



# GETTING FROM FARM TO FORK: ROADS, DRONES AND DIGITAL HIGHWAYS

Written by



## Foreword by Cargill

### Moving food from where it's grown to where it's needed

Population growth in Asia is expected to surpass global population growth in the coming decades. Asia will also become vastly more urban than it is today, in line with global trends. Food demand from this growing urban population is likely to shift more towards resource-intensive food, even as resources become increasingly scarce. Higher consumption of resource-intensive food will also lead to overuse of natural resources like water and land. On the other hand, both quality and sustainability of these resources is a growing concern due to degradation and pollution issues. Given Asia's focus on increasing agricultural yields, these factors will have serious implications for countries looking to meet agricultural demand domestically.

The integration and globalisation of supply chains has enormous potential in overcoming these challenges and driving growth in food and agricultural markets. Policy action is also urgently needed to address a range of issues, including agricultural efficiency, food loss and food waste, and the modernisation of food distribution. However, this requires policies that extends beyond agriculture. Adopting a systems mind-set will help assess upstream and downstream policy impacts.

Building a resilient food supply chain is crucial to support wider food security goals in the region. Strong collaboration between Asian countries' public-private sectors across the food systems can help transform agricultural production to meet future food demands. Investing in infrastructure is another key aspect to smoothen functioning of the food supply chains and mitigate impact of climate change.

### **About the research**

*Getting from farm to fork* is part of *Fixing Asia's Food Systems*, a five-part research programme commissioned by Cargill. The research is based on two surveys conducted in November 2017 and March 2018 of a total of 820 industry leaders in the region, and expert interviews.

We would like to thank the following experts for contributing their time and insights:

- Ramesh Chand, member, National Institution for Transforming India
- Mohamad Roff Mohd Noor, director of crop science, Malaysian Agricultural Research and Development Institute

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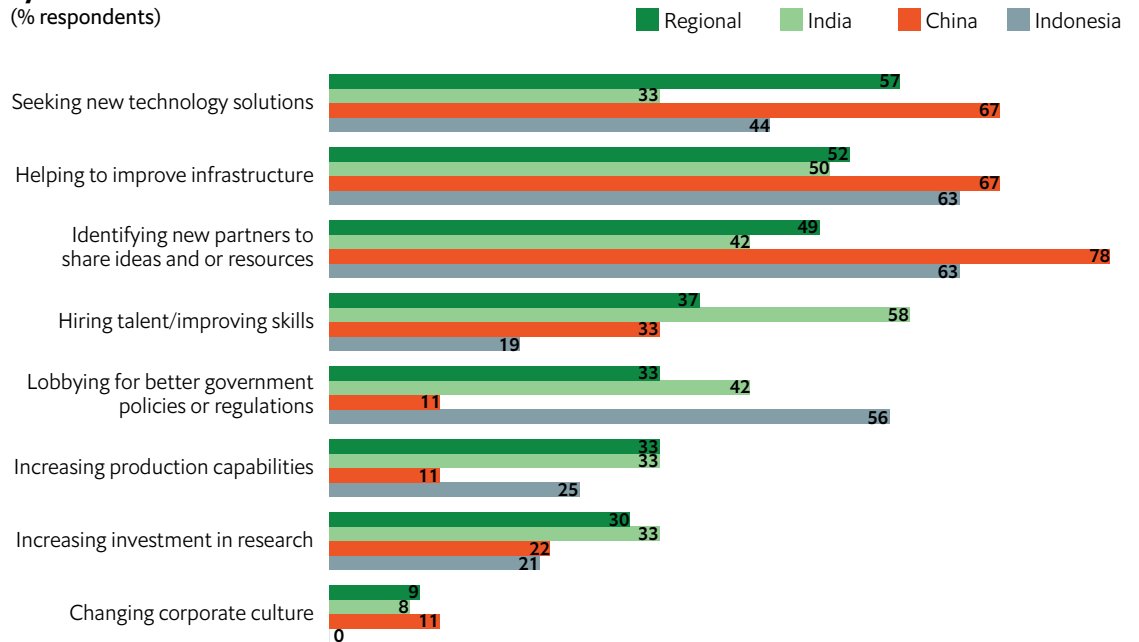
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Farmers are used to looking at the skies. But in the next few years, producers in China’s Shaanxi region may be scanning for drones rather than signs of rain.

