

In Chapter 19, the authors make specific policy recommendations for achieving the following objectives: developing the biofuels market; facilitating national and international research, development and demonstration; providing incentives for rapid deployment of advanced low-impact biofuels and technologies; infrastructure development; optimizing ecological impacts; maximizing rural development benefits; and encouraging sustainable trade in biofuels. The authors' key overarching recommendations are to (1) develop the market, (2) speed the transition to next-generation technologies, (3) protect the resource base, (4) facilitate the sustainable international biofuel trade, and (5) distribute the benefits equitably.

The book concludes with studies of biofuels in transportation for four countries: China, India, Tanzania, and Brazil. Each country study describes the current situation for ethanol and biodiesel, the potential, and the outlook.

Although it is light on the economics, I would recommend this book to anyone conducting research on biofuels, as it contains a thorough treatment of the technical, environmental, social, economic, and policy issues concerning biofuels production and use. It serves as a very useful and essential reference volume.

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**Collier, Paul. *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It*. New York: Oxford University Press, 2007, 205 pp., \$28.00.**

A shrinking minority of the world's population, now one person in six or seven, lives in extreme poverty at the margin of survival. Meanwhile, an ever-expanding number of people enjoy unprecedented levels of wealth and productivity. Thanks to global economic growth, a falling fraction of rich people's income can provide an ever-larger level of assistance to each person still in extreme poverty. But what kind of intervention, if any, should we offer?

Paul Collier's *The Bottom Billion* joins a growing number of recent books on the causes and cures for extreme poverty, written by top scholars for popular audiences. That this book and its predecessors exist at all is a fact worth celebrating. They reflect a broader movement toward popularizing modern economics in general, led by best-sellers from Stiglitz and Krugman and several million copies of *Freako-*

*nomics*. The alternative, if top scholars did not try to reach popular audiences, would be far worse: in the 1980s when I first pursued economics, even college bookstores had only dusty stuff from Friedman and Galbraith lost amidst the business titles.

Before *The Bottom Billion*, the prominent economists' debate about foreign aid was largely between Jeffrey Sachs' passionate call for more assistance (*The End of Poverty* and his new *Common Wealth*), countered by William Easterly's cautionary tales of aid gone wrong (*The Elusive Quest for Growth* and *The White Man's Burden*). Collier's *Bottom Billion* enters the fray with a very different kind of argument, calling for a variety of interventions, some of which are not really aid at all. Sachs wants more aid and Easterly wants less, but Collier wants different.

Like Sachs and Easterly, Collier sources his book mainly from his own scholarly writings, leavened with anecdotes from practical engagement at the highest levels of policymaking. The storyline is simplified, however, like the movie version of a great novel. In many ways, content follows form in these matters: Sachs' bestseller is told as a personal odyssey of discovery and redemption, with every reader invited to join the voyage. Easterly's is an old-school scolding, a morality play in which well-intentioned but poorly informed "planners" run afoul of human nature, while more flexible "seekers" actually drive progress. Collier's approach is less emotional, perhaps less appealing to a mass readership, but in some ways more effective.

The structure of *The Bottom Billion* is taxonomic: it describes four major obstacles to local economic growth, which can be countered with four kinds of external political intervention. In Collier's classification, the roughly one billion people still living in extreme poverty had the misfortune to be born in a country affected by recurrent conflict, the resource curse, geographic isolation or bad governance. Outsiders cannot eliminate these four growth traps, but they can make escape more likely through traditional aid, military intervention, international laws and charters, and improved trade policies. All four are instruments of rich-country governments. Unlike Sachs' call for social activism and Easterly's call for local entrepreneurship, Collier's book is a call for informed citizenship. The book is about what governments should do, as captured by his final sentence: "That should be the agenda for the G8."

Collier builds his taxonomy of diseases and remedies in a purely narrative fashion, without a single table, chart or map. He does not even provide a specific list of the 58 “trapped” countries, tactfully naming only the most obvious examples: most of Africa, plus Haiti, Yemen, and so forth. The style is friendly, relating the results of his state-of-the-art research as if it were an extended conversation with his grad students.

The greatest original contribution of Collier’s previous research has been to document the first kind of trap featured in *The Bottom Billion*: recurrent civil wars. In more than 20 influential papers, Collier has led a sea-change in the economic analysis of how countries fall into and sometimes escape from a cycle of conflict and poverty. Collier’s work illustrates the maxim that fights are often fiercest where the stakes are lowest: with low opportunity costs, the poor are more likely to join rebellions—which poor governments are less able to contain, making society even poorer and more vulnerable to future conflicts.

Collier also pioneered research in the second kind of growth trap: the resource curse, in which countries that discover oil or diamonds or other sources of windfall revenue are often wracked by social conflict over those rents. Even if they avoid outright civil war, the dissipation of resource rents often leaves countries even poorer than before. Avoiding the trap requires strong governance institutions that limit rent-seeking and force resource revenues to be invested productively, in places like Norway and Botswana.

Collier’s third growth trap was actually documented in the economics literature mainly by Sachs, whose papers on physical geography emphasize the high cost of isolation: being landlocked with poor neighbors. Being landlocked is not so costly if the neighbors offer plenty of opportunities for trade with themselves and the rest of the world, as in Switzerland (via Germany, France and Italy) or again Botswana (via South Africa). But if your route to the world is blocked by poor countries with bad infrastructure, then it is very difficult to grow.

