

Strategic Analysis Paper

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The State of China's Agricultural Research

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Key Points

- An overbearing, state-controlled, industry is suppressing innovation in the Chinese agricultural sector.
- Foreign involvement in the agricultural R&D sector is relatively weak, compared to the level of assistance it receives from the State.
- Making it easier for private investment may introduce new or better forms of technology to help in China's agricultural research plans and set Chinese research on a more experimental/strategic path.
- The Communist Party's legitimacy lies, in part, in its success in agriculture. It is not willing to relinquish this to the private sector.

Summary

China's agricultural research is at present dominated by the State. Since the establishment of Communist China in 1949, the Chinese Communist Party (CCP) has linked its legitimacy to progress in the betterment of the agricultural sector. It is therefore easy to see why it still exercises near total control of the direction of the agricultural sector. To rationalise the State's presence in agricultural research and development (R&D), the CCP has treated R&D as an inherently public good.

Making agriculture a public good implies that the industry is certain to flourish, provided it remains in the hands of the public. State involvement, as opposed to private investment, is the guarantor of agricultural success. The CCP attaches this thinking to R&D investments so that the CCP alone can, for the most part, choose the direction of agricultural research. This opens the industry to a series of challenges. Foreign investment is vital to furthering experimental or strategic fields of research, such as, biotechnology or genetically modified foods (GMOs). A predominantly publicly funded sector tends to focus instead on basic research that involves improving existing practices, rather than on the advancement of knowledge in new areas. Private investment in research in China is rising, but the CCP's desire to monitor R&D investments may prove a hindrance to furthering Chinese food security.

Analysis

The closing stages of 2017 saw the introduction of China's latest efforts to reform its state-owned sector. Last October, as the Communist Party Congress approached, many commentators were keenly awaiting Beijing's plans for dealing with the country's state-owned enterprises (SOEs). The SOEs are responsible for many key industries, such as banking, energy and construction. China's SOEs have become synonymous with waste and stagnation and many observers, both inside and outside China, have watched President Xi Jinping's efforts, or lack thereof, to reform them.

China's rapid growth and industrialisation have convinced many China watchers that only the implementation of reforms could be responsible for pushing China forward and away from the Mao Zedong era, which so successfully ruined much of the Chinese economy. Others, however, [contend](#) that China's political leadership is not committed to reforming the economic performance of SOEs, but to delivering growth and ensuring that the engine of growth stays in state hands. According to Arthur Kroeber, author of *China's Economy*, 'there is no foundation to the hope that, having consolidated political control, Xi will suddenly reveal his true colours as a market-oriented, pro-private sector economic reformer.'

This kind of debate is critical to the current state of China's agricultural research. China's agricultural sector – from research to production – is mainly state-owned and heavily subsidised. Roughly 35 per cent of the Chinese population works in agriculture, which thus commands significant attention from the CCP. Due to the size and political significance of the farming community, the CCP continues to see the agricultural industry as vital to the economic security architecture of the state.

One of the ways to analyse the state of China's agricultural research is by assessing the funding patterns that sustain it. According to [Nature](#), middle-income countries like India and China are investing more in public-sector agricultural R&D than high-income countries like the United States or Australia. As of 2011, around 55 per cent of the total amount of global private and public spending on R&D was in high-income countries, down from 69 per cent in 1980. Middle-income countries, however, contributed around 43 per cent of global agricultural R&D spending in 2011, having accounted for only 29 per cent in 1980. For public sector spending, by 2011 middle-income countries (50 per cent of global public sector agricultural R&D) had overtaken high-income countries (47 per cent). Private sector spending is also up. According to the same *Nature* report, middle-income countries are increasing private sector spending also, relative to their high-income country counterparts. In 2011, some 57 per cent of China's agricultural R&D spending came from the private sector. It should be noted, however, that the private sector in China can involve both private companies and/or for-profit firms. In the Chinese sense, the latter could either be a normal private company or an SOE that now generates its own profits and is concerned with its own interests.

Since China continues to view its agricultural industry as a vital strategic sector, it is difficult to acquire information on budgets or spending trends. Nonetheless, analysts believe that China's public agricultural R&D system is the largest in the world. According to the [Chinese Academy of Sciences](#), government spending on R&D accounted for 2.1 per cent of GDP in 2016, reaching 1.54 trillion yuan (\$296 billion). Despite the rise of the private sector in China, the R&D scene is still mainly [dominated by the public sector](#). As previously stated, countries like China are increasing their public sector investments, while rich countries like Australia and the US are trimming theirs and instead focusing more on private investment. How a country funds its agricultural research is an indication of the kinds of goals it wants to pursue. As in many other fields, public and private agricultural researchers follow different research paths. How China chooses

to determine how much of a certain kind of investment (public or private) goes into its agricultural R&D, can indicate the direction of China's agricultural research in the long term.

The Chinese state is spending significantly large sums of money on agricultural R&D projects, mainly through the public sector. The rationale behind this lies in agriculture's purpose in China as a public good. As [stated elsewhere](#), 'public goods are non-rival and non-exclusive.' This implies that the consumption of a product by one person should not be at the expense of another, and that 'social benefits from the public goods are far greater than the private producer benefits.' Since agriculture is such a politically sensitive topic for the CCP, agricultural policy is presented as a sector abounding with social benefits; the point of minimising private involvement is so that agriculture can never be used by foreigners to extract benefits that would otherwise go to Chinese consumers.

