

Agricultural and rural development in China during the past four decades: an introduction*

Jikun Huang, Scott Rozelle, Xinkai Zhu, Shiji Zhao and Yu Sheng [†]

The past four decades have witnessed unprecedented economic growth and rapidly rising food demand in China. This paper provides an introduction to readers with useful information summarising the development of China's agricultural sector and the transformation of its rural economy over the 40 years of economic reform. It is, however, impossible to cover all aspects of this recent and rich history in a single journal special issue. Nevertheless, we are of the view that these papers address the most fundamentally important and insightful topics including: land reform and rural development; technology progress and productivity growth; changing food consumption patterns; rural education and human capital accumulation; and poverty alleviation.

Key words: agricultural production, rural development in China, 40 years of reform.

1. Introduction

The past four decades have witnessed unprecedented economic growth and rapidly rising food demand in China. From 1978 to 2018, gross domestic product (GDP) in China grew at an average annual rate of 9.4% (NSBC 2019). By this measure, the Chinese economy has become 37 times larger than it was in 1978 when the nation's reform efforts were launched. Consequently, by 2011, China had become the second largest economy in the world. Rapid economic growth and an expanding population have significantly increased the demand for food in China. With rising incomes and steady urbanisation,

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[†]Jikun Huang is Professor and Director and Yu Sheng is an Associate Professor (e-mails: ysheng.ccap@pku.edu.cn; yu.sheng@pku.edu.cn) are with the China Center for Agricultural Policy, School of Advanced Agricultural Sciences, Peking University, Haidian, China. Scott Rozelle is Professor at Freeman Spogli Institute for International Studies, Stanford University, Stanford, California, USA. Xinkai Zhu is Professor and Deputy Chancellor at School of Agricultural Economics and Rural Development, International College, Renmin University, Haidian, China. Shiji Zhao is Senior Economist and Section Manager at Productivity Section, Department of Agriculture and Water Resources, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, Australian Capital Territory, Australia.

China's food consumption also has shifted towards foods with higher proteins and higher-valued products (Huang *et al.* 2017).

Notably, the rapid growth of food demand in China has been largely met through its own agricultural production. The average annual growth rate of agricultural GDP over the past 40 years of 4.5% far exceeds the 1% average annual population growth over the same period (NBSC 2010, 2018). With nearly 20% of the world's population, China met 95% of its total food demand in 2015 (Huang and Yang 2017) using the endowments of less than 8% of global arable land and approximately 5% of the world's fresh water.

China's agricultural sector itself has experienced a rapid transformation over the past four decades. There has been a sharp shift away from a strategy that focused on enhancing the yields of traditional crops (as was the case in the early reform period) to one that is seeking to produce labour-intensive and high-value cash crops and meat products (Huang *et al.* 2002; Jin *et al.* 2002; Huang and Rozelle 2010). At the same time, farmers have become increasingly engaged in off-farm activities for additional income – a development that has aided the transformation of rural labour into either full-time off-farm employment or full-time farming (Meng 2000; Meng and Gregory 2005; Zhang, Dong *et al.* 2018).

Significantly, growth in agriculture and the rise of off-farm employment have sharply increased the income of farmers and, at the same time, helped to substantially reduce rural poverty. When China started its reforms in 1978, nearly all rural residents (more than 500 million) were in poverty. Forty years later, the rural population living in poverty has fallen to 16.6 million (or 1.7% of the rural population) (NSBC 2019). Consequently, China was the first developing country to meet the *Millennium Development Goals* (MDGs) target to halve the share of the population that was in poverty and achieve the goal ahead of the 2015 deadline.

Understanding China's agricultural development over the past decades is important for China's own future reforms, and it also has implications for other countries. In 2018, China initiated a *Rural Revitalization Development Strategy* to foster further agricultural reform and rural development. In pursuing this new policy initiative, lessons that China can learn from its past may have implications for other developing countries in their agricultural development and transformation. Against this background, the *Australian Journal of Agricultural and Resource Economics* (AJARE) marks the 40th anniversary of economic reform in China with this Special Issue.

