Penson, Jr., Oral Capps, Jr., C. Parr Rosson III, and Richard T. Woodward, published by Pearson Education © 2015.

All rights reserved. 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 or otherwise, without either the prior written permission of the publisher or a license permitting restricted copying in the United Kingdom issued by the Copyright Licensing Agency Ltd, Saffron House, 6–10 Kirby Street, London EC1N 8TS.

All trademarks used herein are the property of their respective owners. The use of any trademark in this text does not vest in the author or publisher any trademark ownership rights in such trademarks, nor does the use of such trademarks imply any affiliation with or endorsement of this book by such owners.

ISBN 10: 1-292-07306-3

ISBN 13: 978-1-292-07306-4

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library

10 9 8 7 6 5 4 3 2 1

Typeset in A Garamond Pro by Lumina Datamatics, Inc.

Printed and bound by Courier Kendallville in United States of America

We thank our families for their patience and support,
and dedicate this book to them:

My wife Donna; children Matt, John, and Laura;
and my mother Mary Elizabeth for her interest in literature *JBP*

My wife Debbie, sons Kevin and Eric, and my mother Shirley and grandmother
May Manuel—my most ardent supporters. I am forever grateful to them for inspiring
me to do my best and to always finish strong! *OCJ*

My wife Helen and sons CP, Henry, and Jonathan *CPR*

My wife Rosie and children Christopher and Sophia *RTW*

contents

part one Introduction



1 What Is Agricultural Economics? 23

Scope of Economics 24

- Scarce Resources 24
- Making Choices 25

Definition of Economics 27

- Microeconomics versus Macroeconomics 27
- Positive versus Normative Economics 27
- Alternative Economic Systems 28

Definition of Agricultural Economics 28

What Does an Agricultural Economist Do? 28

- Role at Microeconomic Level 29
- Role at Macroeconomic Level 29
- Marginal Analysis 29

What Lies Ahead? 29

- Summary* 30
- Key Terms* 31
- Testing Your Economic Quotient* 31
- References* 31
- Graphical Analysis* 32



2 The U.S. Food and Fiber Industry 35

Indices 36

What is the Food and Fiber Industry? 38

Changing Complexion of Farming 41

- Physical Structure 41
- Specialization, Diversification, Organization,
and Contracting 41
- Productivity 44
- Profitability 45
- Financial Structure 47

Other Sectors in the Food and Fiber Industry 49

- Farm Input Suppliers 50
- Food Processors, Wholesalers, and Retailers 50
- Value-Added Process 52

- Fiber Manufacturers 54
- Shippers and Handlers 55
- Importance of Export Markets 55
- Summary 56
- Key Terms 57
- Testing Your Economic Quotient 57
- References 58

part two
Understanding Consumer Behavior



Theory of Consumer Behavior 59

Utility Theory 59

- Total Utility 60
- Marginal Utility 61
- Law of Diminishing Marginal Utility 62

Indifference Curves 62

- Concept of Isoutility 63
- Marginal Rate of Substitution 64

The Budget Constraint 65

- Summary 68
- Key Terms 69
- Testing Your Economic Quotient 69
- Reference 72



Consumer Equilibrium and Market Demand 73

Conditions for Consumer Equilibrium 73

Changes in Equilibrium 75

- Changes in Product Price 75
- Changes in Other Demand Determinants 78

The Law of Demand 80

- Market Demand 80
- Interpretation of Market Demand 81

Tastes and Preferences 82

- Composition of the Population 82
- Attitudes toward Nutrition and Health 83
- Food Safety 83
- Lifestyles 83
- Technological Forces 83
- Advertising and Promotion 84

Consumer Surplus 84

- Summary 85
- Key Terms 85
- Testing Your Economic Quotient 86
- Reference 89



Measurement and Interpretation of Elasticities 91

Own-Price Elasticity of Demand 92

Income Elasticity of Demand 95

Cross-Price Elasticity of Demand 97

Other General Properties 97

Some Real-World Examples 99

Applicability of Demand Elasticities 101

Applicability to Policymakers 101

Applicability to Farmers 102

Applicability to Consumers 102

Applicability to Input Manufacturers 102

Applicability to Food Processors and Trade Firms 103

Summary 103

Key Terms 104

Testing Your Economic Quotient 104

References 106

part three

Business Behavior and Market Equilibrium



Introduction to Production and Resource Use 107

Conditions for Perfect Competition 108

Classification of Inputs 108

Land 108

Labor 108

Capital 109

Management 109

Important Production Relationships 110

The Production Function 110

Total Physical Product Curve 111

Marginal Physical Product Curve 112

Average Physical Product Curve 113

Stages of Production 114

Assessing Short-Run Business Costs 115

Total Costs and the TPP Curve 115

Average Costs and the APP Curve 117

Marginal Costs and the MPP Curve 117

Economics of Short-Run Decisions 118

Marginal and Average Revenue 118

Level of Output: $MC = MR$ 118

Level of Resource Use: $MVP = MIC$ 121

What Lies Ahead? 122*Summary 123**Key Terms 123**Testing Your Economic Quotient 124***Economics of Input and Product Substitution 127****Concept and Measurement of Isoquants 128**

Rate of Technical Substitution 128

The Iso-Cost Line 130**Least-Cost Use of Inputs for a Given****Output 132**

Short-Run Least-Cost Input Use 132

Effects of Input Price Changes 134

Least-Cost Input Use for a Given Budget 134**Long-Run Expansion of Input Use 135**

