

BOOK REVIEW

Sigrid Schmalzer. *Red Revolution, Green Revolution: Scientific Farming in Socialist China*. Chicago: University of Chicago Press, 2016

Spencer Stewart, *University of Chicago*

When William S. Gaud of the United States Agency for International Development (USAID) first used the term “green revolution” in 1968, he drew a clear division between its purely technological approach to rural reform and the state-socialist (“red”) path of political revolution. However, as *Red Revolution, Green Revolution* demonstrates, the geopolitical subtext and ostensibly apolitical approach of the Green Revolution has obscured the significant achievements of socialist China that in important ways paralleled what Gaud and others have described for the “developing world.” Contrary to popular perceptions, technocrats and radicals in Maoist China embraced the core values of science and modernization, adopting the Green Revolution technologies of high-yielding varieties (HYVs), chemical fertilizers, pesticides, and mechanization. At the same time, socialist China was unique in its blending of “red” and “green” revolutions. The denunciation of the term “green revolution” in socialist China (the more common term being “scientific farming” 科学种田) didn’t derive from an anti-science platform, but from the belief that the Green Revolution of science and technology couldn’t be divorced from the Red Revolution of political and social reform.

In this reassessment of science and politics under Mao, Sigrid Schmalzer focuses on the understudied “rural scientific experiment movement” (农村科学实验运动) of the mid-1960s and 1970s. In contrast to conventional histories of science focusing primarily on trained experts, this study incorporates a variety of additional perspectives such as peasants, local cadres and technicians, women, and youth. The author brings these voices to life by drawing from oral interviews, diaries, surveys, biographies, state propaganda, scientific publications, and archival materials. This approach raises important questions about what constitutes science and who contributes to the development of scientific inquiry.

The first chapter outlines the major ideologies and state policies of Mao-era scientific farming that reoccur throughout the book. Most notable is the tension that Schmalzer finds, not between pro-science and anti-science factions within the Chinese Communist Party, but rather between what was described as *tu* 土 (“native, Chinese, local, rustic, mass, crude”) and *yang* 洋 (“foreign, Western, elite, professional, ivory-tower”) forms of science (p. 34). This *tu/yang* binary represented the reconstitution of authority in the production of knowledge as envisioned under Mao. It insisted that local,

mass-based (*tu*) science needed to lead professional, theory-based (*yang*) science in order to produce technologies originating from and in service of the masses. Science in socialist China was, therefore, the amalgamation of a *tu* ideology emphasizing mass mobilization, class struggle, and self-reliance, with the *yang* of Green Revolution technologies, foreign-trained scientists, and the research and extension apparatus inherited from the Republican period (1912-1949).

The lives and works of trained scientists Pu Zhelong 蒲蛰龙 (1912-1997) and Yuan Longping 袁隆平 (1930-) are featured in chapters 2 and 3 to both highlight this *tu/yang* binary and place China’s Green Revolution within a global context. Pu’s elite background and training as an entomologist at the University of Minnesota distinguished him as a *yang* scientist. Yet all accounts suggest he was spared the violence of the Cultural Revolution due to a willingness to engage in applied (*tu*) science and by working closely with local peasants as seen at the Big Sand Commune (大沙公社) in Guangdong. Whereas Pu was marked a *yang* scientist, the famous agronomist and “father of hybrid rice,” Yuan Longping, exemplified *tu* science. By focusing on changing narratives about Yuan, Schmalzer highlights how *tu* science was supplanted in post-socialist China. Interestingly, Mao-era sources fail to mention Yuan by name, instead emphasizing the collaborative and mass-science (*tu*) base for the invention of hybrid rice. It is only in post-Mao sources, especially biographies, that Yuan is credited for personally triumphing over political opposition to utilize *yang* science in developing hybrid rice.

Both Pu and Yuan further demonstrate the need to understand China’s scientific farming within a global context. The trajectories of entomology for China and the United States, for example, were surprisingly similar. Around the same time that Rachel Carson wrote *Silent Spring* (1962), Chinese scientists similarly warned about the overuse of chemical insecticides. And by the early 1970s, Pu was putting into practice his own system of integrated control at Big Sand. Moreover, the development of hybrid rice coincided with the breeding of high-yielding semi-dwarf rice at the International Rice Research Institute that was so important to the promotion of Green Revolution in other parts of Asia.

The remaining chapters focus on peasants, local state agents, and educated youth—the main actors in the “three-in-one” (三

结合) formulation that proved foundational to experiment groups and the promotion of scientific farming in rural communities. These experimental groups aimed to produce politically and scientifically viable knowledge by bringing together the practical experiences (*tu*) of the “old peasants” (老农), the political consciousness of local cadres, and the technical knowledge (*yang*) of youth (or scientific personnel when available).