The papers published in this Special Issue will provide readers with useful information about the development of China's agricultural sector and the transformation of its rural economy over the 40 years of economic reform. It is, however, impossible to cover all aspects of this recent and rich history in a single journal special issue. Nevertheless, we are of the view that these papers have covered some of the most fundamentally important and insightful topics including the following: land reform and rural development; technology

progress and productivity growth; changing food consumption patterns; rural education and human capital accumulation; and poverty alleviation.

2. Agricultural productivity and land institutional arrangements, the extension system and irrigation policy reforms

The first of China's rural reforms, the implementation of the household responsibility system (HRS), was initiated during the period 1978–1984. It was focused on dismantling the people's communes and contracting out cultivated land to individual households in each village. From the very beginning, farm households were allowed to regain responsibility for input and output production decisions. Although the ownership of land remained collective, control and income rights were given to individuals. Numerous authors have attempted to explain this reform to the world and make assessments of its role in the growth of the agricultural productivity in China (McMillan *et al.* 1989; Lin 1992; Huang and Rozelle 1996; Fan 1997; Ravallion *et al.* 2007). All of these studies showed the HRS significantly increased agricultural productivity during the early reform period (1978–1984). However, past studies have focused on the direct effect, giving little attention to the distributional impacts.

In this Special Issue, *Aggregate and Distributional Impacts of China's Household Responsibility System* by Gibson (2019) contributes to this topic by analysing the non-random spread of the HRS during implementation years, and discussing the potential spillovers from early adopters. The author first uses a synthetic control method to gauge the impacts of the HRS by comparing aggregate agricultural output over the reform period with that under the hypothesis that the HRS reform had not been implemented. The paper then uses a spatial autoregressive panel model to examine its underlying determinants across regions. The findings indicate not only a significant positive effect of the HRS on grain output and food supply, but also an overall reduction of regional inequality in China.

Over the past four decades, institutions that govern land ownership and use have gradually strengthened. In the early 1980s, land contracts were granted for an initial term of 15 years. As they approached expiry in the late 1990s, the contractual period was extended by another 30 years. Recently, the Government announced further extension of the contract period for an additional 30 years from the late 2020s. During the reform period, the Government made major efforts to stabilise land use rights (Ji and Huang 2013) and developed new institutional arrangements (e.g. township land rights transfer platforms) to facilitate land consolidation (Huang and Ding 2016). Stabilising farmer control and income generated from the contract rights over cultivated land is important because it provides farmers with incentives to invest in agricultural land. Better institutional arrangement of land property rights was shown to have stimulated land transfer among farmers and raised farm size, which improves agricultural efficiency,

productivity and farmer income (Ji and Huang 2013, Gao *et al.* 2012, Deininger *et al.* 2016). A recent nation-wide farm survey shows that about one third of the land contracted by households (through the formal HRS system) had been transferred among farm households (Huang and Ding 2016).

The paper, *Impact of Property Rights Reform to Support China's Rural-Urban Integration: Household-level Evidence from the Chengdu National Experiment*, by Jin *et al.* (2019) in this Special Issue, analyses the effects of a package of comprehensive property rights reforms (i.e. complete registration of all land and certification of land property/entitlement rights) conducted in Sichuan Province's greater Chengdu region (Chengdu Prefecture) in 2008. The aim of the reform was to ease transferability and remove restrictions on the movements of labour into and out of the farm sector. By applying a difference-in-differences approach to data that come from a household survey conducted by the National Bureau of Statistics China (NBSC), the authors found that the new reforms to land entitlement rights increased consumption and income – particularly in financially disadvantaged and less educated households. In addition, the authors found that the estimated benefits far exceeded the costs associated with the changes, as local labour supply increased with the young shifting towards agriculture and the old towards off-farm employment. The reforms also contributed to higher agricultural yields and profits through three channels: transfers of land to more productive producers, made possible by the more active rental market; the substitution of purchased inputs for labour; and a shift out of grains towards the production of vegetables, corn and oilseeds – all of which offer higher profitability. These findings support the notion that, without reforms, imperfections in land markets and poorly defined land rights undermine investment and prevent high-value, peri-urban land from being used more productively.

