

Economics of Agricultural Development

World Food Systems and Resource Use

ROUTLEDGE TEXTBOOKS IN ENVIRONMENTAL AND AGRICULTURAL ECONOMICS

Fourth Edition



Economics of
Agricultural Development

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George W. Norton, Jeffrey Alwang,
and William A. Masters

"The book does an excellent job of documenting and explaining the role of agriculture in the development process. Economic concepts are introduced with real-world examples in a way that is accessible to students. Topics such as food, poverty, population growth, and trade are treated in a manner that gives a clear picture of the challenges and opportunities facing the world in the 21st century."

Jacob Ricker-Gilbert, Professor, Department of Agricultural Economics, Purdue University, USA

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Economics of Agricultural Development examines the causes, severity, and effects of poverty, population growth, and malnutrition in developing countries. It discusses potential solutions to these problems, progress made in many countries in recent years, and the implications of globalization for agriculture, poverty, and the environment.

Topics covered in the book include:

- Means for utilizing agricultural surpluses to further overall economic development
- The sustainability of the natural resource environment
- Gender issues in relation to agriculture and resource use
- The contribution of improved technologies to agricultural development
- The importance of agricultural policies and institutions to development and trade
- Actions to encourage more rapid agricultural and economic development

This new edition reflects the following developments:

- Growth in environmental challenges due to climate change
- Continued progress in agricultural and economic development in many low-income countries while other countries and regions are being left behind
- Continued growth in demand for higher-valued farm products

This book is essential reading for undergraduate students seeking to understand the economics of agricultural development and the world food system, including environmental and human consequences, international trade, and capital flows. It contains a wealth of real-world case studies and is accompanied by a website.

George W. Norton is Professor Emeritus of Agricultural and Applied Economics at Virginia Tech, USA, and a Fellow of the Agricultural and Applied Economics Association. He is the author of 12 books and numerous scholarly articles.

Jeffrey Alwang is Professor of Agricultural and Applied Economics at Virginia Tech, USA, and has won several international research and outreach awards. He is the author of 14 books and more than 100 journal articles.

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Fourth Edition

**George W. Norton, Jeffrey Alwang,
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Preface

Extreme poverty and undernutrition remain serious problems in many developing countries despite significant progress in reducing them globally over the last 30 years. *Economics of Agricultural Development* examines the causes, severity, and effects of these persistent problems. It identifies potential solutions and considers the implications of globalization and potential future reduction in globalization for agriculture, poverty, and the environment. It identifies linkages in the world food system and stresses how agricultural and economic situations in poor countries affect industrialized nations and vice versa. It focuses on the role that agriculture has played in improving economic and nutritional well-being and how that role can be enhanced. It explores causes and implications of agricultural commodity price volatility and potential effects of climate change on agriculture.

Much has been learned about the importance of technology, education, trade and capital flows, agricultural policies and institutions, and rural infrastructure in stimulating agricultural and economic development. In some cases, the same factors that contribute to economic growth can lead to price and income instability or environmental risk. These lessons and other issues are examined in the book using basic tools of economic analysis. The need is stressed for improved information flows to help guide institutional change in light of social, cultural, and political disruptions that occur in the development process.

The challenge in studying the economics of agricultural development is to build a broad view of the problem and to bring economic theory to bear on specific challenges faced by the rural sector and on means for utilizing agricultural surpluses to further overall economic development. The goal of this book is to help students and other interested practitioners gain an understanding of the agricultural development problem, including the environmental and human consequences of different development paths, the influence of international trade and capital flows, and the reasons for progress in reducing poverty and improving food security in some countries but not others. It is designed to help students develop skills that will enhance their capability to analyze world food and development problems.

This book interprets for undergraduates the economics of development and trade, including the importance of using economics to account for institutions, imperfect information, and the willingness of people to exploit others and to act collectively. This use of economics provides important insights for development policy and helps explain why some countries develop while others are left behind. The role of the government in promoting broad-based development is explored. The book also covers topics related to sustainability of the environment, gender roles in relation to agriculture and resource use, and the importance of macroeconomic policies as related to development and trade. This new edition of the book provides new insights into economic issues related to climate change and how they affect agriculture in developing countries.