Long-Run Average Costs 135

The Long-Run Planning Curve 136

Economics of Business Expansion 138

Capital Variable in the Long Run 139

Concept and Measurement of the Production Possibilities Frontier 141

Production Possibilities Frontier 141

Product Substitution 142

**Concept and Measurement of the
Iso-Revenue Line 143****Profit-Maximizing Combination of
Products 144**

Choice of Products in the Short Run 144

Effects of Change in Product Prices 145

*Summary 147**Key Terms 147**Testing Your Economic Quotient 148**Reference 151***Market Equilibrium and Product Price: Perfect Competition 153****Derivation of the Market Supply Curve 153**

Firm Supply Curve 153

Market Supply Curve 154

Own-Price Elasticity of Supply 155

Producer Surplus 156

**Market Equilibrium Under Perfect
Competition 157**

Market Equilibrium 157

Total Economic Surplus 160

Applicability to Policy Analysis 161

Adjustments to Market Equilibrium 161

- Market Disequilibrium 161
- Length of Adjustment Period 162
- Cobweb Adjustment Cycle 163

Summary 164

Key Terms 164

Testing Your Economic Quotient 164



Market Equilibrium and Product Price: Imperfect Competition 169

Market Structure Characteristics 170

- Number of Firms and Size Distribution 170
- Product Differentiation 171
- Barriers to Entry 171
- Economic Environment 172
- Classification of Firms 172

Imperfect Competition in Selling 173

- Monopolistic Competition 173
- Oligopoly 176
- Monopoly 179
- Comparison of Alternative Market Structures 181
- Welfare Effects of Imperfect Competition 181

Imperfect Competition in Buying 182

- Monopsony 183
- Oligopsony and Monopsonistic Competition 185

Market Structures in Livestock Industry 186**Governmental Regulatory Measures 187**

- Legislative Acts 187
- Ceiling Price 188
- Lump-Sum Tax 189
- Minimum Price 189

Summary 191

Key Terms 191

Testing Your Economic Quotient 191

References 194

part four

Government in the Food and Fiber Industry



Natural Resources, the Environment, and Agriculture 195

Agriculture and the Environment 196

- Water Pollution 196
- Air Pollution 198

Global Climate Change 199
Other Environmental Impacts 201

Economics of the Environment 202

Efficient Property Rights 203
Efficiency and Externalities in
Agriculture 203
Environmental Policies 205

**The Economics of the Resources of
Agriculture 208**

Soil Quality and Quantity 208

The Economics of Soil Conservation 209

Characteristics of Soil 209
Discounting and Present Value
Analysis 210
The Present Value of Soil Resources 210
Practice: The Dust Bowl 211

Water as an Economic Asset 212

Government Policies for Agriculture, Natural Resources, and the Environment 214

Soil Erosion Policies and the Conservation Reserve Program 214
Other Federal Incentive Programs for Agricultural Conservation 215
Environmental Regulations 215
The Endangered Species Act 216

Summary 217

Key Terms 218

Testing Your Economic Quotient 218

References 220



11

**Government Intervention
in Agriculture 221**

Rationale for Government Intervention 221

Farm Economic Issues 223

Historical Perspective on the Farm
Problem 223
Forms of Government Intervention 225

Consumer Issues 227

Adequate and Cheap Food Supply 227
Nutrition and Health 228
Food Safety 228
Food Subsidies 228

Historical Support Mechanisms 229

Loan Rate Mechanism 229
Set-Aside Mechanism 231
Target Price Mechanism 233
Countercyclical Payments Mechanism 233
Conservation Reserve Mechanism 234
Commodities Covered by Government Programs 235

Phasing Out of Supply Management 236**Domestic Demand Expansion Programs 238****Importance of Export Demand 239***Summary 241**Key Terms 242**Testing Your Economic Quotient 242**References 244*

part five

Macroeconomics of Agriculture **12****Product Markets and National Output 245****Circular Flow of Payments 246**

Barter Economy 246

Monetary Economy 247

**Composition and Measurement
of Gross Domestic Product 249****Consumption, Savings, and Investment 250**

Determinants of Planned Consumption 251

Determinants of Planned Saving 254

Determinants of Planned Investment 256

Equilibrium National Income and Output 259

Aggregate Expenditures 259

The Keynesian Cross 259

Deriving Aggregate Demand Curve 260

Aggregate Supply and Full

Employment 261

Recessionary and Inflationary Gaps 263

What Lies Ahead? 263*Summary 264**Key Terms 265**Testing Your Economic Quotient 265**References 266* **13****Macroeconomic Policy Fundamentals 267****Characteristics of Money 268**

Functions of Money 268

Money versus Near Monies 268

Backing of Money 269

Federal Reserve System 269

Organization of the Federal Reserve System 269

Functions of the Federal Reserve System 271

Monetary Policy Instruments 272

Changing the Money Supply 274

Creation of Deposits 274

Monetary Policy and the Money Supply 277

Money Market Equilibrium 278

Demand for Money 278

Equilibrium Conditions 280

Effects of Monetary Policy on the Economy 280

Transmission of Policy 280

Combating Recessionary Gaps 280

Combating Inflationary Gaps 282

Microeconomic Perspectives 282

The Federal Budget 284

Federal Expenditures 284

Federal Receipts 285

Budget Deficit 287

The National Debt 288

National Debt and GDP 288

Ownership of National Debt 288

Burdening Future Generations? 290

Fiscal Policy Options 291

Automatic Policy Instruments 291

Discretionary Policy Instruments 292

Fiscal Policy and Aggregate Demand 294

Combating Recessionary Gaps 295

Combating Inflationary Gaps 296

*Summary 297**Key Terms 298**Testing Your Economic Quotient 298**References 300* **14****Consequences of Business Fluctuations 301****Fluctuations in Business Activity 301**