The success of agricultural development in China has come from both productivity growth and increased input use. Productivity growth is important because it underpins continued growth of rural income, an improvement of farmer livelihood and the security of the domestic food supply.

It is widely accepted that both ongoing institutional and policy reforms, technological progress and increased investment in public infrastructure are three important drivers of agricultural productivity growth. For decades, China has achieved significant productivity growth in agriculture through either land reform, technological innovation, market reforms or public investment in rural infrastructure (Huang and Rozelle 2018). This Special Issue presents three papers addressing different aspects of agricultural productivity and technology diffusion in China.

Understanding productivity is preconditioned by accurately measuring its changes and identifying the underlying determinants, which is the aim of *Exploring Agricultural TFP Growth and Its Determinants in China: 1978-2016*

by Sheng *et al.* (2019). There has been no shortage of interest in measuring Chinese agricultural productivity either at the industry level across China or at the province level. Indeed, there are no less than 80 papers published in professional journals on this topic. It is beyond doubt that the authors of these studies have significantly increased the level of knowledge on this topic. The current consensus is that agricultural TFP growth rate has been high in China – the estimated average annual growth rates ranged from about 2% to more than 3% during different periods of the past four decades. Recently, using provincial data, Wang *et al.* (2019) concluded that China's agricultural TFP increased by 2.8% per annum between 2000 and 2013. However, the work by Sheng *et al.* (2019) in this Special Issue challenges some recent studies by showing that the rapid agricultural output growth over the past four decades was, to a larger degree, attributable to the acceleration of input use (accounting for around 60%) and, in recent years, TFP growth has begun to decelerate with fluctuation.

Sheng *et al.* (2019) use the well-proven index number method to measure Chinese agricultural TFP of the farm sector (including both the cropping and livestock industries) over the past 40 years. To generate their results, the authors constructed new agricultural production accounts comprising 26 main commodities and commodity groups, covering more than 90% of total agricultural inputs and outputs. The authors demonstrate that pre-2009 agricultural TFP in China grew at a rate of around 2.4% a year, which is fairly consistent with the previous findings, comparable with most OECD countries, and approximately double the global average. During this period, institutional reforms, policy adjustments (i.e. market integration), technological progress and public and private investment in R&D were the drivers of agricultural TFP. In this period, TFP growth accounted for around 40% of output expansion (compared to about 60% contribution of input growth). However, in the most recent decade, the authors show that average productivity growth has slowed and fluctuated. The authors argue that emerging challenges facing agricultural production in China are beginning to impede TFP growth, suggesting that further institutional reform may be required.

Lifting agricultural productivity through technology should be an important policy objective, and China's agricultural policymakers must do a better job in the coming years. In order to have a good understanding of how agricultural technology could be adopted by millions of small farmers in China, it is essential to examine recent changes in the nation's agricultural extension system and its evolution over time. This is because an effective extension system is considered the most important channel through which Chinese farmers can have access to and adopt the new technologies. As farming systems have changed, the extension system must also adapt itself to meet the changing needs of farmers. The Chinese Government played a critical role in the reform of the agricultural extension system, and, in the last 40 years, implemented several important initiatives to address various

institutional, management and incentive issues. Despite enormous achievements, more improvement is required in the future.

Reforming the agricultural extension services has not been straightforward. Indeed, some of the policy changes have proven more successful than others. *China's New Agricultural Extension Reform and Its Impact on Agents' Time Allocation* by Cai *et al.* (2019), another paper in this Special Issue, analyses the reforms in agricultural extension. The paper seeks to understand how policy shifts have improved (or did not improve) their effectiveness since 1978. Based on a review of the process of reforming China's agricultural extension system, Cai *et al.* (2019) found that three of the major initiatives – the financial assurance, the administrative/institutional reform and the management of 'three rights' (the management rights on personnel, budget and assets) – significantly increased the time (and effectiveness of extension services) that service agents spent on agricultural extension services. However, the way extension agents delivered their services differed over time and across regions and the effectiveness of their services varied.