Chapter 4 outlines the paradox in Maoist China of the peasant as both “experienced” and “backward.” The experience of old peasants proved useful in promoting “traditional” farming practices such as organic fertilizers and biological control when chemical fertilizers and pesticides were in short supply. Despite such contributions, however, the dominant narrative emphasized the need to remake peasants into skilled technicians capable of engaging in real scientific research.

Chapter 5 focuses on local cadres and agricultural technicians (state agents) who were on the “front lines of the green revolution” in extending science and technologies to the grassroots (p. 153). This chapter provides important insights into state-society relations by highlighting the difficulties encountered by state agents when imposing top-down models on local society. Interestingly, the author shows that at times locals appealed to political rhetoric to resist the imposition of top-down models deemed inappropriate for local conditions.

Chapter 6 looks at educated youth to explore what the author calls the “Lei Feng Paradox:” the “conflicting calls [for youth] to be revolutionary heroes and mere ‘bolts’ in the revolutionary machine” (p. 156). Educated youth, both urban and rural, were seen as committed to promoting socialist revolution while also capable of accepting new scientific knowledge (*yang*). Contrary to post-socialist narratives surrounding the need to invest in youth for the future, youth under Mao were heralded for their immediate contribution in transforming the socialist countryside.

Chapter 7 approaches the topic of opportunity and failure among educated youth to reassess typical narratives of scientific farming in socialist China. Schmalzer contests that post-Mao narratives of failure have been unfair in their depictions of science and rural development under Mao, pointing to the reality that most scientific experiments and development projects have clear points of failure; the negative environmental consequences of the Green Revolution are a stark and relevant example. Together with the epilogue, the author questions this popular narrative by highlighting the opportunities that the movement offered participants, along with emphasizing the important legacies of Mao-era policies and *tu* science more generally in shaping post-socialist rural and economic reform: from bottom-up participatory approaches of reform and model village projects to the promotion of indigenous knowledge and the sustainability movement.

This fascinating book raises a number of interesting questions, one of which relates to the legacies of the Republican period.

While recent scholarship has shown that Republican China served as a “laboratory” for post-1949 developmental projects—including the Green Revolution—in Taiwan and other parts of Asia, Schmalzer demonstrates that this period was also instrumental in shaping Mao-era approaches to agricultural science. The most prominent influence highlighted is the agricultural research and extension system in the United States. Other potential sources of inspiration that received less attention include Japan, which served as a model in late-Qing and early Republican-era agricultural experimentation and was an important destination for Chinese students of agricultural science as late as the 1930s. Given the highly eclectic nature of rural reconstruction during the first half of the twentieth century, I wonder how we are to more broadly understand the impact of pre-1949 science and rural reform efforts on scientific farming in Maoist China.

A second question regards the relationship between scientific farming and labor. As Schmalzer reminds us, critics have suggested that HYV’s should be more accurately called “high-responsive varieties” as high yields are achieved due to their responsiveness to chemical fertilizers. For socialist China, which lacked sufficient supplies of such fertilizers, HYV’s relied heavily on “intensive cultivation” (精耕细作) to increase yields and feed China’s growing population. Many of the practices highlighted in this study, from methods of biological pest control to green manures, are appealing for their ecological sustainability. But as portions of this book highlight, such practices often required tremendous amounts of labor that went uncompensated. I am curious about how we should evaluate the accomplishments of Mao-era agricultural development given the significant amounts of labor required to make scientific farming work.

In summary, *Red Revolution, Green Revolution* is an important study that brings together a wide range of materials to add much to our understanding of socialist China and the study of science and technology more broadly. By recasting conventional histories of “green” and “red” revolutions, Schmalzer effectively questions common assessments of agricultural development projects that attribute all success to good science and all failure to bad politics. In highlighting both stories of success and failure, the author advances the conversation by showing that the shortcomings of Maoist science weren’t that it was too political, but rather that there was too much political oppression and insufficient criticism of technological triumphalism—issues common to the experiences of capitalist and state-socialist countries alike.

Response

Sigrid Schmalzer, *University of Massachusetts Amherst*

I am delighted to have this opportunity to respond to Spencer Stewart's thoughtful review of my book. Whenever I publish something, I wonder whether others will notice the same flaws that I do, and I hope that if so they will be kind enough first to do justice to the main contributions before turning to points of constructive criticism. I thank Mr. Stewart for this elegant summary of my arguments followed by insightful questions that not only recognize the book's inevitable limitations but also help to point the way forward.

