

Introduction

In this rapidly globalizing world, possibly the most fundamental problem facing us all is the continuing prevalence of poverty in so many countries while only a minority of industrialized countries enjoy wealth. The World Bank estimates that more than half of the world's poor live in rural areas, the majority of them subsistence farmers. "More than half a century of persistent efforts by the World Bank and others have not altered the stubborn reality of rural poverty, and the gap between the rich and poor is widening. Most of the world's poorest people still live in rural areas and this will continue in the foreseeable future" (World Bank, 2002a).¹

Can success in agricultural transformation make a major contribution to solving this problem, and if so, how? This is one of at least two major questions regarding agricultural policy today. A second one concerns agricultural protection in rich industrialized countries. Such protection has major implications for agricultural development in developing countries. While we do not focus on agricultural policy in rich countries, we do address it insofar as it affects agricultural development in developing countries.

To answer these questions, the book addresses an old debate: How critical is the role of agriculture in economic development? Since England's agricultural and industrial revolutions in the 18th and 19th centuries, the world has witnessed the spread of sustained and transformative rises in income and consumption in only a minority of countries. These are primarily the industrialized economies of Western Europe,

¹ Throughout we use the internationally accepted poverty level of two dollars per day. Extreme poverty is at one dollar per day. According to the 2008 World Development Report on agriculture, 75 percent of the world's poor still live in rural areas. The September 2008 update on the Millennium Development Goals (MDGs) indicates that, despite progress, the world population suffering from extreme poverty remains substantial; it declined from 41.8 percent in 1990 (1.8 billion) to 25.7 percent in 2005 (1.4 billion).

North America, Australia, and New Zealand.² In the 1980s, there was economic convergence among some countries of Western Europe, such as Ireland, Portugal, and Greece, and since WWII between the West and a minority of rapidly developing countries mainly in East and Southeast Asia – for example, Japan; the Republic of Korea; Taiwan, China; Malaysia; and Singapore. However, there has been widening economic divergence between this minority of industrialized and rapidly industrializing countries and most of the developing world.³

A striking similarity among the countries where economic development has lagged is the economic predominance and slow growth of their agricultural sectors, low rates of increase of rural household incomes, and the prevalence of poverty in rural areas. It is equally notable that in the minority of economies that did develop agriculture, the entire economy thrived.

Is this an accident? Or is there a causal link between success in agricultural transformation to broader-based growth in rural areas and the overall economy? Or instead, do the same underlying causes that enable agriculture to thrive also promote broad-based overall economic growth?

These are old questions. Indeed, debates concerning the productive role of agriculture date back to the physiocrats in 18th-century France. Among development economists, there are two polar views regarding the centrality of agriculture's role in building the wealth of a nation. At one pole, there is a large literature arguing that agricultural development is necessary for the overall economic transformation of a country (Eicher and Staats, eds., 1998). The contribution of agriculture in terms of food, fiber, raw materials, labor, and financial surplus (including foreign exchange) to invest is essential to jumpstart the process of industrialization in its early stages, during which, by definition, the industrial sector is small. At the other pole is the view that economies can bypass this process of agricultural development and instead invest in building an industrial base (while extracting

² This group of countries is commonly referred to as the West or the Western world because these countries share a common European (Anglo-Saxon, Romance, etc.) cultural heritage. Unlike high-income industrialized economies, New Zealand is high income but with agriculture still its most important tradable sector.

³ "The average income in the richest 20 countries is already 37 times that in the poorest countries.... Both the gap between rich and poor countries and the people living on fragile lands have doubled in the past 40 years" (World Bank, 2003c).

agricultural surplus for industrial investment). The latter view, popular in the 1950s, has recently gained adherents, even among macroeconomists. Many believe “resources devoted to slow growing agriculture as wasted” (Timmer, July 2005).