Nature of Business Fluctuations 302

Indicators of Economic Activity 303

Consequences of Business Fluctuations 305

Unemployment 305

Inflation 306

Short-Run Phillips Curve 311

Macroeconomic Policy Options 312

Laissez-faire Macroeconomic Policy 313

Demand-Oriented Macroeconomic Policy 313

Supply-Oriented Macroeconomic Policy 314

*Summary 315**Key Terms 316**Testing Your Economic Quotient 316**References 317*



15

Macroeconomic Policy and Agriculture 319

A Historical U.S. Perspective 320

The Big Five 321

- Rate of Inflation 322
- Rate of Interest 322
- Rate of Unemployment 323
- Rate of Growth in Real GDP 323
- Rate of Foreign Exchange 323

Impacts of Macroeconomic Policy Actions on the General Economy 323

- The Real Economy 324
- The Monetary Economy 324

Macro-Market-Micro Linkage 325

Impacts of Macroeconomic Policy Actions on Agriculture 326

- Effect of Expansionary Monetary Policy 327
- Effect of Contractionary Fiscal Policy 329
- Microeconomic Performance Implications 331
- Implications for Imperfect Competition 332
- Implications for Other Sectors in the Food and Fiber Industry 333

Summary 333

Key Terms 334

Testing Your Economic Quotient 334

Reference 335

part six

International Agricultural Trade



16

Agricultural Trade and Exchange Rates 337

Growth and Instability in Agricultural Trade 338

- Export Boom and Bust 338
- Moves toward Trade Liberalization 339

The Importance of Agricultural Trade 340

- Increased Export Dependence 340
- Greater Dependence on Imports 340

The Composition of Agricultural Trade 341

- The Role of Agricultural Exports 341
- The Role of Agricultural Imports 341

Direction of U.S. Agricultural Trade 342

- Major Export Markets 342
- Major Import Suppliers 342

U.S. Agricultural Trade Performance 342

- The Balance of Trade 343

Exchange Rates and the Foreign Exchange Market 344

- Exchange Rates Defined 344
- The Foreign Exchange Market 344

The Balance of Payments 347

- The Current Account 347
- The Capital Account 348
- Financial Account 348
- The United States as a Debtor Nation 348

The International Monetary System 349

- The Gold Standard and the Interwar Years 350
- The Bretton Woods System 350
- The Present International Monetary System 352
- The European Monetary System 353
- The European Union and the European Monetary System 353

Exchange Rate Determination 354

- Demand and Supply of Foreign Currencies 354
- Relative Interest Rates 355
- Changes in Relative Prices 356
- Balance of Trade Impacts 357
- The Role of Expectations 358

Exchange Rates and U.S. Agricultural Trade 358

- Exchange Rate Indices 359
- Exchange Rate Impacts on Prices 359

Considerations for Policy Coordination 360

- Macroeconomic Policy Coordination 360
- Domestic Agricultural Policy Coordination 361
- Summary* 362
- Key Terms* 364
- Testing Your Economic Quotient* 364
- References* 365



17

Why Nations Trade 367**Why Trade? 367****Absolute Advantage 368**

- Comparative Advantage 370
- Factors Affecting Comparative Advantage 372
- Comparative Advantage and Competitive Advantage 372

Gains from Trade 374

- The Importance of Exchange and Specialization 374
- Distribution of the Gains from Trade 375
- Summary* 376
- Key Terms* 377
- Testing Your Economic Quotient* 377
- References* 378



Agricultural Trade Policy and Preferential Trading Arrangements 379

Trade and Welfare 380

Autarky or the Closed Economy 380

Trade and Partial Equilibrium 381

Welfare Gains from Trade 382

Why Restrict Trade? 383

Protectionism in Agriculture 383

Arguments against Trade 383

Trade Restrictions 385

Import Policies 385

Domestic Agriculture and Food Policies 390

Export Policies 391

Agricultural Trade Policy Making 392

The General Agreement on Tariffs and Trade and the World Trade Organization 392

The United Nations Conference on Trade and Development 394

U.S. Agricultural Trade Policy Formulation 394

The Economic Policy Council 395

The Importance of Preferential Trading Arrangements 396

Forms of Economic Integration 396

Reasons for Preferential Trading

Arrangements 397

Counter Economic and Political Power in Other Parts of the World 398

Reduce Side Effects 398

Foster Political Stability and Economic Prosperity 398

Do Preferential Trading Arrangements Create or Divert Trade? 399

Static Effects 399

Dynamic Effects 402

Summary 403

Key Terms 404

Testing Your Economic Quotient 405

References 406

Glossary 407

Index 421

Preface

The purpose of this book is to provide beginning students in agriculture with a systematic introduction to the basic concepts and issues in economics as they relate to a major segment of the U.S. economy—the food and fiber industry. This process requires an understanding of the microeconomic and macroeconomic forces influencing the decisions of producers and consumers of food and fiber products, including (1) farmers and ranchers, (2) the agribusinesses that supply them with production inputs and credit, (3) the agribusinesses that process food products and manufacture fiber products, and (4) the agribusinesses that provide marketing and related services at the wholesale and retail levels to both domestic consumers and overseas markets.

We begin the book by answering the question raised in Chapter 1, “What is agricultural economics?” We first define the field of economics and then develop our definition of agricultural economics based on the role agricultural economists play at the micro and macro levels. Chapter 2 provides a historical background by discussing the changing structure of agriculture during the post–World War II period and of the sectors that supply farmers and ranchers with inputs, process their output, sell value-added products to domestic consumers, and trade food and fiber products in the global marketplace.

Part 2 helps students understand the economic decisions made by consumers of food and fiber products. Topics include the forces influencing consumer behavior (Chapter 3); the concept of market demand for a particular product (Chapter 4); and the elasticity of demand (Chapter 5). The specification of key elasticity measures is supplemented by empirical examples and their relevance to decision-making in the food and fiber industry, including the potential magnitude of consumer response and its implication on producer revenue.