Interestingly, the authors also found that government investment (mostly from the local governments) and commercialisation of agricultural extension did not make extension services more effective, although both increased the frequency of visits by the service agents to the farms. This highlights the importance, of reducing the administrative intervention of local governments in the process of marketising and commercialising agricultural extension system. These findings confirm the important role of local governments in the recruitment and training of skilled professionals in the agricultural extension system.

The Chinese Government also made efforts to improve agricultural productivity through reforms to irrigation policy. China has a long history of irrigated agriculture. Around 256 B.C., the first emperor of China commissioned the construction of the Dujiangyan – a major irrigation project that successfully turned the basin in Sichuan Province into one of the nation's most productive rice bowls. This irrigation system has remained in operation ever since. Irrigation is now a significant feature of the current Chinese agricultural landscape, particularly in the northern part of the country. According to *40 Years of Irrigation Development and Reform in China* by Wang *et al.* (2019) in this Special Issue, over 70% of grain, 80% of cotton and 90% of vegetable production depend on irrigation. Investments in irrigation are apparently profitable. However, this is also an area where policymakers are confronted with serious issues. Today, more than ever, the sustainability of irrigated agriculture faces difficult challenges, including the decline of available water supply and an increase in the demand for water from non-agricultural sectors. Hence, water needs to be better managed from both the supply side and the demand side.

In this Special Issue, Wang *et al.* (2019) discuss issues of irrigation during the reform period from a demand perspective, focusing on the development of irrigation, the transformation of institutional arrangements and incentive

mechanisms that have been designed to better manage irrigation. After the initial reforms in the 1970s, government investment in irrigation slowed until the late 1990s. During this period, investors in groundwater and the development of property rights for tube wells were gradually transferred from collectives to individual farmers affiliated with collective entities. Although this change generated some positive effects on the adjustment of cropping patterns and farmer income, it also accelerated the fall of the groundwater table. Since the 1990s, Water Use Associations have been established at the village level to manage surface irrigation, replacing certain functions of the collective entities. The new mechanism, according to the paper, has produced mixed outcomes – efficient irrigation was achieved only in some places where sound incentive mechanisms were in place and being used effectively to encourage water resources managers to save water.

Recently, government policy began to focus on providing incentives for farmers to save water (without greatly sacrificing their income). Despite the government's commitment to further enhancement of water rights and reform of water markets, the paper suggests that little progress has been made and there is still a long way to the full implementation of water rights measures. For example, Wang *et al.* (2019) reveal large scope in the water sector to save water and enhance farm output in China's rural areas, by increasing the adoption of new irrigation technologies. Facing increasing pressures of water scarcity and the need to improve food security, further reforms in water management are expected. To save water resources, the government has started to initiate a number of pilot projects that seek to resolve the nation's increasing water scarcity.

3. Rural welfare: food consumption, rural education, income and poverty reduction

Prior to the economic reforms, Chinese consumers had little power to influence domestic markets through their consumption decisions. Over the three decades leading up to 1978, the distribution of most goods, including agricultural products, was conducted by the central allocation system. This type of a system meant that the consumption of specific goods was confined to whatever the allotted coupons permitted – which were more or less equally distributed among urban residents. Almost all goods and services were distributed through a network of state-run entities, limiting the opportunity for residents to determine their own consumption behaviours.

However, economic reform changed everything: the coupons were abolished; private food services flourished; the supply shortages faded into history; and consumers enjoyed greater freedom and wider choice as their income increased year by year. Although the freedom of consumption choice is worth celebrating, it has also generated new problems for analysts in understanding the demand for goods and services. The work by Bai *et al.* (2019), *Meat Demand in China: To Include or Not Include Meat Away from*

Home, demonstrates how to tackle issues triggered by the rise of consumer power.