The fourth trap is the most familiar: it is the everyday complaint of bad governance and state failure, usually associated with despotism of one kind or another. Examples of bad governance typically have suffered from at least one of the previous three traps as well, so this condition is most useful to show how fragile the path out of poverty can be: with limited

checks and balances, a poor country’s government can easily go astray. The vulnerability of seemingly successful governments has recently been shown most dramatically by Zimbabwe and Kenya; many other examples show the difficulty of emerging from these episodes.

After describing these four growth traps, Collier devotes an “interlude” chapter to the idea that globalization by itself would not solve the problem: the bottom rungs of the economic ladder toward prosperity offered by low-skill exports, inward foreign investment, and outward migration are simply too narrow to accommodate a billion people. As a result, many of the bottom billion who might otherwise rise are forced to wait in low-growth stasis for their place on the ladder, during which time they remain vulnerable to a recurrence of the civil wars, resource curse, geographic isolation or bad governance that made them poor in the first place.

The four interventions that Collier advocates are remarkable in their diversity. To begin, Collier makes a spirited defense of foreign aid itself, calling for more funding but also clever innovations such as “independent authorities” to deliver essential services. Then, Collier turns to his most distinctive contribution, calling for more military intervention to break the cycle of coups and civil wars. He identifies where external militaries have helped the most, where they have entered too late, and where they have withdrawn too soon; Collier deplores the way in which misguided interventions discredit the whole idea of military assistance, and credits France with protecting much of West Africa from the recurrent conflicts arising elsewhere in Africa. Collier’s third set of interventions are rich-country laws and “charters” that improve transparency and accountability, while the fourth are trade agreements such as a revised WTO agreement. In summary, Collier wants development efforts to “narrow the target,” and “broaden the instruments.” His arguments have the rare quality of being both new and true. The book deserves its many accolades, such as the 2008 Lionel Gelber Prize for nonfiction.

*The Bottom Billion* is a short book, and much is left out. There is no mention of climate, for example, which can limit agricultural output and worsen disease pressure, thereby trapping people through malnutrition and ill-health. There is no mention of the demographic transition, which produces a burst of population growth that can condemn a country to several decades of rising child dependency

and falling acreage per farmer. Both trap people in low-productivity agriculture, requiring more and more effort just to feed themselves. Billions of people were rescued from that trap through the green revolution, which was the late 20th century's most successful anti-poverty weapon by far. But those are topics for other books—for now, I am very happy to have this one in my library, to press on my family and students. It is a wonderful book, a quick read that will forever change how you see the future of the bottom billion, and that could even change their future for the better.

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**Anandajayasekeram, Ponniah, Mandivamba Rukuni, Suresh Chandra Babu, Frikkie Liebenberg, and C. L. Keswani. *Impact of Science on African Agriculture and Food Security*. Cambridge, MA: CAB International, 2007, 310 pp., \$150.00.**

The motivation for producing this volume is stated in the opening chapter. "The problem driving in this book is the stark reality that the long-term average food grain yield has been stagnant during Africa's 45 years of independence . . . Research is needed to generate high yielding food crops that are profitable to smallholders on a recurring basis and at an acceptable level of risk." (p. 3). This book provides important evidence on what types of agricultural research could lead to improved productivity in African agriculture. After setting out the broad themes of the issue in the first two chapters, the book turns to presenting short case studies summarizing the impact of agricultural research in sub-Saharan Africa.

The middle section, and substantive core, of the book presents 21 chapters that analyze the role of agricultural research in improving the performance of particular African agricultural sub-sectors. The settings of the studies are eastern and southern Africa: 7 are from South Africa, 4 are from Zimbabwe, 3 are from Tanzania, 2 are from Kenya, and 1 each is reported for Namibia, Uganda, Zambia, Ethiopia, and the Southern African Development Community (SADC). The spectrum of topics is broad, with findings presented on maize, wheat, millet, cassava, sorghum, cotton, groundnut, sunflower, wine grape, floriculture, *Prosopis* control, and livestock research. Most cases are *ex post* analysis of research

that has been completed, though a few are *ex ante* assessments or combine *ex post* and *ex ante* elements. The two main methodological approaches are the surplus approach (Akino-Hayami method) and econometric regression. With a few exceptions, the studies confirm that by conventional standards of internal rate of return, net present value, or benefit cost ratio, the costs of the research process are more than compensated for by the benefits to society generated by the research results.

The findings of this collection will be of interest to agricultural economists due to the wide applicability of the benefit cost techniques presented. These methods are well summarized in the closing chapter. The detailed case studies also will be of interest to those in the profession who work on issues related to African agricultural development. The contributors provide analysis of research that may not have reached a wider audience without the publication of this book, as many of the chapters summarize findings that are either technical reports or graduate student research. Tracking down all of these thematically related papers would have been a daunting challenge in the absence of this volume. Combining them in a single book also provides an opportunity to get the big picture result that yes, agricultural research has a positive impact on well being, and yes, it usually passes a benefit-cost test. The book brings out the message that there is some reason to be optimistic about the potential for progress in sub-Saharan African agriculture. The stagnant trend in food grain yield in this region noted in the quotation from the book above evidently masks some impressive results and promising opportunities revealed by this volume.

The chapter authors are generally careful to state their assumptions, describe the sensitivity of their results, and identify the limitations and caveats they feel should be noted by readers of their work. They faced major challenges in coming up with reasonable estimates for values when there was a missing piece of the puzzle, and make clear arguments for the approach they took in such cases. I found they really tried to live up to the challenge of conducting defensible benefit-cost analysis as set out in Gittinger's 1982 book. It was encouraging to see people trying to put these recommendations into action in the field.

Of course, 21 case studies in 214 pages leads to some rather brief chapters—a few as short as five or six pages long. Through the use of relatively small font they present as much as