

Agricultural Development from Asia to Africa

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Estudillo, Jonna P., Kijima, Yoko, and Sonobe, Tetsushi (2023), *Agricultural Development in Asia and Africa: Essays in Honor of Keijiro Otsuka*, Springer, Singapore, 387 pages.

The book under review is a compilation of scholarly essays honouring the lifelong research interests and contributions of Keijiro Otsuka, the Japanese social scientist who taught at the National Graduate Institute of Policy Studies (GRIPS), Tokyo, and Graduate School of Economics, Kobe University. He was for many years associated with the International Rice Research Institute (IRRI), first as a member of the Board of Trustees, and subsequently, between 2004 and 2007, as Chair and Senior Adviser to the Director General.

The essays in the book, written by distinguished scholars in the field, explore the themes that have been part of Professor Otsuka's areas of interest, notably those relating to the linkages and potential for collaboration in respect of agricultural development and rural transformation between Asia and Africa. The book explores the interesting question of whether contemporary Africa can replicate Asia's success in enhancing agricultural productivity. In his own work, Professor Otsuka emphasised the importance of technology transfer and scientific knowledge from Asian green revolution regions to sub-Saharan Africa. During his term as the Chair of IRRI, he facilitated visits and interactions between researchers at IRRI and researchers from research centres in Africa, to explore pathways of agricultural development in Africa based on lessons from the Asian experience. The essays in the volume suggest that Africa's path of agricultural development has and continues to benefit from the Asian experience.

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¹ In this book, Africa refers to Sub-Saharan Africa, and Asia to the tropical regions of Asia that include South and Southeast Asia.

The book is organised into four thematic sections; on the green revolutions in Asian and African countries, on land tenures and sustainable natural resource management, on transformations of rural economies, and lastly, on emerging issues in African agriculture.

The first section draws on lessons and experiences from the Asian green revolution and examines their applicability to the African context. Prabhu Pingali, in this volume (p. 21), describes the green revolution as representing "epochal change" in the agricultural and rural landscape of Asian countries, one that facilitated modern economic growth and transformation. The change was driven by factors such as stagnant yields, burgeoning population, a lack of availability of arable land, and food security challenges. Africa is currently in the grip of similar conditions. It faces a food security crisis owing to low crop yields and growing population pressure on land. Africa's arable land per rural population has fallen from 0.61 hectares per person in 1961 to 0.36 in 2018, the same level as tropical Asia before the Green Revolution (0.33 hectares/person in the 1960s) (p. 4).

In their introduction, Estudillo, Kijima, and Sonobe make a strong case for technology transfer from Asia to Africa for yield enhancement in major grains in sub-Saharan African countries. The yields of six grains, namely, rice, wheat, cassava, maize, millet, and sorghum have been rising, although slowly, between 1960 and 2021 in Africa, but nevertheless lag behind yields in Asian countries. The average rice yield per hectare in sub-Saharan Africa rose from one to 2.1 tonnes/hectare in these 60 plus years, while in tropical Asia it rose from 1.7 to 4.2 tonnes/hectare (p. 5). The authors highlight the urgent need for technologies that can enhance yields of major grains in Africa.

The Introduction draws an interesting parallel between the current context, namely, of technology transfer from tropical Asia to sub-Saharan Africa, and similar transfers that occurred between temperate and tropical Asia in the 1960s. The authors note that adaptive crop breeding and learning from improved farm management practices were key components of the Green Revolution in tropical Asia. For example, the IR8 hybrid rice variety, a cross between an Indonesian variety and a semi-dwarf variety from Taiwan, was modelled after high-yielding varieties from Japan. There was also transfer of machinery and related technologies from Japan to Taiwan and Korea, and from there to tropical Asia.

Timothy Njagi and Yukichi Mano evaluate the factors that contributed to the improvement in rice yields in sub-Saharan Africa. Drawing on evidence from household surveys and official statistics from Kenya, they demonstrate how the Mwea Irrigation Scheme facilitated technology adoption through improved irrigation and machinery, which, in turn enhanced rice productivity in the region. A similar analysis by Yuko Nakano and Eustatius Francis Magezion in Tanzania, using official data, shows how the development of irrigation and a system of effective

agricultural extension improved rice productivity in the country. Much of the analysis in the book is based on rice yields (given Asia's accumulated experience in advanced rice technologies), and underscores the critical role of technology transfer and adaptive crop breeding research. The authors emphasise the role of supporting infrastructure, such as developed input markets and irrigation, for an effective transfer of technology and adoption of improved farming practices.