The pro-agriculture view argued by Johnston and Mellor (1961), among others, emphasized the five potential contributions of agriculture to the structural transformation of an economy and the critical importance of investing in agriculture in order to generate a surplus for industrialization. This view did not, however, explicitly claim that rural poverty would be significantly reduced in the process, although rural poverty reduction was implied. Johnston and Mellor did advocate a unimodal land distribution (land fairly equally divided among the majority of farmers), which would make possible an equitable distribution of the benefits of agricultural development. Kuznets (1968) argued that a revolution in agricultural productivity is indispensable for modern economic growth.

The pro-agriculture view defended agriculture’s role in response to the position of the early development economists (Rosenstein-Rodan, 1943; Lewis, 1954; Hirschman, 1958; Fei and Ranis, 1964). They treated agriculture as a passive sector with weak links to non-agriculture, a resource reservoir from which to extract labor and other resources to invest in industry, considered to be the leading sector. Agriculture could be exploited, but it was not necessary to invest in the sector for it to contribute to economic growth. In the Lewis model, expansion of a two-sector economy is fueled by unlimited supplies of rural labor. Expansion of the capitalist sector would continue until capitalist and rural wages were equal. This anti-agriculture view was reinforced by Prebisch (1959), who argued that agriculture faces secularly declining terms of trade. Thus, for different reasons, investing in agriculture was a bad development strategy. We label this anti-agriculture view the “squeeze agriculture” development strategy. The entire import-substitution industrialization (ISI) strategy, popular among developing countries in the 1950s, is predicated on the belief that investing in agriculture is a bad strategy.

The key difference between these polar views was whether or not they asserted that it was necessary to invest in the agricultural sector for it to play a key development role. Both agreed that the sector was necessary to generate the surplus needed by industry in its

early stages but disagreed on the importance of agricultural investments to generate such surplus. A more recent (mid-1980s) version of this anti-agriculture view is based on trade: World cereals prices have fallen by 50 percent over a span of some four decades – from around USD 300 per metric ton (in USD 1990 prices) in 1960 to around USD 150 per metric ton in 2005. This secular decline in real cereals prices, combined with agricultural price subsidies in member countries of the Organisation for Economic Co-operation and Development (OECD) – an estimated USD 360 billion per year – removes much of the rationale for investing in agriculture (Ashley and Simon, 2001: 405). Whether the food crisis caused by the spectacular rise in cereals prices of early 2008 will actually rekindle and sustain interest among donors in investing in the sector remains to be seen (Slayton and Timmer, 2008).⁴

In sum, the measure of agriculture's contribution to overall economic development in increasingly urban economies and whether it is necessary to invest in the sector to generate that contribution is still in doubt among many academics, policy makers, and development practitioners.

What the Book Does and Does Not Address and How it is Organized

This book revisits this old but still unresolved debate. Drawing upon selected historical and post-WWII country experiences, it seeks to answer two main questions:

1. In a world of widespread rural poverty and highly unequal development, does success in agricultural transformation matter?
2. If it does, in what ways does it matter, and how can such transformation be brought about?

Part One deals with what success in agricultural transformation means, and Part Two with what makes it happen. To address the first issue, the book evaluates the evidence on the role of successful agricultural transformation in promoting industrialization and general economic

⁴ Rice prices rose to \$1,100 per ton in April 2008, from \$375 per ton in December 2007. Over a longer period, real (in constant 2007 dollars) rice prices declined from \$2,500 per ton (1974) to \$200 per ton (2002) (Timmer, 2007: 51).

growth, assessing as definitively as possible the relative accuracy of the polar views. To address the second, it discusses the literature and country evidence on causes and consequences of sustained increases in agricultural productivity and broad-based growth.