INTENDED AUDIENCE

Economics of Agricultural Development is designed as a comprehensive text for the first course on the economics of world food issues and agricultural development. The book is aimed at undergraduate students, with the only prerequisite a course in introductory economics. Students in undergraduate courses that address world food and agricultural development represent a range of majors. Economic jargon is kept to a minimum and explained where necessary, and the book sequentially builds a base of economic concepts that are used in later chapters to analyze specific development problems. A second audience for the book is those who work for public and private international development organizations.

ORGANIZATION OF THE BOOK

Agricultural development is important for rural welfare and for overall economic development. Part 1 of the book considers the many dimensions of the world food–income–population problem in both a human and an economic context. Having established the severity and dimensions of the problem, Part 2 examines the economic transformation experienced by countries as they develop, sources of economic growth, and theories of economic development, including the role of agriculture in those theories. Part 3 provides students with an overview of traditional agriculture and agricultural systems and their determinants in developing countries, with particular attention to issues such as environmental sustainability

and gender roles. Part 4 then identifies agricultural development theories and the technical and institutional elements required for improving the agricultural sector. It stresses the need to improve domestic institutions. Finally, Part 5 considers the importance of the international environment, including trade and trade policies, macroeconomic policies, capital flows, and foreign assistance, including food aid. The concluding chapter integrates various development components addressed in the book and discusses future prospects for agricultural development.

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George W. Norton

Jeffrey Alwang

William A. Masters

PART 1

Dimensions of world food and development problems



Rural family in Colombia

1 Introduction

THIS CHAPTER

- 1 Examines the basic dimensions of the world food situation
- 2 Discusses the meaning of economic development
- 3 Considers changes that occur during agricultural and economic development

OVERVIEW OF THE WORLD FOOD SITUATION

One of the most urgent needs in the world today is to solve the persistent problems of hunger and poverty in developing countries. Despite significant progress in reducing these problems over the past few decades, millions of people remain ill-fed, poorly housed, under-employed, and afflicted by a variety of poverty-related illnesses. These people regularly suffer the pain of watching loved ones die prematurely, often from preventable causes. In many countries, the natural resource base is also being degraded, with potentially serious implications for the livelihoods of future generations.

Why do these problems persist? How severe are they, and what are their causes? What role does agriculture play in economic development and how might it be enhanced? What does the globalization of goods, services, ideas, technologies, and capital mean for agriculture, poverty, and environment around the world? How do policies in developed countries affect developing countries? And, how does the situation in low-income countries affect wealthier nations? An understanding of the fundamental causes of the many problems in poorer countries and the

progress that has been achieved is essential if solutions are to be recognized, encouraged, and implemented.

Much has been learned over the past several years about the roles of technology, education, international trade and capital flows, agricultural and macroeconomic policies, and rural infrastructure in stimulating agricultural and economic development. In some cases, these same factors can be a two-edged sword: they contribute to economic growth on the one hand, but lead to price and income instability or environmental risk on the other. These lessons and other potential solutions to development problems are examined herein from an economic perspective. The need is stressed for improved information flows to help guide institutional change in light of social, cultural, and political disruptions that occur in the development process.

World food and income situation

Are people hungry because the world does not produce enough food? No. In the aggregate, the world produces a surplus of food, and it has for a long time, even during the COVID-19 pandemic. If the world's food supply were evenly divided among the world's population, each person would receive substantially more than the minimum amount of nutrients



Many farm workers in Asia earn between one and two dollars per workday

required for survival. The world population has more than doubled over the past 50 years, but food production has grown even faster.

If total food supplies are plentiful, why do people perish every day from hunger-related causes? At its most basic level, hunger is a poverty problem. Only the poor go hungry. They are hungry because they cannot afford food or cannot produce enough of it themselves. The very poorest groups tend to include: families of the unemployed or under-employed landless laborers; the elderly, handicapped, and orphans; and people experiencing temporary misfortune due to abnormal weather, agricultural pests, health crises, or political upheaval. Thus, hunger is for some people a chronic problem and for others a periodic or temporary problem. Many of the poorest live in rural areas.