Papers in the second section of the book underline the importance of secured property rights and land tenure – a reference to private ownership of land – in incentivising cultivators to use efficient technologies and farming practices, increase land productivity, and manage natural resources sustainably. Stein Holden provides an extensive review of land tenure contracts in developing countries in the last century and analyses the impact of land tenure reforms on land, credit, and labour markets and their implications for rural transformation. He provides evidence to suggest that land titling programmes improved access to credit, as land could be used as collateral. The author's research in Ethiopia shows that low-cost land registration introduced in 1998 resulted in land titling, credit market improvements, the development of land rental markets, and investments in conservation.

The constraints and possibilities of natural resource management and integrated farm management practices, such as sustainable intensification, conservation agriculture, and climate-smart agriculture practices in sub-Saharan Africa are examined in the articles in this section of the book. In their contribution, which draws on experimental research and literature, Frank Place, Rie Muraoka, Kazi Arif Uz Zaman, and Kaliappa Kalirajan suggest a mix of yield-enhancing and resource-conserving practices specific to local conditions, rather than either in isolation.

The third section of the book deals with emerging changes associated with economic transformation as a result of the shift of economic activities from agriculture to industry and services. Contributions by Jikun Huang, Lanlan Su, and Xinyu Liu, and by Tomoya Matsumoto and Ggombe Kasim Munyegera, discuss the widespread use of information and communication technologies (ICTs) in contemporary Asia and Africa. The surge in the use of mobile phones in rural sub-Saharan Africa, and the subsequent use of "mobile money" helped improve access to finance for small farmers, including women (p. 234). Jonna P. Estudillo and Yasuyuki Sawada discuss the various processes associated with economic transformation in the Philippines, particularly with the expansion of non-farm labour market and migration. Using data from various sources for a fifty-year period (1960s to 2010), Donald Larson and Kevin Bloodworth explore the relationship between sectoral migration and rural transformation. The authors find that a movement of skilled and educated youth out of agriculture led to labour shortages and a rise in wages, which, in turn, resulted in a push for labour-saving mechanisation in agriculture. Drawing evidence from the Asian experience, Jonna P. Estudillo and Yasuyuki Sawada show that investments in education and human capital, followed by rising incomes due to improved yields during the green revolution, improved the capacity to adopt new technologies enabling transformation.

The final section of the book discusses emerging issues in agriculture, such as the diversification of agriculture towards high-value crops and activities, the question of women's role in agriculture, and agricultural laws and governance. Aya Suzuki and Vu Hoang Nam describe the growth of shrimp culture in Vietnam, and Takeshi Aida examines the tapioca industry in Thailand. Xiaobo Zhang discusses the practice of "cluster" farming: of potato in China, dates in Tunisia, and medicinal crops in Egypt. Futoshi Yamauchi and Hiroyuki Takeshima explore the interesting theme of food loss and the challenges of horticultural crop cultivation in Nigeria. Agnes Quisumbing, Ruth Meinzen-Dick, and Hazel Malapit explore new metrics for measuring women's economic empowerment in agriculture.

Although a rich compilation of papers on issues of contemporary agriculture and rural development in Asia and Africa, and a valuable resource for young researchers, the book has some noticeable conceptual gaps. The Asian green revolutions, as is well known, were initiated under a state-led modernisation apparatus, which saw massive public investments in irrigation, expansion of credit, provision of subsidised inputs including fertilizers, and other infrastructural inputs. The current discourse on rural development in Africa is in the context of a neo-liberal policy regime, which constrains state support for facilitating the spread of the green revolution in Africa. Technology alone cannot drive agricultural development; it also needs an enabling infrastructure and ecosystem, which must necessarily be state-led, to effect transformative change. Although there is some discussion on supporting infrastructure in these essays, this important aspect of the political economy of the Asian green revolution, specifically the role of the State and other institutions, is not adequately explored.

Secondly, as highlighted by Prabhu Pingali, the green revolution in sub-Saharan Africa cannot be limited to two or three staples like rice and wheat. Africa has a rich diversity of traditional staples with high nutritional content that have adapted to local agroecological conditions. As there is limited scope for technology transfer in respect of these Africa-specific crops, effective strategies to strengthen independent African agricultural research and development programmes are critical. Thirdly, given the pivotal role of women in food production, the book could have offered more insights and given more attention to the role of women in effecting structural transformation. The rise in male emigration and the shift of men to non-farm jobs has meant that women are increasingly involved in making farm-level decisions. Specific support in terms of infrastructure and an enabling environment is essential to ensure that women farmers adopt productivity-enhancing technologies and farming practices.

Contemporary agricultural development in Africa appears to be more complex than in Asia in the 1960s. While there is potential for taking experiences and technologies from Asian success stories, there is a need in Africa for sustained investment in education, irrigation, and infrastructure, which, along with the creation of enabling institutions and policies, can provide soil in which technology transfers can thrive.