This book, however, does not address two major agriculture-related concerns. The first is how to achieve environmentally sustainable agricultural development. Environmental sustainability deals in part with the selection of agricultural technologies and is without doubt essential for long-term agricultural and overall economic development, but it is not the focus of this book. With the reality of climate change, the specific steps governments should consider to facilitate agriculture's adaptation constitute a major subject that deserves at least a book by itself. The arguments here regarding the importance of achieving success in agricultural transformation and the public foundations of achieving such success are not affected by considerations of environmental sustainability in the context of climate change. Successful agricultural transformation in the years to come must be environmentally sustainable and adjust to climate change. The second concern is the multi-functionality of agriculture – for example, agriculture as the repository of bio-diversity and recreational activities. The argument is that as a sector that fulfills several critical public sector roles, it should be supported. Again, the arguments made here are not affected by considerations of multi-functionality. Environmental sustainability and multi-functionality are both important concerns, but they are not the focus of this book.⁵

The book is organized in two parts. Part One reviews the evidence on the role of sustained agricultural development in promoting overall growth, raising rural incomes, and reducing rural poverty. It also compares the approach of the book with that of several other studies that set out to evaluate the contribution of the sector to economic development and poverty reduction. Part Two proposes a hypothesis about what makes success in agricultural transformation happen and systematically tests it using evidence from both economic history and more recent post-WWII worldwide experiences. The hypothesis proposes

⁵ McCalla (2000: 2–5) discusses the three major challenges of agriculture in the 21st century. These are global food security, poverty reduction, and sustainable natural resource management.

five conditions that must be maintained for decades for agricultural transformation to materialize. The hypothesis itself draws upon patterns identified in successful agricultures.

Throughout, the book is structured so as to highlight “main messages” and thus facilitate selective reading by the busy reader.

The Meaning of “Success in Agricultural Transformation”

“Success in agricultural transformation” refers to two simultaneous developments:

1. Increases in productivity (output per unit of input, variously defined) sustained over two to three decades at least; and
2. Sustained increases in income for the majority of farm/rural households.

Quantitatively, and at macro and sector levels, the process of agricultural transformation is characterized by (a) a declining share of agriculture to gross domestic product (GDP); (b) a declining share of agricultural employment to total employment;⁶ (c) positive growth in productivity sustained over several decades; and (d) steady income increases over several decades for at least 50 percent of rural households.⁷

Thus cases of agricultural development where only a minority of rural households participate in and benefit from economic growth are ruled out as being “successfully transformed.” It follows that the growth of dualistic agricultures is ruled out as being successfully transformed, because only a minority of rural households benefit. The concept of successful agricultural transformation used here goes beyond the concept of sustained agricultural growth in that it has a distributional component, namely broad-based income growth and rural poverty reduction. The book takes an inclusive view of successful agricultural transformation.⁸ This view borrows from Sen’s (2000) *Development*

⁶ When the absolute number of people employed in agriculture declines, Tomich, Kilby, and Johnston (1995: box 1.1) call it the “structural turning point.”

⁷ The exact length of time it takes varies among countries, as historical experience indicates. See country cases discussed in this book. However, it is always “long.” Also see Timmer (2007: 26). Timmer (1988) characterizes this long process in terms of different stages.

⁸ Timmer (2009: 4–6, fig. 1–1) characterizes the successful process in similar terms, consistent with what is described here. Quantitatively, the process has four main features: a falling share in economic output and employment; a rising share of urban economic output in industry

as *Freedom*. For Sen, development is not just increases in income and productivity, but more fundamentally, the expansion of human capabilities, enabling the enrichment of human lives. People have greater freedom to choose the lives they want to live. Likewise, success in agricultural transformation transforms human lives. Such success is both the means to transforming the daily lives of millions of smallholders and poor people and an end in itself. My view of agricultural transformation therefore goes beyond the instrumental view of Johnston and Mellor (1961) stressing the material contribution of agricultural development to industrialization.

Empirically, productivity increases are measured by total factor productivity (TFP) growth or best proxies thereof.⁹ For increases in the income of rural households, the book uses movements in median household incomes or best proxies thereof.¹⁰ The concept of successful transformation in this book thus has both efficiency and distributional dimensions: sustained and widespread productivity gains in agriculture and substantial income gains for poor households, which constitute the bulk of the rural population.