Opening such a politically sensitive sector to the foreign market, in China's view, risks exposing it to market failures. The agricultural sector is too precious to be left to the vagaries of a free market; consequently, the State is needed to mitigate economic inefficiencies, reduce poverty and improve economic equality. Such responsibility has forced the CCP to engage in a certain kind of agricultural R&D that fulfils this need. The need to provide as much food as possible to as many people as possible, has caused the CCP to rely on State money to fund agricultural R&D, because publicly funded research mainly results in basic research. Politically safe and agriculturally fulfilling, basic research is an apt fit, however, it does not allow for the experimental research that China may need in the event of a severe and drastic food crisis.

Publicly invested R&D mainly focuses on [basic and applied research](#). According to [The Australian Journal of Agricultural and Resource Economics](#), basic research is 'experimental and theoretical work undertaken to acquire new knowledge without looking for long-term benefits other than advancement of knowledge.' Applied research is, however, 'original work undertaken primarily to acquire new knowledge with a specific application in view.' It is undertaken to either further basic research or to find a new way of achieving a goal. The Chinese government's attitude toward agriculture as a public good and the rationale behind basic research may help explain why the public sector is so dominant when it comes to Chinese R&D investment. As stated by the journal quoted above, a distinctive feature of basic research is that it is undertaken by researchers and funded by institutions that 'make a decision on the extent to which funding should be devoted to researchers who are constrained to achieving particular practical outcomes.' Furthermore, 'even strictly commercial organisations sometimes fund researchers with a basic orientation, and for sound commercial reasons.'

The legitimacy of the Party has always rested, in part, on improving the lives of those working in agriculture, which is why Party officials feel the need to direct how those improvements occur. Bottom-up efforts, such as rural cooperatives or credit groups, have been restricted. Agriculture is a portfolio covered by the Central Party Committee, with Party officials embedded in all levels (national, provincial and local) of the agricultural sector as supervisors. It should therefore follow that the funding of agricultural R&D is equally as regimented. The Party needs to maintain the idea that agriculture remains the great unifier; the public good that the Party is most apt at providing.

This is one of the challenges the CCP is going to have to contend with in the period to 2050. To maintain power, the Party needs to be the one to direct agriculture and by extension the many millions of people working in it. At the same time, however, private sector investment is suffering, particularly in the experimental/strategic field of R&D; especially in those telling indicators of agricultural progress: inventions and patents.

Researchers have found that the promotion of private agricultural R&D is vital to increasing agricultural productivity and for furthering the production and survivability of inventions through patents. Though patents are only one aspect of research productivity, they [have been good indicators of agricultural production in China over the last 30 years](#). A paper published in [Technological Forecasting & Social Change](#) clearly shows the effectiveness of public and private investment in agriculture, through patents. It also shows how, despite the influence of publicly funded patents, private inventions seem to be more valuable in both life span and length of renewal. According to the paper, domestic patents in China are growing more rapidly than foreign patents and already outnumber the latter. Between 1985 and 2009, domestic invention patent applications rose by approximately 69-fold, while foreign patents rose only 9-fold.

Domestic patents were responsible for driving the agricultural investment boom seen throughout the 2000s in China. Chinese domestic patents after 2001 are more durable than they were pre-2001 and domestic filings already outnumber foreign filings. It turns out, however, that domestic patents, despite their numbers, are not as valuable as foreign ones. Almost all foreign patents (around 99 per cent) are later registered as inventions. By contrast, a mere 57.2 per cent of domestic patents are accepted as inventions. The average lifespan of a foreign patent is around 11.2 years, while domestic ones usually last around 7.5 years; foreign lifespan renewal is about four years, but only one year for domestic patents. The authors found that foreign patents 'have a lower grant ratio, but once their applications are granted, they are likely to maintain a longer protection period than public entities. It is no great surprise that, in China, even though foreign investment appears to be the most valuable, domestic R&D is still quite dominant.

Conclusion

Chinese agricultural research is a sector of the economy dominated by the public sector. Agriculture has been, and will remain, a vital part of the CCP's strategic thinking and a staple tool in how it maintains legitimacy. For these reasons, agricultural R&D is a portfolio reserved mainly for the State. With so many people involved in agriculture, the CCP feels that the long-term outcome of agricultural R&D projects, especially innovations of the experimental kind, cannot be left to the whims of the free market. This "public good" mentality surrounding agriculture explains why, despite the value and survivability of privately funded patents, domestically funded ones not only outnumber their foreign counterparts, but are unlikely to devalue in the event of an increase in foreign patents.

Private investment in R&D has been increasing since 2000; however, it appears that, despite this, foreign inventions struggle to breach the Chinese market en masse. This needs to change if China wants to improve its [experimental/strategic](#) research capabilities in areas pertinent to food security, such as biotechnology and genetically modified foods. China has reportedly committed to improving its research in more [experimental fields](#), but while its aversion to large-scale private investment in agriculture remains, the CCP will find it difficult to match US and other Western researchers.

The long-term progress of China's agricultural research seems likely to remain a closely guarded sector. China cannot rely on basic research to flow into experimental research; to achieve this, more foreign connections need to be facilitated in China. Private investment in Chinese agricultural research is increasing, but the CCP's continued dominance of the sector could prove a hindrance.

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