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BOOK REVIEW

Agricultural development in Asia and Africa: essays in honor of Keijiro Otsuka

Jude Esguerra



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Book Review

Jude Esguerra*

Independent researcher

Jonna P. Estudillo, Yoko Kijima, and Tetsushi Sonobe, eds.
Agricultural development in Asia and Africa: essays in honor of Keijiro Otsuka. 2023. Singapore: Springer Singapore.

1. Introduction

This compendium, spanning 27 chapters, traverses the diverse landscapes of Asia and Africa and journeys back to the inception of the Green Revolution in the 1960s. It delves into comparative research across specific contexts and forwards some of the most insightful and less obvious knowledge produced in development economics.

The editors and authors, all of whom have collaborated with Keijiro Otsuka, have collectively authored over four hundred papers. Professor Otsuka's collaborative research approach stands as a testament to his leadership and has enabled contributions to a broad spectrum of knowledge areas—not only concerning the Green Revolution and agriculture, but also state capacities, entrepreneurship, small- and medium-scale industries, and foreign investments.

The book addresses a variety of contexts requiring dedicated institutions to adapt technological innovations to become fit-for-purpose. It features the harvest of insights when longitudinal surveys are used. It illustrates work methods, including anecdotes of how Professor Otsuka transformed field observations into economic insights—sometimes by dinner, after a day's fieldwork—and developed them into hypotheses. For example: in the case of rice seeds and fertilizers from Southeast Asia that are known to also lead to high yields in Sub-Saharan Africa but have not been widely adopted there, Professor Otsuka fruitfully formulates his hypothesis that, perhaps, the key is in cultivation and water and soil management capabilities, and in the delivery systems for this know-how that work and do not [Otsuka and Muraoka 2017]. This hypothesis then is studied and tested repeatedly over many years, until it ascends to the status of wisdom in the scientific community.

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The chapters also highlight the strategies for data collection, including tedious soil sampling, for example, to account for unobserved variables, as well as the development of publications aimed at delivering policy-relevant recommendations. The book moreover showcases the thoughtful data gathering and cutting-edge econometric work that characterized these collaborations.

The book is divided into four parts: i) Green Revolution in Asia and Africa; ii) Land Tenure and Natural Resource Management; iii) Transformation of the Rural Economy; and iv) Emerging Issues in Agriculture.

This review probes the core themes of this extensive work, particularly resonating with the lessons from the first Green Revolution and their recent application in Africa. It examines chapters in Part I in-depth and selectively draws from the other sections.

The review highlights the gap between knowledge production and its practical application in African countries and notes that essential corrective programs remain underappreciated in countries like the Philippines, even decades after their own Green Revolution. It acknowledges that technological advancements, environmental challenges, and economic shifts necessitate a continuous reevaluation of strategies for agricultural modernization and rural development.

While this review concentrates on specific themes within the volume, it acknowledges the breadth of knowledge contributed by each chapter, including those not covered here.

2. Key chapters

In addition to the excellent introductory and concluding sections, Chapter 2 by Prabhu Pingali reprises lessons from the Asian Green Revolution. It also anticipates the challenges as Africa embarks on its own Green Revolution, and also as Asia must embark on a second wave of post-Green Revolution agricultural and rural development. This chapter collates empirical literature demonstrating the Green Revolution's significant impact on staple crop production in Asia and its role in averting a Malthusian food scarcity crisis. It also discusses the initial absorption of unemployed rural workers due to new varieties and technologies, which created more farm tasks for unskilled rural populations, raising wages and creating the impetus for non-farm livelihoods [Pingali 2023].

However, the research also indicates that rice monoculture in Asia displaced other crops critical for nutrition, and chemical fertilizers polluted soil and water resources. Incomes in areas without irrigation did not rise all that significantly unless the household members migrated to the lowland regions where modern agriculture was flourishing. Chapter 18 by Jonna Estudillo [2023] shows that in villages that she and Professor Otsuka tracked over time, non-farm incomes, rather than employment in Green Revolution farms, have provided the main pathways out of poverty for children of landless farmers.