In the book, the term “agriculture” refers to the crop, livestock, and forestry sub-sectors.¹¹ The term “rural” is notorious for its ambiguity, as the concept varies among countries, and sometimes even within the same country over time.¹² For the purposes of data collection, we have no option but to accept (as does the World Bank) the definition of “rural” adopted by a given country government, even if the definitions

and services; the migration of rural workers to urban settings; and a demographic transition in birthrates and death rates.

⁹ TFP growth refers to the output growth not accounted for by input growth. Appendix B presents a glossary of commonly used economic terms.

¹⁰ The best proxies are often per capita income levels and their rates of increase over time and a measure indicative of the country’s income distribution.

¹¹ As in many works on agriculture, this book does not deal with the fishing sub-sector.

¹² The term “rural” is obvious to the layperson, but its administrative/operational definition varies by country, and within a given country, over time. Census criteria take various cutoff points between rural and urban. For example, in Mexico the cutoff point is a locality with more or less than 2,500 inhabitants. In other countries the cutoff point may vary between 5,000 and 10,000. The World Bank accepts each country’s definition, even though there is no consistent definition of “rural” across countries. There is really no choice but to accept the country’s definition. Another example is China, where the concept of what constitutes “rural” has changed. “Rural” population is the population not included in towns. What constitutes a “town” changed in 1964 and 1984.

differ across countries. What is common in the various definitions is that “rural” is a multi-dimensional concept that refers to areas where population density, and the availability and quality of public infrastructure and services, are lower than in urban areas. However, at the end of the day, the administrative demarcation of rural versus urban is arbitrary. The practical implication of this arbitrariness is that it is poverty reduction that matters for this book, not whether the poverty is rural or urban. After all, the rural poor crowd cities and are then counted as urban. It is the stagnation of the agriculture and rural sector and the despair of agriculture/rural households that are the problem, wherever they are.

Methodological Approach of the Book: Testing Theories by Seeking Refutations, Not Confirmations

The book uses economic history and quantitative analysis in the following ways. First, it documents the ways in which successful agricultural transformation has enabled countries to promote industrial wealth and raise the income levels of the majority of poor households, in particular, rural households. Second, it identifies patterns and regularities in historical and post-WWII data. Using insights gained from these patterns and regularities, it formulates hypotheses that, it is hoped, can constitute a fruitful start for further research. On the basis of these empirical patterns, it hypothesizes that five conditions must be met for achieving success in agricultural transformation. Third, it tests this hypothesis by seeking instances that could refute the five conditions.

This approach stands in sharp contrast to the more common approach, which involves a search for supporting or confirming instances using regression analysis and computable general equilibrium (CGE) modeling. Instead, in the present approach, testable hypotheses are developed to explain well-known events in agricultural development.¹³ To assess the relative accuracy of competing universal hypotheses on growth and development, one tests them by seeking to refute them. This is counterintuitive to the prevailing practice, which is to find confirmations, based on an inductive use of econometric

¹³ On testability in the social sciences within the Popperian approach, see Berkson (1989).

measures of statistical significance. Currently, the approach is to get theory to emerge from evidence by using regression. Regressions are run on a number of variables in the data, usually in the hope or expectation that some of the variables are a cause of the others. When it is found that a correlation exists, the “null hypothesis” is refuted, and a theory of a causal relationship is confirmed. This theory is then advanced. It is important to recognize that even though logically speaking a “null hypothesis” is an alternative theory, it is extremely weak in giving us any guidance on where to test further, as it contains no theory of causation.¹⁴