Part 3 covers the supply side of the market. Chapter 6 focuses on issues related to resource use and production responses by businesses in the short run. Chapter 7 discusses the economic forces underlying the firm’s input use, the expansion of the firm, and the choice of commodities. An introduction to the market supply curve and determination of market clearing prices and quantities under perfect competition (Chapter 8) and imperfect competition (Chapter 9) completes this part. This section of the book includes empirical examples that illustrate the magnitude and applicability of the relationships covered in these chapters.

Part 4 addresses the role of government in the food and fiber industry. Natural resources, the environment, and agriculture are covered in Chapter 10. This chapter includes the role of government regulation, which reflects the increasing recognition that natural resources and the environment are scarce resources and require careful management. The government’s role in providing subsidies to agriculture, curbing market power, and providing for a secure and safe food supply is addressed in Chapter 11.

Part 5 focuses on the macroeconomics of agriculture. Chapter 12 outlines the general linkages between product markets and national output. Chapter 13 documents the importance of monetary and fiscal policy to the performance of the economy. The consequences of business fluctuations in the economy are covered in Chapter 14. Chapter 15 covers the relationship between macroeconomic policy and its effects on the economic performance of agriculture.

Part 6 focuses on international agricultural trade issues. Chapter 16 examines the growth and instability of agricultural trade, including the relative dependence on exports

and imports, as well as the foreign exchange market, the international monetary system, and the effects of foreign exchange rates on U.S. agricultural trade. Chapter 17 explores the rationale behind international trade as well as the beneficiaries of international trade. Finally, Chapter 18 focuses on agricultural trade policy and preferential trade agreements. This includes issues dealing with trade restriction and whether preferential trade agreements create or divert trade.

Each chapter concludes with a summary and a list of key terms. A “Testing Your Economic Quotient” section contains questions and problems to reinforce the key issues covered. Understanding the answers to these questions and problems will help students properly prepare for exams. References also are listed at the end of each chapter.

This book goes beyond the farm gate to address the entire food and fiber industry, which represents a notable percentage of the U.S. national output. This book places a strong emphasis on the macroeconomics of agriculture, the role of government in agriculture, and international agricultural trade. Experience over the last several decades certainly has shown that farmers and ranchers, agribusinesses, financial institutions, and consumers of food and fiber products are significantly affected by macroeconomic policies and trade agreements.

We wish to thank the many students who have given us comments and suggestions during the development phases of this and previous editions of the book. We also thank the following reviewers for their valuable feedback: James Beierlein, Penn State University, University Park; Marlies Boyd, Modesto Junior College; and Stephen King, Western Kentucky University.

John B. Penson, Jr.
Oral Capps, Jr.
C. Parr Rosson III
Richard T. Woodward

Pearson would like to thank and acknowledge Thiagu Ranganathan, Institute of Economic Growth; and G. Mythili, Indira Gandhi Institute of Development Research, for their contributions to the Global Edition. Pearson would also like to thank James E. Allen IV, University of Kentucky; Duncan Farquhar, Charles Sturt University; Johann Kirsten, University of Pretoria; and Soumyanetra Munshi, Indira Gandhi Institute of Development Research for reviewing and providing suggestions that helped in improving the Global Edition.

About the Authors

John B. Penson, Jr. John Penson is Regents Professor and Stiles Professor of Agriculture in the Department of Agricultural Economics at Texas A&M University. He received a Ph.D. degree in agricultural economics from the University of Illinois in 1973. He has received numerous teaching and research awards from professional associations during his career, including the Distinguished Teaching Award from the American Agricultural Economics Association. Penson has taught courses in Korea, Japan, Guatemala, Nicaragua, and Ecuador.

Penson's research has focused on the macroeconomics of agriculture and credit analysis. This includes the development of quantitative economic models emphasizing the role of the agricultural sector for various state and national economies. His research has involved projects assessing the implications of macroeconomic policy for agriculture as well as analysis of lending programs and credit analysis for major domestic and international lenders.

Oral Capps, Jr. Oral Capps is Regents Professor, Executive Professor, and holder of the Southwest Dairy Marketing Endowed Chair in the Department of Agricultural Economics at Texas A&M University. Dr. Capps also is co-director of the Agribusiness, Food, and Consumer Economics Research Center (AFCERC) in the Department of Agricultural Economics at Texas A&M University. Dr. Capps was educated at Virginia Tech University, where he earned a B.S. degree in mathematics in 1975, M.S. degrees in agricultural economics (1977) and statistics (1979), and a Ph.D. degree in agricultural economics in 1979.

Capps's research focuses on demand and price analysis, with particular expertise in econometric modeling and forecasting methods. His applied research areas include analyses of expenditure patterns of pre-prepared foods and foods eaten away from home, analyses of health and nutrition issues, uses of scanner-derived information for managerial decision-making in food retailing, and analyses of regional, national, and international markets for the farm, agribusiness, and financial sectors. In addition, Dr. Capps specializes in unilateral price effects of mergers and acquisitions as well as evaluations of agricultural checkoff programs.

C. Parr Rosson III Parr Rosson is professor and extension economist with the Texas AgriLIFE Extension Service. He is also the director of the Center for North American Studies, Department of Agricultural Economics, at Texas A&M University. Rosson, now department head, received his B.S. in agronomy from Texas A&M University in 1971 and was commissioned as an infantry officer in the army of the United States, where he served until 1977. He received an M.S. (1978) and Ph.D. (1982), both in agricultural economics from Texas A&M University.