Hunger is an individual problem related to the distribution of food and income within countries and a national and international problem related to the geographic distribution of food, income, and population. About 9 percent of the world's population (roughly 700 million people) lives on less than \$1.90 per day (the World Bank definition of extreme poverty), and about half the world lives on less than \$5 per day. These people are found primarily in sub-Saharan Africa and South Asia, although poverty is also prevalent in East and Central Asia, Latin America and Caribbean, and Middle East and North Africa. Significant strides have been made in reducing global poverty, with the proportion of the world's population living in extreme poverty cut by more than half over the past three decades. However, much remains to be done to alleviate poverty-related problems.

While hunger and poverty are found throughout the world, over the past 40 years per capita food production has grown steadily in most regions, and in the last 20 years it has grown in every major region, including Africa (Table 1.1). The result has been substantial progress in reducing hunger and poverty, although per capita calorie availability remains below minimum nutritional standards in many sub-Saharan countries. Low agricultural productivity (farm output divided by farm inputs), wide variations in yields due to climatic, economic, and political causes, and rapid population growth have combined to create a precarious food situation in these countries.

Annual variation in food production is also a serious problem in several countries, particularly in Africa. This variation has meant periodic severe food shortages in some countries, especially when production problems have been compounded by political upheaval or wars that have hindered international relief efforts. Production variability causes wide price swings that reduce food security for millions who are on the margin of being able to purchase food.

Table 1.1 Food Production Index and Average Dietary Energy

<i>Year</i>	1997	2007	2017
Food Production Index (2004–06 = 100)			
World	82	106	131
Asia	77	109	140
Africa	74	104	135
Americas	83	106	126
Europe	99	98	111
Oceania	87	92	119
Ave. Dietary Energy Supply (KAL/Cap/Day)			
World	2716	2792	2908
Asia	2580	2650	2840
Africa	2432	2537	2561
Americas	3125	3210	3279
Europe	3237	3362	3380
Oceania	2889	2988	3023

Source: FAOSTAT, 2020, www.fao.org/faostat/en/#country

Food prices

From 1970 to 2000, the real price of food for most people trended down slightly, and from 2001 to 2020 it exhibited a slight upward trend. U.S. prices (in nominal or “current” dollars) of maize, rice, and wheat (the world’s major food grains) are shown in Figure 1.1. Despite peaks in 1972, 1981, 1996, 2008, and 2011, the average prices of all three grains fluctuated around a relatively constant level. The prices of most other things rose more steadily over the entire period, so for most people the *relative* price of food fell slightly, except during the peak years noted above. This reduction in the price of food was both good and bad because prices affect economic growth and social welfare in a contradictory fashion. Lower food prices benefit consumers and stimulate industrial growth but can lower agricultural producer incomes and reduce employment of landless workers. To the extent that lower prices reflect lower production costs, impacts on producers may be mitigated.

The three grains shown in Figure 1.1 have exhibited sizable year-to-year price variations. Food price fluctuations directly affect the well-being of the poor, who spend a high proportion of their income on food. Food price instability can increase human suffering and threaten political stability. Food price swings have resulted from a combination of factors

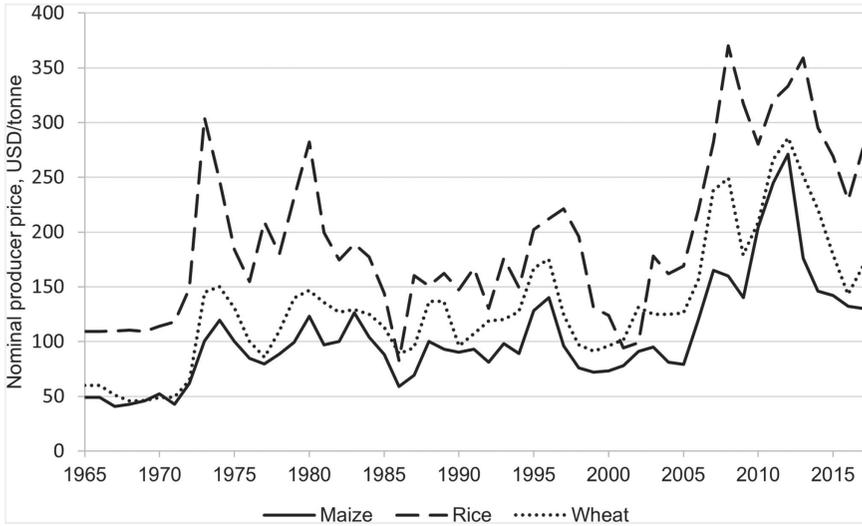


Figure 1.1 U.S. prices of major food grains in current dollars
Source: FAOSTAT, 2019