It is no wonder that this approach has led to contradictory claims, as evidenced by several recent studies, including those on agriculture’s role in promoting pro-poor growth.¹⁵ Within this confirmation-cum-inductive-inference approach, there is no independently replicable way to resolve contradictions. Specifically, the book considers the validity of claims made in several recent studies regarding the importance of growth of the primary sector or of agriculture in promoting income growth and in reducing poverty – for example, studies on India (Ravallion and Datt 1994; Beesly, Burgess, and Esteve-Volart 2004), China (Ravallion and Chen, 2004), Indonesia (Timmer, September 2004), and worldwide cross-country regressions by the World Bank (January 2005). Using econometric methods, these studies derive statistically significant coefficients and quantify various elasticity estimates – for example, the elasticity of poverty with respect to growth, cross-sector growth elasticity, and elasticity of connection. Then they proceed to infer causality from growth to poverty reduction and make judgments about the relative quantitative role of primary or agricultural growth within this causal structure.

In his recent review of these studies, Timmer (July 2005: 11–12) writes, “What are we to make of all this confusion?”¹⁶ Timmer proposes

¹⁴ This same point is made by Meehl (1978: 817) and is discussed in Freedman (1991: 310). See Appendix A.

¹⁵ According to one definition (Martin Ravallion, 2004, of the World Bank), growth is pro-poor if it reduces poverty. This happens when the distribution of growth reduces poverty and average living standards rise. According to a second definition (Baulch and McCulloch, 2000; Kakwani and Pernia, 2000), growth is “pro-poor” when poverty falls more than it would have if all incomes had grown at the same rate – in other words, when growth disproportionately benefits the poor.

¹⁶ The countries discussed are India, Bangladesh, Indonesia, Japan, the Republic of Korea, Taiwan, China, and the People’s Republic of China.

“enforcing common data, definitions and methodologies [that] would help clarify the different cases considerably.” The answer here is: change the method.

The approach of this book is directed more centrally at the refutation of key hypotheses. In this, it follows the Popperian idea that outcomes inconsistent with a hypothesis constitute more powerful evidence against the hypothesis than positive statistical correlations can generate in favor of the hypothesis. The focus on potential and actual refutations is the hallmark of Popper’s methodology and stands in sharp contrast to the current inductive approach that seeks confirmations (Popper, 1961: 134). Popper makes use of a well-known logical principle, namely the asymmetry between confirmation and refutation: Countless clear confirmations cannot establish the truth of a universal claim, but one clear refutation can refute a universal claim. Thus, finding another white swan cannot prove that all swans are white, but finding one black swan can demolish the universal claim that all swans are white. In our case, for example, the finding that the surplus food, raw materials, and investible wealth generated by England’s agricultural revolution (the white swan) were essential to the success of England’s industrial revolution cannot prove the universal claim that agricultural development is an essential condition of successful industrialization (all swans are white). The successful industrialization of the United States is a refutation of such a universal claim. It constitutes the black swan.¹⁷ The methodological approach of the book is discussed more fully in Appendix A.¹⁸

¹⁷ Nassim Nicholas Taleb, author of *The Black Swan: The Impact of the Highly Improbable*, refers to Popper’s technique of using falsifications to distinguish between science and non-science (Taleb, 2007: 56–58). In his section entitled “Negative Empiricism,” he argues that “we can get closer to the truth by negative instances, not by verification! Contrary to conventional wisdom our body of knowledge does not increase from a series of confirmatory observations, like the turkey’s.” Taleb uses the existence of black swans, events of low predictability but with high impact, or the non-occurrence of highly probable events to question how we go about dealing with risk, uncertainty, and outliers. Of particular interest to social scientists, he lambasts portfolio managers in the way they measure “risk.” Thus, “(we will see how they dress up the intellectual fraud with mathematics). This problem is endemic in social matters” (2007: xviii).

¹⁸ Tsakok and Gardner described their research methodology in a paper presented at the American Agricultural Economics Association annual conference in Portland, Oregon, July 2007 (Tsakok and Gardner, 2007: 1145–51).