individuals’ adult labor productivity—to the long-run prevention of famine is somewhat underemphasized. This underemphasis may feed economists’ unfortunate propensity to treat nutritional status solely as an outcome, not as a state variable influencing future productivity and welfare. Chapter 7, on individual households’ natural preventive and responsive behaviors in the face of varying degrees of food insecurity, drawing heavily on the authors’ own field experiences in Ethiopia, Sudan and Zimbabwe, offers a good synthesis of the literature on coping strategies available. The authors do an excellent job of capturing the dynamism of the food insecure’s endogenous responses to threat without overstating the limited capacity of the poor to resolve fully these problems themselves.

Although the authors indicate they wish to “enhance[e] the theoretical basis of the debate [on famine] … and [enrich] the theory through empirical fact finding”, it is apparent that neither sophisticated theorizing nor methodologically advanced empirical inquiry were their priority. One can easily pick holes in the relatively simplistic and dated empirical methods employed in the chapters on agricultural production and food marketing, where typographical errors in several equations may also frustrate readers who want to learn the models for the first time. And the vast majority of the empirical findings have been previously reported elsewhere. This book is not a map to the formal, methodological or theoretical research frontier on famine. But the authors usefully identify key areas in need of further advanced research, notably improved understanding of the functioning of rural labor and food markets, effective targeting strategies, the cost-effectiveness of relief operations, and capacity to predict the onset of complex humanitarian emergencies that increasingly absorb the human and financial resources of development agencies.

The strength of this volume lies in its compact and clear presentation of a mass of useful concepts and findings scattered across the disciplines and often buried in an inaccessible grey literature. The authors focus heavily on policy and program issues. The chapter on that subject is as long as the book’s first five chapters combined, underscoring the intended audience. von Braun, Teklu and Webb’s volume deserves to be widely read by activists, policymakers, practitioners and students looking for a lucid synthesis of the complex and disturbingly current reality of famine in Africa.

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Agricultural Biotechnology and the Environment

Over the past decade biotechnology has evolved from a research area to an industry. Applications of biotechnology in agriculture are second only to uses related to human health, and the rate of innovation is such that even an attentive bystander easily becomes confused. This book responds to an obvious need for a wide ongoing survey of biotechnology used in agriculture.

The scope of the subject matter is very broad, comprising herbicide tolerant crops, insect resistant plants, disease resistant crops, transgenic plant products, microbial pesticides, frost-inhibiting bacteria, animal growth hormones (especially Bovine Somatotropin), and transgenic animals. Economic and cultural aspects are also addressed.

The diverse topics are linked in this book by a question that pervades the whole discussion: will biotechnology fulfill its early promise of ameliorating the environment by providing substitutes for artificial chemicals as herbicides and insecticides, and by reducing the burden of harmful wastes by increasing feed conversion efficiency? Given the infancy of the industry, any conclusion on this score must be premature. But the early promise of unambiguous reduction in chemical use has not been fulfilled in the evolution of the industry to date, as described in this book. Herbicide tolerance genes in crops directly increase use of the relevant herbicide; whether this is more than fully
compensated by a reduction in other, more harmful, herbicide applications is the crucial question. In the long run, the answer may hinge partly on the rate of transfer of herbicide-tolerance to weeds, which could result in greater use of more harmful herbicide in the future. Similarly, plant pest resistance due to Bt genes might reduce current pesticide use, but might hasten the onset of resistance in insects and thus the use of more dangerous pesticides in the future. Bt resistance will also pose problems for pest control programs of organic farmers who rely on Bt applications for pest control. Bovine growth hormone (BST) reduces feed use and production of animal waste, but some fear that it will induce greater incidence of mastitis and increase the contamination of milk by illegal antibiotics.

The great strength of the book is its comprehensive coverage of the issues. In this fast-moving field I know of no other similarly comprehensive survey. But its very scope means that achieving accuracy on all the facts and issues must stretch the competence of even two authors. As an economist, I found that the coverage was weak and superficial on economics issues. For example, arguments that various forms of biotechnology will hasten the trend towards fewer, larger farms are too casually accepted. Most biotechnologies from BST to organic pesticides require more high-quality managerial attention by farmers to individual animals and fields. In the past, consolidation into large-scale or plantation-style agriculture has proceeded farthest in crops where the production technology is simplest and the managerial demands are low. If the past is a good guide, managerial complexity will favor family farming.

On the other hand the recent intensification of contract production of poultry, and the current dramatic changes in pork production are being driven by economies of coordination in processing and marketing and perhaps by the gains from internalizing the benefits from productivity enhancing research. The implications of biotechnology for these types of production system merit more attention than is given here.

As is too common in discussions of biotechnology in agriculture, benefits of production efficiency to consumers are all but ignored in this book. Price, productivity, yield and consumption do not appear in the index. In the text, a possible drop in price of milk due to BST is viewed negatively, as a threat to farmers, with no mention of benefits to families and children via lower food costs and possibly better nutrition due to higher consumption. The issue is not whether these benefits would outweigh possible negative implications for consumer welfare, such as increased exposure to growth hormones or antibiotics in milk, or even increased cholesterol intake due to higher consumption levels. The key point is that the possibility of positive effects on consumers does not even get a hearing.

This bias in favor of the interests of producers (farmers) is commonplace and 'politically correct' in the literature on agriculture, but contrasts sharply with work on the pharmaceutical industry. Consider the reaction to a book on the effects of biotechnology on the pharmaceutical industry that evaluated innovations solely with respect to their effects on drug producers' welfare and on possible harmful side-effects on users, while ignoring their positive effects on consumers' health and health costs. Such a work would be rejected by most political activists as unacceptably biased, and by economists as missing the main positive elements of the net social value of pharmaceutical innovations. Yet in studies of agricultural biotechnology, lingering agrarian sentiment, and justifiable respect for the integrity and independence of farmers, allow a similar blindness to the existence, let alone the possible primacy, of positive consumer interests to go generally unremarked by the guardians of 'political correctness,' even though consumers with most at stake are in the poorer and less privileged part of the population.

Given the range of disciplines covered in this book, it would be unfair to judge its accuracy and balance solely on the basis of its economic content. As a spot check on the quality of its treatment of other scientific areas, I asked my colleague Steve Lindow, a pioneer in the area of frost-inhibiting bacteria, to scan the chapter devoted to this subject. Unfortunately, he found that the authors appear to have made numerous errors in the details of their coverage. They confuse a hundred field trials of naturally occurring bacteria with two or three trials of genetically altered bacteria, they miss by years the timing of initial discoveries, and they confuse scientific and procedural issues in covering the regulatory delays. This lack of reliability on the details is a pity, as such a comprehensive monograph could, if accurate, be a wonderful reference to the state of agricultural biotechnology in all
its applications. In fairness, it is good to keep in mind the enormous challenge faced by authors who attempt to piece together, from primary sources with varying degrees of objectivity, an account of all aspects of agricultural biotechnology and its environmental effects.

Despite the above shortcomings, the book deserves serious consideration by economists interested in agricultural biotechnology. It offers an informative and wide-ranging, if slightly blurred, view of a fast-moving and exciting field. It is highly readable and well-organized. I will value it as a permanent addition to my professional bookshelf.

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