Rosson's extension activities include analysis and impacts of labor, invasive species, trade agreements, and policy changes resulting from WTO negotiations. Rosson has 25 years of experience working on projects in Mexico, Canada, Central America, Iraq, Cuba, South America, Europe, Australia, Japan, and developing Asia. This includes the economic impacts of U.S. agricultural exports to Cuba, irrigation water use and crop production trends in Chihuahua, Mexico, and the impacts of trade disruptions due to animal disease outbreaks. He is a member of the USDA/USTR

Agricultural Trade Advisory Committee on Grains, Feed, and Oilseeds and chairs the Agribusiness and Fisheries Committee of the Border Trade Alliance.

Richard T. Woodward Richard Woodward is a full professor in the Department of Agricultural Economics at Texas A&M University. An environmental economist, Dr. Woodward received his Ph.D. from the Department of Agricultural and Applied Economics at the University of Wisconsin. Along with this book, he has been the author or coauthor of over 30 journal articles and book chapters.

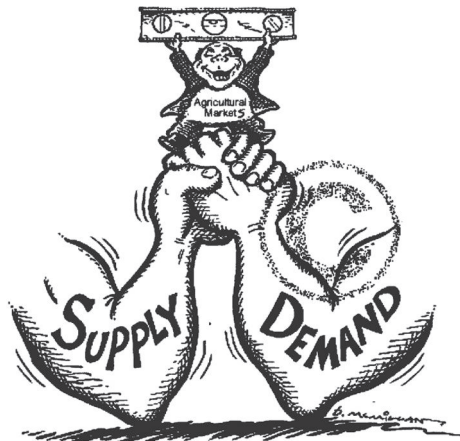
Dr. Woodward's principal areas of research have been in the use of market-based approaches to environmental and resource management problems. He has studied the use of these policies in fisheries, water pollution, and ecosystem services. In 2007 to 2008, he was a Fulbright Scholar working with the Environment for Development program at the Tropical Agricultural Research and the Higher Education Center in Costa Rica.



What Is Agricultural Economics?

Chapter Outline

SCOPE OF ECONOMICS 24	Role at Macroeconomic Level 29
Scarce Resources 24	Marginal Analysis 29
Making Choices 25	WHAT LIES AHEAD? 29
DEFINITION OF ECONOMICS 27	SUMMARY 30
Microeconomics versus	KEY TERMS 31
Macroeconomics 27	TESTING YOUR ECONOMIC
Positive versus Normative	QUOTIENT 31
Economics 27	REFERENCES 31
Alternative Economic Systems 28	GRAPHICAL ANALYSIS 32
DEFINITION OF AGRICULTURAL	Constructing a Graph 32
ECONOMICS 28	Slope of a Linear Curve 33
WHAT DOES AN AGRICULTURAL	Slope of a Nonlinear Curve 33
ECONOMIST DO? 28	
Role at Microeconomic Level 29	



Agricultural economics is an applied social science that deals with how producers, consumers, and societies use scarce resources in the production, marketing, and consumption of food and fiber products. In agricultural markets, the forces of supply and demand are at work. Credit: Brad McMillan/Cartoon Stock.

Agriculture certainly is among the most prominent sectors of any economy. Psalm 104 illustrates this point: “Bless the lord, O my soul, thou dost cause the grass to grow for the cattle, and plants for man to cultivate, that he may bring forth food from the Earth.” Unequivocally, agriculture has been a discipline then worthy of study. We specifically are interested in the economic relationships inherent in the agricultural sector.

The roots of agricultural economics can be traced back to ancient Egypt, arguably to the first agricultural economist, Joseph. Joseph interpreted the dreams of the Pharaoh of Egypt and correctly predicted seven years of feast and seven years of famine.

What is agricultural economics? If you were to say “Agricultural economics is the application of economic principles to agriculture,” you would be technically correct—but in a narrow context. This definition does not recognize the economic, social, and environmental issues addressed by the agricultural economics profession. To perceive agricultural economics as being limited only to the economics of farming and ranching operations would be incorrect. These operations annually account for only 2% to 4% of the nation’s output. Actually, the scope of agricultural economics goes well beyond the farm gate to encompass a broader range of food- and fiber-related activity, which annually accounts for approximately 12% to 15% of the nation’s output.

Before we define agricultural economics further, let us first examine the scope of economics and the role that agricultural economists play in today’s economy. This examination will allow us to propose a more definitive answer to the question raised by the chapter title. A more in-depth assessment of the nation’s food and fiber industry is presented in Chapter 2.

SCOPE OF ECONOMICS

Two frequently used clichés describe the economic problem: “You can’t have your cake and eat it too,” and “There’s no such thing as a free lunch.” Because we—individually or collectively—cannot have everything we desire, we must make choices. Consumers, for example, must make expenditure decisions with a budget in mind. Their objective is to maximize the satisfaction they derive from allocating their time between work and leisure, and from allocating their available income to consumption and saving, given current prices and interest rates. Producers must make production, marketing, and investment decisions with a budget in mind. Their objective is to maximize the profit of the firm, given its current resources and current relative prices. After considering the costs and benefits involved, society also must make choices on how to allocate its scarce resources among different government programs most efficiently.

Scarce Resources

The term *scarcity* refers to the finite quantity of resources that are available to meet society’s needs. Because nature does not freely provide enough of these resources, only a limited quantity is available. **Scarce resources** can be broken down into the following categories: (1) natural and biological resources; (2) human resources; and (3) manufactured resources.

Scarce resources can be decomposed into natural and biological resources, human resources, and manufactured resources.

Natural and Biological Resources Land and mineral deposits are examples of scarce **natural resources**. The quality of these natural resources in the United States differs greatly from region to region. Some lands are incapable of growing anything in its natural state, and other lands are extremely fertile. Still other areas are rich in coal deposits, or oil and natural gas reserves. In recent years, our society also has become aware of the increasing scarcity of fresh water, especially in the West. Whereas energy-related natural resources have represented critical scarce resources in recent decades, water could become *the* critical scarce natural resource

in the near future. In addition to natural resources, scarce resources also include **biological resources** such as livestock, wildlife, and different genetic varieties of crops.