Yasuyuki Sawada [2023] in Chapter 19 asks why the Philippines has so far failed to replicate the structural transformation seen in other Green Revolution countries in Asia, whereby workers shed by agriculture would find employment in manufacturing.

The book offers guidance on effectively disseminating and locally adapting Green Revolution technologies, but it also provides cautionary tales for the ongoing African Green Revolution.

3. Emerging concerns

The first-generation modern varieties were not resilient to weather extremes and have been susceptible to disease outbreaks as noted in Chapters 2, 3, and 4. The same challenge is no less of a concern when staples are replaced by higher-value crops catering to more diversified tastes and to demand from more distant markets. In Chapter 21, for example, Suzuki and Nam [2023] note that shrimp disease in Vietnamese farms often spreads to neighboring farms.

The longitudinal loop studies of Central Luzon covering 1961-2021 (Chapter 3) revealed that after the adoption of modern agriculture, factors such as factory and road construction and increased rainwater runoff from deforested upstream areas have exacerbated floods and affected yields. The still incomplete adoption of mechanization has led to stagnant and variable yields; this shows that rising nonfarm household incomes are not always able to adequately underwrite investments in farm mechanization [Kajisa et al. 2023].

In the post-Green Revolution period, Central Luzon faces challenges. Kajisa et al. [2023] in Chapter 3 discuss the crossroads at which post-Green Revolution agriculture finds itself, with the release of hybrid and genetically modified rice varieties resilient to submersion and pests. However, the adoption of such flood-resilient second-generation varieties in India is episodic as Yamano [2023] argues in Chapter 4, indicating a need for further investigation into the adoption patterns of flood-resilient varieties. The adoption of flood-resilient crop varieties tends to surge following instances of notably more destructive flooding.

In retrospect, and as a contribution to Africa, the chapters that focus on sub-Saharan Africa (Chapters 5, 6, 8, and 12) provide operational guidance on the most effective combinations or sequences of Green Revolution initiatives. Key empirical puzzles, such as the above-mentioned importance of agronomic or rice cultivation practices, the low uptake of credit and technology when irrigation is limited, or the low adoption of good varieties and fertilizer use when there are high fixed costs to acquiring these inputs due to geography and thin upstream suppliers become solid guides for recommendations.

The initial signs of an African Green Revolution are evident in Tanzania's rising rice imports, despite yield increases from 3.7 to 4.2 tons per hectare between 2009 and 2018. This paradox is attributed in Chapter 6 to population pressures

outpacing yield gains. The same chapter by Nakano and Magezi [2023] evaluates recent literature on the effectiveness of irrigation, credit, and training and extension services. The findings suggest that credit facilitates investments in machinery, seeds, and fertilizers, with the greatest uptake and marginal benefits occurring on already irrigated land and where training and extension services mitigate uncertainties and demonstrate the viability of new business models at the farm level. Training and, more importantly, the adoption of the correct cultivation and agronomic practices have been known to deliver a three-fold increase in productivity.

Beyond providing operational guidance from Asia and sharing examples on some of the necessary adaptations, these chapters on Africa also discuss the returns to various investments in land titling and tenure reforms to encourage investments in soil quality improvements and conservation in general. Building on Otsuka's suggestive study [Otsuka et al. 2015] and referencing Elinor Ostrom's work on common-pool resources, the chapter on forest management by Takahashi [2023] (Chapter 10) reveals that assigning individual responsibility for timber resources incentivizes intensive production, while community management of non-timber resources (such as mushrooms, animals, and wood fuel) is more effective when supported by programs that enable communities to develop collective sustainable management rules.