The review raises two sets of concerns. The first relates to "the impact of pre-1949 science and rural reform efforts on scientific farming in Maoist China." Here Mr. Stewart highlights two gaps in the book that have nagged at me, and which I am glad to see someone else flag: the insufficient attention to imperial-era agricultural reform efforts, and the arguably disproportionate attention to U.S. influence. On both points, I recommend Peter Lavelle's "Agricultural Improvement at China's First Agricultural Experiment Stations."¹ Although I mentioned Lavelle's discussion of Japanese influences in an endnote (p. 233n9), I squeezed it in after the book was already in production and so failed to grapple with the full implications of this history. Moreover, I utterly missed the opportunity Lavelle's work affords to trace the imperial-era history of the "suitability" (宜) principle in agriculture. I emphasized this concept so much as it relates to the Mao-era history (especially with respect to the slogan "suit local conditions" 因地制宜), it pains me to have flubbed this. And I'm sure there's much more that could be said on this subject: my discussion of imperial-era precedents is sadly limited to paragraphs here and there drawing on the scholarship of Francesca Bray, Peter Lavelle, Peter Perdue, and a few others. In contrast, I admire the breadth of Shellen Wu's fascinating new research on continuities and changes in state management of agriculture from the Qing dynasty, to the Republican-era warlords and Nationalist government, to the PRC era.

I admit to having mixed feelings about the very large emphasis on the U.S. in *Red Revolution, Green Revolution*. As I had earlier conceived the book, the emphasis was still larger but perhaps the reasons for that were clearer. Two chapters focusing on American visitors to China (including the famous green revolutionary Norman Borlaug, radicals involved with Science for the People, and more mainstream scientists who traveled on government-sponsored delegations) had to be cut to make the manuscript less unwieldy. Sino-U.S. agricultural exchange was thus more obviously one of the explicit subjects of the book, rather than being a kind of a priori assumption about what matters in China, as it may appear now to some

readers. That said, the tremendous influence of a U.S. model² of agricultural extension was one of my most significant research findings—all the more significant because it was contrary to what I had expected. When I first embarked on this project and an Americanist colleague assumed that it would be a story about Norman Borlaug in China, I felt indignation. This was socialist China we were talking about—how could anyone assume U.S. agricultural models would be dominant?! More interesting to me was the inspiration socialist China provided U.S. scientists searching to expand their imagination of what was possible. And yet, the more I looked at it, the more I had to recognize how similar the ideas and practices were, and how clear the historical connections.³ While the book is perhaps begging for a corrective exploring other influences, I think there are many good reasons to spend some time dwelling on the unexpectedly outsize role of the U.S. in shaping the principles and practices of Mao-era agricultural extension.

Mr. Stewart's second set of questions highlights the relationship between labor and science, especially given the enormous labor inputs necessary to achieve the production gains associated with the Green Revolution. I touch on this a bit—especially in chapters four and five, where I discuss peasant resistance to labor-intensive practices and the obstacles this posed for local state agents. However, like Mr. Stewart, I consider this a question raised by the book that demands further exploration. Indeed, labor has become a central concern in my new work on the history of agricultural terracing campaigns. Mao-era documents on terracing speak to the relationship between labor and technoscience in numerous ways: once again we see peasant fatigue and consequent resistance to the introduction of terracing; we also find explicit attention to labor as a necessary aspect of terracing technologies (the calculation of labor inputs and the optimal organization of labor appear along with mathematical formulas prescribing terrace slopes, widths, spacing, etc.); and we see peasant knowledge conceived as intimately connected to long years of labor experience. This last point is especially intriguing (and worrisome) to me: as in my previous research, I am glad to see labor recognized for its role in generating technoscientific knowledge, but I find it difficult to understand how the experiences of massive numbers of people engaged in back-breaking efforts constitute knowledge production and not drudgery or desperation.

I thank Spencer Stewart for his kind review and am grateful to the editors of *PRC History Review* for this opportunity to respond, however insufficiently, to his important questions. I know that a growing number of colleagues, including Mr.

Stewart himself, will share in the work of writing a fuller history of agricultural science in modern China.

¹ Peter Lavelle, “Agricultural Improvement at China’s First Agricultural Experiment Stations,” in *New Perspectives on the History of Life Sciences and Agriculture*, ed. D. Phillips, S. Kingsland, 323- 44 (Switzerland: Springer International Publishing, 2015).

² I say “a U.S. model” to emphasize that U.S. agriculture itself was highly diverse, with some areas technologically “advanced” and others (especially in the South) bearing remarkable resemblance to the “under-developed” countries that the Green Revolution was meant to assist. I am indebted to Tore Olsson for this insight and wish I had encountered his work earlier. See his *Agrarian Crossings Reformers and the Remaking of the US and Mexican Countryside* (Princeton: Princeton University Press, 2017).

³ On the earlier twentieth-century history, I still love Randall Stross’s *The Stubborn Earth: American Agriculturalists on Chinese Soil, 1898-1937* (Berkeley: U of California Press, 1986).