Human Resources **Human resources** are services provided by laborers and management to the production of goods and services that also are considered scarce. Laborers, for example, provide services that, combined with scarce non-human resources, produce economic goods.¹ Workers in the automotive industry provide the labor input to produce cars and trucks. Farm laborers provide the labor input to produce crops and livestock. Labor is considered scarce even when the country's labor force is not fully employed. Laborers supply services in response to the going wage rate and to the returns that they derive from leisure. Agribusinesses may not be able to hire all the labor services they desire at the wage they wish to pay.

Management, another form of human resource, provides entrepreneurial services, which may entail the formation of a new firm, the renovation or expansion of an existing firm, the taking of financial risks, and the supervision of the use of the firm's existing resources so that its objectives can be met. Without entrepreneurship, large-scale agribusinesses would cease operating efficiently.

Manufactured Resources The third category of scarce resources is **manufactured resources**, or **capital**. Manufactured resources are machines, equipment, and structures. A product that has not been used up in the year it was made also is considered a manufactured resource. For example, inventories of corn raised but not fed to livestock or sold to agribusinesses represent a manufactured resource.

Scarcity is a relative concept. Nations with high per capita incomes and wealth face the problem of scarcity like nations with low per capita incomes and wealth. The difference lies in the degree to which resource scarcity exists and the forms that it takes.

Making Choices

Resource scarcity forces consumers and producers to make choices. These choices have a time dimension. The choices consumers make today will have an effect on how they will live in the future. The choices businesses make today will have an effect on the future profitability of their firms. Your decision to go to college rather than get a job today was probably based in part on your desire to increase your future earning power or eventual wealth, knowing what your earning potential would be if you did not attend college.

The choices one makes also have an associated **opportunity cost**. The opportunity cost of going to college now is the income you are currently foregoing by not getting a job now. The opportunity cost of a consumer taking \$1,000 out of his or her savings account to buy a gaming station is the interest income this money would have earned if left in the bank. An agribusiness firm considering the purchase of a new computer system also must consider the income it could receive by using this money for another purpose. The bottom line expressed in economic terms is whether the economic benefits exceed the costs, including foregone income. Simply put, opportunity cost is a concept associated with economic decisions. It refers to the implicit cost associated with the next best alternative.

Scarcity refers to the fixed quantity of resources that are available to meet societal needs.

Opportunity cost refers to the implicit cost associated with the next best alternative in a set of choices available to decision makers.

¹Goods and services produced from scarce resources also are scarce and are referred to as economic goods. Economic goods are in contrast to free goods, in which the quantity desired is available at a price of zero. Air has long been a free good, but pollution (a negative good), which makes the air unfit to breathe, is changing this notion in some areas.

To illustrate the concept of opportunity cost, consider the following hypothetical example. Suppose that RJR Nabisco has three alternatives for manufacturing snack foods:

- Alternative 1: Manufacture cookies alone and obtain a profit of \$30 million
- Alternative 2: Manufacture chips alone and obtain a profit of \$25 million
- Alternative 3: Manufacture both cookies and chips and obtain a profit of \$35 million

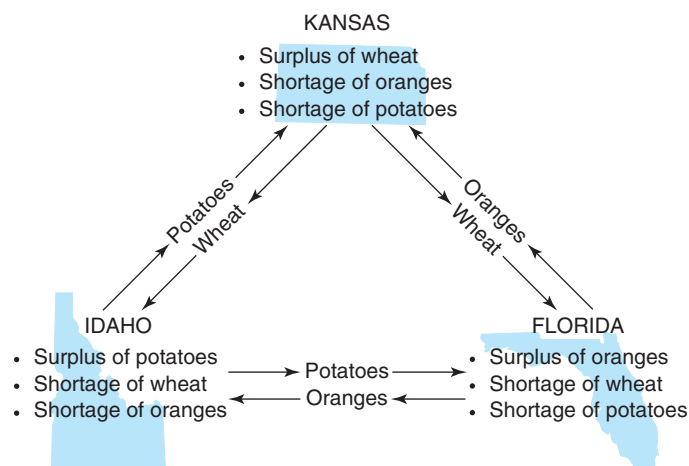
Because Alternative 3 offers the highest profit to RJR Nabisco, it is rational economically for the firm to adopt this choice and consequently manufacture both cookies and chips. However, in doing so, the firm foregoes Alternatives 1 and 2. The implicit cost associated with the next best alternative is to forgo a profit of \$30 million. Thus, \$30 million is the opportunity cost in this example.

Sometimes the choices we make are constrained not only by resource scarcity but also by non-economic considerations. These forces may be political, legal, or moral. For example, some states have blue laws that prohibit the sale of specific commodities on Sundays. A variety of regulations exist at the federal and state levels that govern the production of food and fiber products, including environmental and food safety concerns. For example, specific chemicals are banned from use in producing and processing food products because of their potential health hazard. The Big Green movement in California in 1990 sought to ban the use of all agricultural chemicals that were shown to pose health hazards to laboratory animals. As another example, over the period February 2007 to August 2007, a nationwide recall of Peter Pan peanut butter took place due to its association with salmonella contamination. This product was not available in grocery stores for a period of 27 weeks.