In May 2017 e-commerce giant JD.com announced it was developing large drones to shuttle packages of up to one tonne between cities and rural areas in the province. According to a JD spokesperson, the new drones would allow farmers to ship fruits and vegetables to distant urban markets that would otherwise expire on longer road journeys. The Shaanxi government is contributing to the US\$150m the company plans to invest in the region.

Radical experiments such as these reveal how firms are trying to leapfrog the challenges in Asia’s food supply chain. According to a recent Economist Intelligence Unit study of 400 business leaders in the food industry, 57% cited seeking technology solutions as their top strategy for improving food distribution systems, and 52% said they are seeking to help improve infrastructure.

**Figure 1: Strengthening supply chains**  
**What is your organisation doing in response to poor supply chains, eg poor distribution systems? Select three.**  
(% respondents)



Source: The Economist Intelligence Unit.

The region’s smallholder farmers are in desperate need of this kind of innovation. They face the twin challenge of vertical integration: the ability to adapt quickly to consumers’ changing tastes while inserting themselves into modern retail and supply chains that typically favour large-scale producers.

Farmers need to cater to rapidly shifting diets in Asia. According to our poll, 36% of agri-food business leaders said that rising demand for better and more diversified foods would be the biggest risk to the food system in five years’ time. Tastes are seen evolving towards more protein consumption. The

FAO predicts that each person in China will eat an extra 30 kg of meat by 2030; while even vegetarian-leaning India will consume 18 kg of meat per person by 2050, up from 3kg in 2012. In Malaysia, changing diets and differing family sizes are also reshaping the demand for fresh produce.

“In the past, long beans were common consumed in Malaysia and gave high yield, but now consumers prefer shorter beans,” says Dr Mohamad Roff Mohd Noor, director of crop science at the Malaysian Agricultural Research and Development Institute. “They also want watermelons that are smaller in size, which can be consumed by a small family, since the size of families is reducing especially in urban areas.”

While food demand is shifting, lack of scale and poor infrastructure mean that some farmers still struggle to enter modern supply chains. The average farm size is just 1.4 hectares in South Asia and 1.8 ha in South-east Asia, compared with 111.7 ha in South America, says the World Bank. Despite many economists’ predictions, Asia has not gone the way of big, consolidated farms like Europe or North and South America, notes Ramesh Chand, member of the National Institution for Transforming India (NITI Aayog), a policy commission: “Asia proved to be different and distinct.”

Large vendors find it costly to deal with myriad small operators to obtain food on the scale they need, adds Mr Chand. “This is the main structural reason industry finds it difficult to extend the supply chain to the back end,” he says.

The fragmentation is compounded by uneven investment in transport. Cities gobble up an estimated 80% of government infrastructure funding, leaving little for rural areas. As a result, in places like India as much as 40% of the country’s fresh fruit and vegetables rot because of poor storage and lack of good logistics. As governments struggle to invest and address these challenges quickly enough, businesses are trying to step forward and help fill some gaps; 52% of the leaders surveyed by the EIU say their organisations are actively trying to improve infrastructure as part of their response to poor supply chains.

### Digital highway

Other businesses are building a digital highway to redesign the journey from farm to fork. In China, in particular, the internet behemoths are experimenting with ways to shorten the supply chain by removing the middle men. In 2014 Alibaba announced a plan to invest US\$1.6bn over five years to create Rural Taobao centres in 100,000 villages, entire communities of rural food producers who turn to Taobao to sell their produce. The idea is to construct a two-way distribution infrastructure and help farmers sell directly to city dwellers, the company claims. Proliferating (digital) urban-rural links helps more smallholder farmers connect to the system—obviating the need for scale.

The digital revolution can also bring producers and consumers closer together by better collecting and leveraging data. Business leaders see big data, from weather and eating habits to public health data, as a key way to improve the food systems in their country. Malaysia’s agricultural agency has developed a supply-demand virtual information database, known as SDVI, which analyses commodities