that shifted supply and demand. Supply factors included such items as adverse weather conditions and fuel and fertilizer costs. Demand factors included items such as demand for grains for bio-fuel use, population and income growth in many developing countries, changes in currency values, and policy changes in countries that affected their demand for imported food. Speculative investments in commodity markets have amplified commodity price swings for brief periods of time.

Malnutrition

Hunger is most visible to people in developed countries when a drought or other disaster results in images in the news of starving children. Disturbing as such images are, in a sense they mislead. The less conspicuous but more pernicious problem, in terms of people suffering and dying, is chronic malnutrition. While accurate figures of the number of malnourished in the world are not available, and even good estimates depend on the definition used, recent estimates indicate that almost 700 million people suffer from chronic undernutrition associated with food deprivation (Table 1.2), a number that has undoubtedly grown during the COVID-19 pandemic. Adverse health effects due to micronutrient deficiencies affect about two billion people. More than 5 million children die from preventable causes each year, about half due to malnutrition. Increasing per capita incomes have allowed more of the world's population to

Table 1.2 Estimated Number of Undernourished People in the World

<i>Year</i>	<i>Number of Undernourished (millions)</i>						
	2005	2010	2015	2016	2017	2018	2019
World	826	668	653	658	653	678	688
Africa	193	196	217	225	232	237	250
Asia	575	424	389	382	370	385	381
Latin America and the Caribbean	49	40	39	42	44	47	48

Source: FAO: The State of Food Security and Nutrition in the World, 2020, p. 340

eat better. But for those in lower income groups, the situation remains difficult.

Health

People born in developing countries live, on average, eight years less (in the least developed countries 14 years less) than those born in developed countries. Health problems, often associated with poverty, are responsible for most of the differences in life expectancies. Mortality rates for children under age 5 are particularly high, often ten times higher than in developed countries (Figure 1.2). Though countries with high rates of infant mortality are found in all regions, sub-Saharan African countries are particularly afflicted. The band of high infant mortality stretching from the Atlantic coast across Africa to Somalia on the Indian Ocean covers some of the poorest and most undernourished populations in the world.

Poverty affects health by limiting people's ability to purchase food, housing, medical services, and even soap and water. Inadequate public sanitation and high prevalence of communicable diseases are also closely linked with poverty. A major health problem, particularly among children, is diarrhea, usually caused by poor water quality. According to the World Health Organization, 1.4 million people die annually from causes related to diarrhea, including 500,000 children under the age of 5. Lower respiratory diseases account for an additional 3 million deaths and malaria another 400,000. Basic health services are lacking in many areas; on average, ten times as many people per doctor and per nurse are found in low-income countries as in developed countries.

A major health problem that continues to plague the developing world is acquired auto-immune deficiency syndrome (AIDS). The disease is difficult to contain in many developing countries because of lack



Figure 1.2 Child mortality rates per thousand live births, 2019
Source: World Bank, World Development Indicators 2019

of education about the disease, limited use of protective birth control devices, and in some cases, absence of government commitment to address the problem. Effects are felt in lost productivity and increased poverty in addition to its effects on direct human suffering. According to the World Health Organization, an estimated 37 million people worldwide were living with HIV/AIDS in 2018.

The COVID-19 pandemic in 2020 is estimated to have pushed an additional 50 million people into extreme poverty, according to World Bank data. The World Food Program estimates that 130 million people will be added to the list of those suffering from extreme hunger. Most health systems in developing countries were ill-equipped to address existing health problems, let alone a pandemic.

