

The World Food Economy, Second Edition
Solutions Manual

Douglas Southgate

Chapter 1

1. In the late 1960s and early 1970s, Paul Ehrlich and others forecast imminent famine throughout the world. Describe what has happened and what has not happened in the food economy to avert this disaster.

People have not bred themselves to oblivion and the world is not running short of edible goods; in the face of demographic expansion of unprecedented proportions, food supplies have not just kept pace, but consistently have outstripped increases in demand (pp. 1-2).

2. What are the three main elements of the food economy and how are these elements interrelated?

Production agriculture, which is the source of farm commodities (p. 6); agribusinesses, which provide agricultural inputs and marketing and processing services (p. 3); and government, which establishes the institutional framework for markets and funds and otherwise facilitates investments in human capital and new technology (p. 3).

3. Describe the economy-wide impacts of agricultural development.

As agricultural development makes food more available, prices fall. As a result, poor people who otherwise go hungry can afford an adequate diet. Also, cheap food allows more people to increase their purchases of other goods and services, thereby stimulating the economic diversification that is an essential part of economic development. At the same time, savings increase. This in turn spurs investment and economic growth, as development requires (p. 1).

4. Compare and contrast the impacts of scarcer agricultural commodities in a poor country and in an affluent place, such as the United States.

For much of the human race, higher food prices would hardly be noticeable. In the United States, the value of unprocessed agricultural commodities is roughly 2 percent of total household income. Even a 50 percent increase in the former value, which is more pessimistic than most available forecasts, would only oblige the typical American family to reallocate 1 percent of its budget. But for hundreds of millions of people in South Asia, Sub-Saharan Africa, and other impoverished regions, any increase in scarcity would create real hardship. For example, spiking prices in 2007 and 2008 pushed as many as 155 million people into the sort of absolute poverty that leads to nutritional deprivation (p. 5).

5. Compare and contrast this volume with textbooks on agricultural economics and development economics.

This book does not duplicate more specialized contributions to the economics literature. In a volume about food consumption, for example, consumer behavior is modeled in sophisticated ways. Likewise, texts on agricultural economics contain thorough analyses of such topics as farmers' choices among inputs and production methods, their response to risks created by variable weather and economic fluctuations, and the performance of markets in which they purchase inputs and sell outputs. By the same token, books on the economics of development provide a comprehensive treatment of topics in that field (p. 7).

Chapter 2

1. Describe Thomas Malthus's principle of population, including the view of human behavior on which this principle rests.

The principle of population rests on a simple characterization of human behavior – best expressed by two words: vice and misery. According to Malthus, any positive difference between what people eat and minimum dietary requirements leads to vice, by which he meant (procreative) sex, and ultimately to exponential growth in human numbers. Misery, meaning the pruning back of the population by disease and starvation, results if food consumption falls below subsistence requirements (pp. 12-13).

2. Compare and contrast overshoot and collapse in Malthus's model of trends in food demand and supply and overshoot and collapse in the systems-engineering model developed for the Club of Rome.

In Malthus's model, overshoot and collapse happen from time to time because population and subsistence food requirements grow exponentially while food availability increases in a linear fashion (pp. 12-13). In the systems-engineering model developed for the Club of Rome, overshoot and collapse are the eventual consequence of exponential growth in population, economic output, etc. in the face of limited resources (pp. 15-16).

3. Identify critical missing elements of the Club of Rome model and assess the implications of these omissions.

The Club of Rome model does not incorporate an intrinsic feature of economic life: markets, which provide an important feedback mechanism for dealing with resource scarcity. Due to this omission, the model neglects all the substitution, conservation, and development of new supplies that occur as mounting environmental scarcity drives up resource prices (pp. 15-16).

4. Describe the second agricultural revolution and the technophysio evolution it catalyzed.

Among other scholars, Nobel laureate Robert Fogel uses the term, second agricultural revolution, to describe the increases in output-per-farmer that began in Europe during the 1700s. These increases set technophysio evolution in motion, which Fogel defines as “a synergism between technological advances and physiological improvements that has produced a form of human evolution that is biological but not genetic, rapid, culturally transmitted, and not necessarily stable” (p. 18).

5. What happens to death and birth rates at the beginning of the demographic transition? When is the transition at an end?

Death rates fall as the demographic transition begins, although birth rates change little. The transition is not at an end until death and birth rates are comparable (at lower levels than the rates before the transition gets under way) *and* the age composition of the population is stable (pp. 20-21).

6. Why does natural increase always occur during the demographic transition?

Natural increase would not happen if death and birth rates remained equal as both declined. However, this never happens. Instead, the death rate falls before the birth rate does, which causes the population to grow (pp. 20-21).

7. Explain why mortality has declined faster in the developing world during the twentieth century than it did in places like Great Britain and Scandinavia during the 1800s.

Unlike what happened earlier in Europe, death rates were brought down quickly during the twentieth century in Africa, Asia, and Latin America because it was easy to apply knowledge and technology for combating disease originally developed in other parts of the world (p. 24).

8. What factors have caused human fertility to decline throughout the developing world in recent decades?

Urbanization, improved living standards, better educational and employment opportunities for women, and lower infant mortality all contribute to diminished human fertility (pp. 27-31).

9. Does an improvement in human well-being always lead to diminished TFRs?

Human fertility has increased recently in a number of the world's most prosperous nations (p. 30 and Chapter 10). But elsewhere, the number of births per woman declines as living standards improve (pp. 29-30).

10. Describe demographic momentum and its contribution to natural increase.

Demographic momentum arises at the beginning of the demographic transition, due to the survival of more infants and small children. Eventually, these children reach puberty, thereby adding to the population of reproductive age. This arrests the decline in the birth rate, which keeps that rate under the death rate. Demographic momentum continues to be created as long as the TFR is above the replacement level (p. 23).

11. To improve your understanding of the demographic transition, look up and analyze data on death and birth rates and TFRs since 1960 or so for a few countries, including one where GDP per capita is elevated, another with a low average income, and one or two more that are in between.

As a rule, the data, which can be obtained from either the print or online versions of *World Development Indicators*, reveal an inverse relationship between birth rates and TFRs, on the one hand, and GDP per capita, on the other. In addition, wealthy countries do not have the lowest death rates, mainly because the elderly comprise a large share of the population in places like Scandinavia and Japan. Instead, the lowest death rates are observed in the emerging economies of Asia, Latin America, and the Middle East. Sub-Saharan Africa has the highest death rates, both because it is so poor and also because of HIV/AIDS and other communicable diseases.

12. Contrast the income elasticity of food demand in countries where PPP-adjusted GDP per capita is \$3,000 or less with the income elasticity of food demand in nations with much higher standards of living.

In poor countries, the income elasticity of demand (p. 37) for grain (which comprises more than three-fifths of total food consumption of indirect consumption of feed grains eaten by livestock are factored in) is about 0.60. But in wealthy nations, this income elasticity is much lower (p. 36). Differences of this sort are consistent with Engel's Law (p. 37).