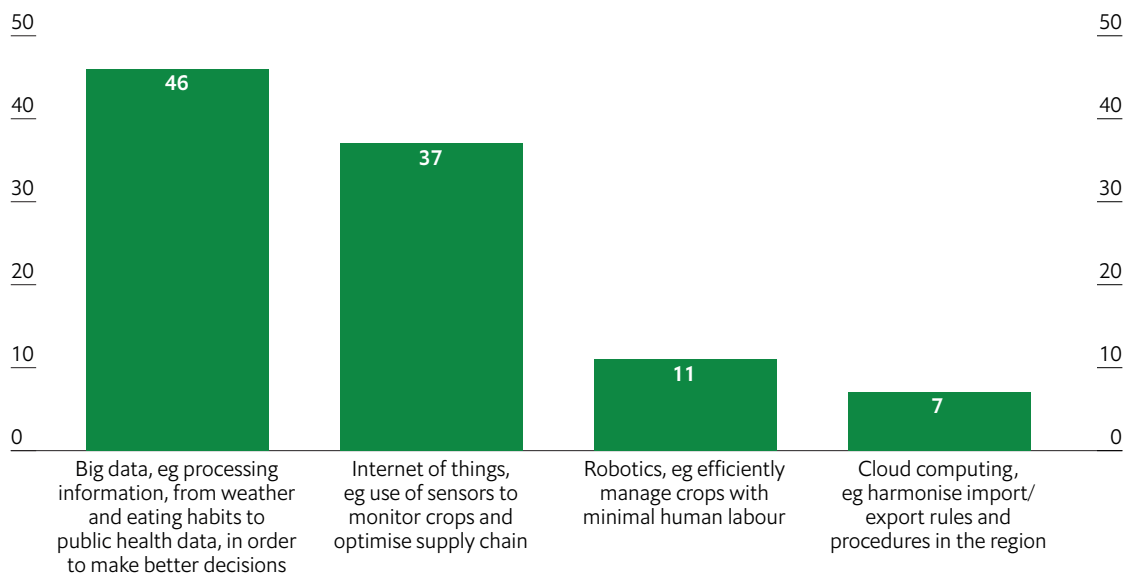
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movements and prices and smooths regional gaps. “In the headquarters, at every stage, they monitor supply and demand in each state. From there, they can channel vegetables or fruits from one state to another,” says Dr Roff.

Lastly, technological advances on all fronts can help potentially tackle young people’s increasing reluctance to work in agriculture. Improving the technological sophistication of agriculture can show younger people that farming is a productive, profitable and future-proof industry. “We want young farmers to be involved, to create the next generation of farmers by developing technologies for them,” says Dr Roff. “We know they are ICT savvy, and we are developing technologies like precision farming and indoor agriculture to help them.”

Likewise, data can be used to provide more information to assuage people’s worries about where food comes from, adds Ms Cairns. Empowering consumers with information can boost markets. During the 2016 Chinese New Year, for example, Alibaba put local products in the spotlight on its website, highlighting their origin. They sold out of locally made chilli sauce and apples within hours, according to media reports.

**Figure 2: Seeking tech support**  
**Which technology has the greatest promise to improve food systems in your country?**  
(% respondents)



Source: The Economist Intelligence Unit.

### Partnering along supply chains

Although technology tackles distribution challenges, business leaders (49% of those polled by the Economist Intelligence Unit) and policymakers are also turning to partnerships to address broader value and supply chain issues. For example, in 2012 the Indian government issued guidelines through

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the Public-Private Partnership for Integrated Agricultural Development (PPPIAD) programme. This allows state governments to team up with corporates to better integrate the whole food production chain—from providing farmers with quality inputs to marketing the final products.

The idea behind these partnership is to get stakeholders involved from the start, so farmers are better aligned with what they need and the volumes required, and businesses and policymakers can better identify and invest in supply chain weaknesses.

The Indian state of Maharashtra was one of the first to take up the programme, which is emerging as a “big success” in attracting the private sector, notes NITI Aayog’s Mr Chand. He hopes the programme will catch on in other states. State governments have about “Rs10bn in matching contributions” to spend on luring the private sector and investing in value addition, he adds. Some 60 businesses had signed up to PPPIAD by 2015, with a goal of reaching 5m farmers by 2020.

“Whenever private businesses meet me, I tell them they need to start spending on the input supply chain...give farmers quality seeds and [fertilisers], give them credit to buy machinery,” he says. “The supply chain will remain weak unless it has [more] linkages with Asia’s smallholder farmers.”

India’s eagerness for PPPs echoes initiatives tried elsewhere. In March 2017 carmaker Toyota signed an agreement with Japan’s Ishikawa Prefecture to teach its “kaizen” (continuous improvement) production system to farmers in the province. This is not the first tie-up. The auto firm first started working with Ishikawa in 2014, using data to increase agricultural efficiency.

Still, Asia’s farmers need a lot more support, according to Mr Chand. He is hopeful more firms will step up to help farmers grow the right amount of the right produce, and get it to consumers’ plates efficiently. “The future of agriculture requires much higher levels of private sector participation,” he says. “I would expect business to take advantage.”

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