Population growth

Population growth is important to poverty and hunger problems for several reasons. First, population is growing less than 0.5 percent per year in developed economies, but about 1.7 percent per year in developing countries, excluding China, and 3 percent or more in some sub-Saharan African countries. High growth rates place pressure on available food supplies and on the environment in many low-income countries. Continual increases in food production are needed, because regardless of how successful efforts to control population growth are, world population will not stabilize for several years. Rapid urbanization is also occurring as populations continue to grow. Second, population growth has slowed significantly in some developing countries, allowing them to benefit over time from having a high proportion of their populations being of working age. However, in countries where population growth rates have been



Children in Honduras

slow for several years, such as in Germany, the United States, and more recently China, a key issue now is how to meet the medical and income needs of large and growing elderly populations.

Globalization

Food and economic systems in less-developed countries are affected by the international economic environment far more today than they were in years past. Trade and other economic policies abroad and at home, international capital flows, migration, disease transmission, and oil price shocks have combined to increase the instability of and opportunities for improving the food and economic security of developing and developed countries.

International trade in agricultural products (as with other products) has grown over the past half century, building on improvements in transportation and information systems. As exports and imports of farm products constitute a higher proportion of agricultural production and consumption, effects of agricultural policies aimed at farm sector and world prices become more important to farmers than they were previously. Possibilities for maintaining a nation's food security at the aggregate level are improved, although price volatility remains an issue. Production and policy changes abroad also tend to have an expanded effect on domestic agriculture as international trade grows. The need to be price competitive with other countries has grown, as has the need to participate in international

negotiations to alter the policy environment. Growing demand in developed countries for non-traditional exports from developing countries, such as fresh fruits and vegetables, presents new opportunities for farmers. Quality and phytosanitary requirements in global markets create challenges for farmers wishing to exploit these opportunities.

International capital (money) markets, through which currencies flow from country to country in response to differences in interest rates and other factors, are as important as trade to the food and economic systems in less-developed countries. Capital flows affect the values of national currencies in foreign exchange markets. The foreign exchange rate, or the value of one country's currency in terms of another country's currency, is an important determinant of the price a nation receives for exports or pays for imports.

Many countries also have serious foreign debt problems. The decade following the 2008 global financial crisis was characterized by cheap credit for borrowers and increased private and public investments in developing countries. The need for foreign exchange to repay external debts has increased the importance of exports for these countries, forcing them to examine their trade and exchange rate policies. Fluctuations in global markets expose debtor nations to foreign exchange crises; when world commodity prices fall, heavy debt burdens can constrain domestic spending on social services and exacerbate political instability.

The lesson of two world wars, 9/11, the food price spike in 2008, and the recent COVID-19 pandemic is that we live in a globalized world that cannot be ignored, or if we do ignore it, it is at our own peril.

Environmental degradation

As populations grow, environmental problems become more severe. Deforestation, farming of marginal lands, overgrazing, and misuse of pesticides have contributed to soil erosion, desertification, poisoning of water supplies, and climate change. Global climate change has gradually warmed the climate and made weather more variable, contributing to stronger storms and harsher droughts. Water has become scarcer. Some environmental degradation is intentional, but most is the unintended result of people and governments seeking means of solving immediate food and economic problems, often at the cost of long-term damage to the environment. Some of this damage may compromise the ability of countries to raise incomes in the long run. When people are hungry, it is hard to tell them to save their resources for the future, and environmental conservation represents a form of savings. However, many potential solutions exist which are consistent with short-term increases in food

production and long-term goals of simultaneously sustaining or improving environmental quality while raising incomes.

Risk and uncertainty

Most of the factors mentioned above are associated with increased exposure to risk and uncertainty. Fluctuating prices, exchange rate instability, agricultural pests, and rapidly changing weather patterns represent risk factors. Risks and risk management imply real costs that may compromise short- and long-run in well-being. For example, the COVID-19 pandemic spread rapidly throughout the world and exposed the limitations of public health systems in poor and wealthy countries alike. More than a million people perished as a result of the pandemic, and economic damage from it and efforts to contain it erased decades of progress in reducing global hunger and poverty.

Pandemics are devastating, but not all risks faced by individuals and countries are necessarily bad. Innovation and entrepreneurship are risky activities with high payoffs. It is how risks are managed that most influences economic growth. Risk management needs to be conducted efficiently; the proper balance must be found between managing risks and pursuing other goals.

The preceding overview provides brief highlights of some of the dimensions of the food–income–population–environment problem.



Slum close to river bank in Katmandu, Nepal