To study this issue, the authors begin with the assertion that there is a measurement problem. This is mainly the result of consumers who choose to dine at restaurants rather than at home, causing traditional estimates of meat consumption to be inaccurate. One of the problems, it is thought, is that the existing literature that examines food consumption in China has given little attention to meat consumed away from home. Bai *et al.* (2019) re-examine this issue by considering both meat consumed at home and elsewhere in *Meat Demand in China: To Include or Not to Include Meat Away from Home*. The study, which uses a diary-based household survey across nine cities in China, finds that growth in the consumption of beef, poultry and pork (and other meats associated with dining out) grew at a faster rate than total meat consumption. This shift towards consuming meat away from home also has been shown to coincide with income growth. Moreover, the price elasticities of pork, beef, poultry and other meats consumed at home are lower compared to their counterparts (i.e. elasticities of meat consumed away from home). This means that the exclusion of meat consumed away from home could translate into a significant underestimation of total meat consumption. Given the large size of the market for meat in China, and also given the nature of the growth of demand for meat products among Chinese consumers, these findings have implications for our understanding of the global meat market. The paper also raises important issues with regard to the relationship of meat consumption with increasingly serious environmental challenges faced by Chinese policymakers.

As markets grow and shift, so too does the demand for human capital resources. The concept of human capital was formally introduced into the economic literature by Schultz (1961) and further developed and refined by Becker (1962, 2009), Mincer (1974) and others. Thanks to the contributions of Romer (1990) and Lucas (1988), human capital has entered the mainstream analysis of the literature on economic growth and development. In this now-formalised analytical framework of human capital, formal education is a key component, which enables individuals to increase their earnings (Mincer 1974) and allow an economy to grow (Mankiw *et al.* 1992). In this context, the importance of human capital for the development of the China's rural sector cannot be ignored. This Special Issue contains two studies focusing on the supply of and demand for formal education in rural China.

One of those papers, *Incentivizing Teachers? Evaluating the Incentive Role of China's Teacher Performance-based Compensation reform in Rural China* by Zhang, Jin *et al.* (2018), focuses on the supply side of education in rural China. Using a panel data set containing information on both students and teachers, the authors evaluate the effectiveness of performance-based financial incentives for teachers offered by the educational institutions in rural China compared to those in urban China. According to their analysis,

after controlling for the baseline academic results of the students, the financial compensation granted to teachers does not explain the ‘value’ added to student academic achievement. While this finding suggests that the performance-based compensation reform did not achieve its expected outcome, it raises questions about the reform measures themselves and the most suitable approach to improving the quality of education in rural China. As in any reform of public policies, while initial intent is important, the design and implementation of the rules is the key to success. The insights from this study are interesting and potentially useful for government policymakers in China.

The paper *The Returns to Education in Rural China: Some New Estimates* by Liu *et al.* (2019) focuses on the demand side of education. Previous studies have found that the returns to education among the (part-time or full-time) off-farm wage earners are far lower in rural China than in other developing economies (Parish and Li 1995; Meng 1996; Ho *et al.* 2002; de Brauw and Rozelle 2008; Johnson and Chow 2010; Wang *et al.* 2017). The authors argue that the returns to education in rural China may have been systematically underestimated due to methodological shortcomings. In addition to issues such as the mismeasurement of the wage rate, as cautioned by de Brauw and Rozelle (2008), previous studies may have also mismeasured the work experience of the survey respondents. Among others, this paper considers interruptions in (off-farm) employment as a key measurement problem. Without properly addressing this issue, wages could be systematically understated.

Liu *et al.* (2019) estimate returns to education among the rural population based on national household survey data collected in 2013. The authors use detailed information about individuals’ employment history, hours worked, earnings and education attainments to come up with improved measurements of wage rate and experiences. These measures have properly accounted for actual hours worked and interruptions. The paper demonstrates that, on average, returns to education in rural China – when measured with traditional approaches – were low, only around 3.1%. Once interruptions in off-farm employment are accounted for, the measured returns to education is actually higher for rural residents who were engaged in non-agricultural employment. Their findings also confirm the existence of mismeasurement if an hourly wage rate (instead of daily or monthly earnings) is used for rural labourers who have dual employment across agricultural sector and another sector. This measurement issue can find its way to the measured rates of return to education. To the extent that the authors find more optimistic returns to education in rural China, they also advocate proper measures being used in the estimation of such returns.