Most resources are best suited for a particular use. For example, the instructor of this course is better qualified to teach this course than to perform open-heart surgery. By focusing the use of our resources on a specific task, we are engaging in **specialization**. With a given set of human and non-human resources, specialization of effort generally results in a higher total output. Individuals should do what they do comparatively better than others, given their endowment of resources. Some individuals might specialize in fields such as professional athletics or law. Others might specialize in agricultural economics. States and nations may find it to their advantage to specialize in the production of coffee, rice, or computers and import other commodities for which their endowment of natural, human, and manufactured resources is ill-suited. As illustrated in Figure 1–1, Kansas has a surplus of wheat production but a shortage of orange production, while Florida has a surplus of orange production and a shortage of wheat production. Both

Figure 1–1

Specialization and resource allocation.



states have a shortage of potato production, while Idaho has plenty to spare. Specialization in production provides the basis for trade among producers and consumers.

Choices in the allocation of resources made by society (a collection of individuals) might be quite different from the choices made by individual members of society. For example, all nations normally allocate some resources to military uses. Society as a whole must decide how best to allocate its resources between the production of civilian goods and services and the production of military goods, popularly referred to as the choice of “guns versus butter.”

DEFINITION OF ECONOMICS

With the foregoing concepts of resource scarcity and choice in mind, we may now define the nature and scope of the field of economics as follows:

Economics is a social science that deals with how consumers, producers, and societies choose among the alternative uses of scarce resources in the process of producing, exchanging, and consuming goods and services.

Microeconomics versus Macroeconomics

As with most disciplines, the field of economics can be divided into several branches. **Microeconomics** and **macroeconomics** are two major branches of economics. Microeconomics focuses on the economic actions of individuals or specific groups of individuals. For example, microeconomists are concerned with the economic behavior of consumers who demand goods and services and producers who supply goods and services, and the determination of the prices of those goods and services. Macroeconomics focuses on broad aggregates, such as the growth of the nation’s gross domestic product (GDP), the gaps between the economy’s potential GDP and its current GDP, and trade-offs between unemployment and inflation. For example, macroeconomists are concerned with identifying the monetary and fiscal policies that would reduce inflation, promote growth of the nation’s economy, and improve the nation’s trade balance (exports minus imports). Macroeconomics explicitly accounts for the interrelationships between the nation’s labor, product, and money markets and the economic decisions of foreign governments and individuals.

Despite the differences between microeconomics and macroeconomics, there is no conflict between these two branches. After all, the economy in the aggregate is certainly affected by the events taking place in individual markets.

A word of caution: we must be careful when generalizing the aggregate or macroeconomic consequences of an individual or a microeconomic event. If not, we run the risk of committing a **fallacy of composition**, meaning that which is true in an individual situation is not necessarily true in the aggregate. For example, suppose Walt Wheatman adopts a new technology that doubles his wheat production. If the other 300,000 wheat farmers in the United States and other wheat producers worldwide do not follow suit, Walt’s income will rise sharply. It would be wrong for Walt or others to conclude, however, that all wheat farmers would achieve income gains if they also adopted this new technology. If other wheat producers did respond, supply would expand substantially, and wheat prices would fall dramatically.

Positive versus Normative Economics

The study of economics also can be divided between **positive economics** and **normative economics**. Positive economics focuses on what-is and what-would-happen-if questions and policy issues. No value judgments or prescriptions are made. Instead, the economic behavior of producers and consumers is explained or predicted.

Microeconomics is a branch of economics that focuses on the actions or behavior of individual agents or groups of agents.

Macroeconomics is another branch that centers attention on broad aggregates of the economy.

Positive economics deals with what-is and what-would-happen-if questions.

Normative economics focuses on what-should-be or what-ought-to-be questions.

For example, policymakers may be interested in knowing how consumers and producers would respond to a tax cut in a tax hike. Or, policymakers may be interested in to what degree the problem of obesity may be mitigated if a notable tax is placed on sugar-sweetened beverages.

Normative economics focuses on determining “what should be” or “what ought to be.” For example, policymakers might inquire as to which of several alternative policies *should be* adopted to maximize the economic welfare of producers and consumers. At the micro level, a canning plant might be interested in knowing what vegetables it *should be* canning to maximize profit.²

Alternative Economic Systems

An *economic system* can be defined as the institutional means by which resources are used to satisfy human desires, in which the term *institutional* refers to the laws, habits, ethics, and customs of the nation’s citizens. **Capitalism** is a free market economic system in which individuals own resources and have the right to employ their time and resources, however they choose, with minimal legal constraints from government. Prices signal the value of resources and economic goods. Under capitalism, as claimed by Adam Smith in his book *The Wealth of Nations* in 1776, individuals’ efforts to maximize their own gains in a free market benefit society. The “invisible hand of the market” is a metaphor conceived by Adam Smith to describe the self-regulating behavior of the market place. Capitalism differs sharply from **socialism**, or **communism**, because resources are generally collectively owned and the government decides how human and non-human resources are to be utilized across the various sectors of the economy. Prices largely are set by the government and administered to consumers and farmers. Winston Churchill noted that “Socialism is a philosophy of failure, the creed of ignorance, and the gospel of envy; its inherent virtue is the equal sharing of misery” (www.brainyquote.com).

The United States has what is commonly referred to as a **mixed economic system**; that is, markets are not entirely free to determine price in some markets but are free in others. The government’s intervention in the agricultural arena, for example, is well known. Loan guarantees to crop producers and guarantees to savings and loan depositors are forms of government intervention in the private sector. The government also controls numerous aspects of transportation, communications, education, and finance. Food assistance programs, such as the Supplemental Nutritional Assistance Program (SNAP) and the Women’s, Infants, and Children’s (WIC) Program, also are indicative of a mixed economic system.

DEFINITION OF AGRICULTURAL ECONOMICS

Because agricultural economics involves the application of economics to agriculture, we may define this field of study as follows:

Agricultural economics is an applied social science that deals with how producers, consumers, and societies use scarce and natural resources in the production, processing, marketing, and consumption of food and fiber products.