Research on crops, technologies, and methods for upland and rolling landscapes—which are the areas left behind by the lowland-focused Asian Green Revolution—remains limited. This is also the case in Africa. Pingali [2023], in Chapter 2, argues for increased scientific research on traditional and nutrition-rich crops (such as millets, sorghum, and cassava) to address both geographical inequalities and the nutritional deficits caused by a staple-focused Green Revolution. The contributors furtively inquire whether entities like local governments can rise to the challenge of managing the heterogeneous and often idiosyncratic character of these non-lowland ecosystems. This concern is particularly pertinent for Indonesia and the Philippines, where agricultural tasks have been devolved for over two decades. A recent development in the Philippines is a second round of financial resource devolution following a Supreme Court ruling [*Mandanas et al. v. Ochoa et al.* 2019], further detailed by central government instructions to implement devolution transition plans. Related to this, Muraoka [2023] in Chapter 12 tackles the prospects and constraints to creating the local institutional arrangements that would foster the adoption of integrated farm management practices for sustainability and adaptation and resilience to climate change.

Otsuka's collaborators describe the vigor of small, field-based scientific teams that anticipate sustainability and inclusivity challenges—issues that students of the Asian Green Revolution mainly recognized in hindsight. However, Chapter 10 by Takahashi [2023], which is about property rights and natural resource management, raises the well-known concern that sustainability and equity, unlike the rapid yield increases for staples, tragically remain distant goals, fraught with open access problems and with dispersed and uninfluential stakeholders.

One contentious phenomenon across countries like Ethiopia, Tanzania and Uganda that is not directly mentioned in the chapters, are the Large Scale Land Acquisitions (LSLAs) that were sometimes either preceded by low-cost tenure improvements or simply through government action that took possession of the lands with a view to conveying them to corporate investors, with little regard to prior informal rights. In the best scenario LSLAs would impose their own kind of clarity with regard to tenure security for those who might invest, especially foreigners who will supposedly bring in the seeds, the fertilizers and modern logistical arrangements (see for example D’Odorico et al. [2017]). But in the process, the program for supporting the productivity and for evolving the local institutional arrangements for smallholders and even pastoralists is set aside.

African grassroots movements anticipate that LSLAs will be corporate enclaves where standardized technologies will pre-empt the emergence of diverse agro-ecological adaptations. Perhaps the still limited state capacities in sub-Saharan Africa also make this panacea of inviting foreign investors attractive—creating institutions that can create, customize and disseminate adaptations of Asian Green Revolution technologies is after all a far more complex way to proceed.

It is certainly too much to ask for more chapters in this already substantive volume. Yet, below are three areas of curiosity that arose for this reviewer after reading the book.

First, converting knowledge into policy. Many of the scholars contributing to this volume are researchers first but they also cannot help but be policy advocates. But as Arsenio Balisacan, an eminent agricultural scholar and now a ranking government official in the Philippines (also a contributor to this volume on competition policies), once said to this reviewer, diagnostics are crucial, but implementing better practices at scale is always more challenging. Some of Otsuka’s collaborators may have even joined the public sector, wielding some authority and experiencing both successes and failures in influencing top policy makers and practice at the frontlines. This adjacent, though maybe still tacit, body of knowledge could be as important as what one finds in this volume.

Second, using limited financial resources and limited institutional capabilities as the starting point, a substantive discussion structured after the manner perhaps of Hausmann and Rodrik’s “binding constraints schema” [Hausmann et al. 2008] can already be stitched together from insights in this book. This analytical and expository approach recognizes that resources are limited and may be deployed sequentially; with some reforms being prerequisites for other reforms, whose later deployment can then happen with greater effectiveness. Perhaps one is induced to look for such implementation-focused schemas because of the great number of actions featured in the different chapters that can all plausibly drive significant technology adaptation and adoption.

Finally, since this is also a book about technology transfer as a means for countries to reach the frontiers of productivity, a little survey of the literature on

systems of innovation could be a nice way of helping the reader put these ongoing efforts in perspective, the better to steer focus towards new kinds of questions about technology transfer that the scientific community represented in this volume can also take on.

This volume is a testament to the professional approach and mentorship of Keiji Otsuka, showcasing the empirical work of his students and collaborators across Asia, Africa, and international institutions. Their contributions underscore the exceptional productivity of Otsuka's problem-focused, empirical approach.

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