Penultimately, poverty relief is arguably the most celebrated achievement in the 40 years of economic reform in China. According to the World Bank (2018), in the period between 1990 and 2013, the global population living under the international poverty line of \$1.90 a day decreased by more than

one billion. In the paper, *China's Poverty Alleviation Over the Last 40 Years: Successes and Challenges*, Liu *et al.* (2019) show that China contributed more than 70 per cent of this decline. Although poverty relief has been a stop-and-go process and the 'way forward' is fraught with difficulty, the authors argue that the Chinese experience provides useful lessons for other developing countries in their efforts to combat poverty.

In their paper, Liu *et al.* (2019) provide an overview of China's past experience to alleviate poverty and that of challenges in the years to come. The experiences in the past include a strategy of development-oriented poverty alleviation – using approaches that strengthened local economies, especially, in poor regions – to support rural development. The national strategy also emphasised initiatives to strengthen the participation of poor populations and introduce technological innovations (instead of handouts) as a way to reduce poverty in rural China. The authors recognise, that while enormous achievements have been made over the past 40 years, several challenges remain. The marginal benefits from investments are diminishing. Distorted incentives have weakened the motivation of the poor. In addition there has been insufficient participation of the poor in markets. As a result, these forces have lessened the effectiveness of poverty relief in recent years. To deal with these challenges, the paper provides some useful ideas that the authors believe policymakers can take to enhance future poverty alleviation efforts.

Finally, in China, the achievement of poverty reduction coincided with a mass human migration from rural to urban areas. In another paper, *Dynamic Wage Gap between Urban Labour Force and Rural Migrants in Chinese Cities*, Zhang (2019) considers this achievement from a different perspective and compares earnings between rural-to-urban migrants and long-term urban residents. The paper examines the possibility of closing the gap between the wages of rural-to-urban migrants and long-term urban residents between 1999 and 2009, and explores the reasons behind it. In doing so, it applies an assimilation model to a repeated cross-sectional data set of seven Chinese cities. The findings are mixed. The paper finds that the wage gap between rural-to-urban and long-term urban residents is narrowing. However, the author concluded that, in the long run, rural-to-urban migrant earnings will not overtake those of long-term urban residents. As the authors highlight, existing institutional arrangements and policies are the main barriers to preventing this gap from fully closing, similar to the finding of Zhou *et al.* (2019). In order to achieve wage equality, the authors call for further labour market reforms.

4. Concluding remarks

China's agricultural and rural sector has achieved rapid development in the past four decades. Under the pressure of increasing scarcities of water and land, China has been able to largely achieve its national food security through increasing productivity and more efficient use of inputs. In the meantime,

significant changes also occurred in the structures of agricultural production and food consumption. Economic reform has led to a massive reduction in rural poverty. As this Special Issue shows, continual institutional innovation and improvement in incentives governing the use of land, water, labour, technology, and human capital accumulation have all played critical role in rural development and poverty reduction.

Although the achievements in the past have been impressive, China's agricultural and rural development still faces many challenges. In response to these challenges, China has initiated the national *Rural Revitalization Development Strategy*. For this to be successful, the past experiences and lessons of agricultural and rural development presented in this Special Issue suggest that further reforms to rural institution and marketisation are essential. It is also important for the Government to continue focusing on technological innovations in the nation's still incomplete agricultural and rural reforms.

China's experiences of agricultural development and rural reforms have important implications for agricultural production and food markets in other developing countries. The authors of this issue believe that a better understanding of the reform process in China and its varied consequences may be useful for the analysis and critique of reform efforts in developing countries that are in earlier or similar stages of rural transformation. It is therefore our hope that this Special Issue of AJARE will not only serve to symbolically mark the 40th Anniversary of China's rural reforms but also provides a platform for sharing and learning from China's experience and its implications for the global food economy.

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