WHAT DOES AN AGRICULTURAL ECONOMIST DO?

The application of economics to agriculture in a complex market economy such as that of the United States has a long and rich history. We can summarize this activity by discussing the activities of agricultural economists at the microeconomic level and at the macroeconomic level.

²For a more in-depth discussion of positive and normative economics, see Friedman, 1974.

Role at Microeconomic Level

Agricultural economists at the micro level are concerned with issues related to resource use in the production, processing, distribution, and consumption of products in the **food and fiber system**. Production economists examine resource demand by businesses and their supply response. Market economists focus on the flow of food and fiber through market channels to their final destination and the determination of prices at each stage. Financial economists are concerned with issues related to the financing of businesses and the supply of capital to these firms. Resource economists focus on the use and preservation of the nation's natural resources. Other economists are interested in the formation of government programs for specific commodities that will support the incomes of farmers and provide food and fiber products to low-income consumers.

Role at Macroeconomic Level

Agricultural economists involved at the macro level are interested in how agriculture and agribusinesses affect domestic and world economies and how the events taking place in other sectors affect these firms and vice versa. For example, agricultural economists employed by the Federal Reserve System must evaluate how changes in monetary policy affect the price of various food commodities. Macroeconomists with a research interest may use computer-based models to analyze the direct and indirect effects that specific monetary or fiscal policy proposals would have on the farm business sector. Macroeconomists employed by multinational food companies examine foreign trade relationships for food and fiber products. Others address issues in the area of international development.

Marginal Analysis

Economists frequently are concerned with what happens at the margin. A microeconomist may focus on how the addition of another input by a business, or the purchase of another product by a consumer, will change the economic well-being of the business and the consumer. A macroeconomist, on the other hand, may focus on how a change in the tax rate on personal income may change the nation's output, interest rates, inflation, and the federal budget deficit. The key word in this example is *change*; or, more specifically, how a change in price, quantity, and so on will affect other prices and quantities in the economy, and how this situation might change the economic well-being of consumers, businesses, and the economy as a whole. Many of the chapters to follow include a discussion of marginal analysis so as to better understand economic decisions made at the firm, household, or economy level.

Key agencies that agricultural economists deal with include the Economic Research Service (www.ers.usda.gov), the U.S. Department of Agriculture, and the American Farm Bureau Federation (AFBF) (www.fb.org), the voice of agriculture. The current U.S. secretary of agriculture is Tom Vilsack, and the current president of the AFBF is Bob Stallman.

WHAT LIES AHEAD?

Chapter 2 gives an overview of the structure of the nation's food and fiber system and the important role it plays in the U.S. general economy. The remaining parts of the book can be summarized as follows:

- Part 2 focuses on understanding consumer behavior in the marketplace, particularly in explaining the demand for food and fiber products. Chapter 3 presents the theory of consumer behavior. Chapter 4 describes the conditions for consumer equilibrium and determination of market demand. Chapter 5 discusses the measurement and interpretation of demand elasticities.

- Part 3 changes the focus from the behavior of consumers to the behavior of producers of food and fiber products. Emphasis is placed on market equilibrium and market structures. Chapter 6 describes the measurement of production relationships, costs of production, and revenue. Chapter 7 describes the economics of input substitution and describes the economics of product substitution. Chapter 8 describes the determination of output and price under conditions of perfect competition. Finally, Chapter 9 describes the determination of output and price under conditions of imperfect competition.
- Part 4 examines the resource, environmental, and political setting in which producers and consumers of food and fiber products in the United States find themselves. Chapter 10 deals with resource and environmental economics. Chapter 11 focuses on the rationale for government intervention and outlines the development and application of income and price supports in the United States, primarily from the 1930s to present.
- Part 5 switches attention to the macroeconomy—what makes it tick and the important links between the food and fiber system and the rest of the economy. Chapter 12 discusses product markets and national output. Chapter 13 also focuses on the tools of monetary and fiscal policy. Chapter 14 centers attention on business fluctuations, addressing consequences and policy applications. Chapter 15 concerns the macroeconomics of agriculture, using information gleaned from Chapters 11 to 14.
- Part 6 draws attention to international linkages and to the global economy. Chapter 16 focuses on agriculture and international trade. Chapter 16 examines exchange rates and agricultural trade. Chapter 17 addresses the issue of why nations trade. Chapter 18 concerns agricultural trade policy and preferential trading arrangements.

SUMMARY

The purpose of this chapter is to define the field of agricultural economics as a subset of the general field of economics. The major points made in this chapter are summarized as follows:

1. Scarce resources are human and non-human resources that exist in a finite quantity. Scarce resources can be subdivided into three groups: (1) natural and biological resources; (2) human resources; and (3) manufactured resources.
2. Resource scarcity forces both consumers and farmers to make choices.
3. Most resources are best suited to a particular use. Specialization of effort may lead to a higher total output.
4. The field of economics can be divided into microeconomics and macroeconomics. Microeconomics focuses on the actions of individuals—specifically with the economic behavior of consumers and farmers. Microeconomic analysis largely deals with the notion of partial equilibrium; events outside the market in question are assumed to be constant. Macroeconomics focuses on broad aggregates, including the nation's aggregate performance as measured by gross domestic product (GDP), unemployment, and inflation. Macroeconomic analysis normally deals with the notion of general equilibrium; events in all markets are allowed to vary.
5. Positive economic analysis focuses on what-is and what-would-happen-if questions and policy issues. Normative economic analysis focuses on what-should-be or what-ought-to-be policy issues.
6. Capitalism, or free market economics, socialism, and communism represent alternative economic systems. The U.S. economy represents a mixed economic system. Some markets are free to determine price, and other market prices are regulated.