



Indian Agriculture: Ripe for Disruption

Technology and new regulations create opportunities for change.

By Parijat Jain, Prashant Sarin and Shalabh Singawne

About the authors

Parijat Jain is a partner in Bain's Energy & Natural Resources and Advanced Manufacturing & Services practices. He leads the Agribusiness practice for India, and is based in the firm's New Delhi office.

Prashant Sarin is a partner in Bain & Company's New Delhi office. He leads the firm's Advanced Manufacturing & Services, Energy & Natural Resources practices in India and is a global leader in Bain's Strategy and Organization practices

Shalabh Singawne is an associate partner and is a member of Bain's Energy & Natural Resources, and Advanced Manufacturing & Services practices, based in the firm's New Delhi office.

At a Glance

- ▶ Close to 55% of India's population depends on agriculture for their livelihood; yet the sector continues to be dominated by small and marginal farmers.
- ▶ Recent technological and regulatory changes are expected to create an estimated \$30 billion to \$35 billion of value pool in agri-logistics, offtake, and agri-input delivery by 2025.
- ▶ There are three potential plays for companies in the agritech ecosystem to leverage these opportunities. These include: setting up an integrated agritech platform, creating an incubation wing for new business models, and reinventing current businesses.
- ▶ Reforming Indian agriculture is also critical from an environment, sustainability, and climate change perspective. The future of agriculture is very important to India's development, its policy planners, and other stakeholders.

Indian agriculture is at an inflection point. The \$370 billion sector will undergo a complete transformation in the coming years on the back of significant technology and regulatory changes.

Agriculture's contribution to the country's gross value added (GVA) is about 20%, and agriculture in India continues to be dominated by small and marginal land holdings. Additionally, close to 55% of the Indian population still depends on agriculture for their livelihood.

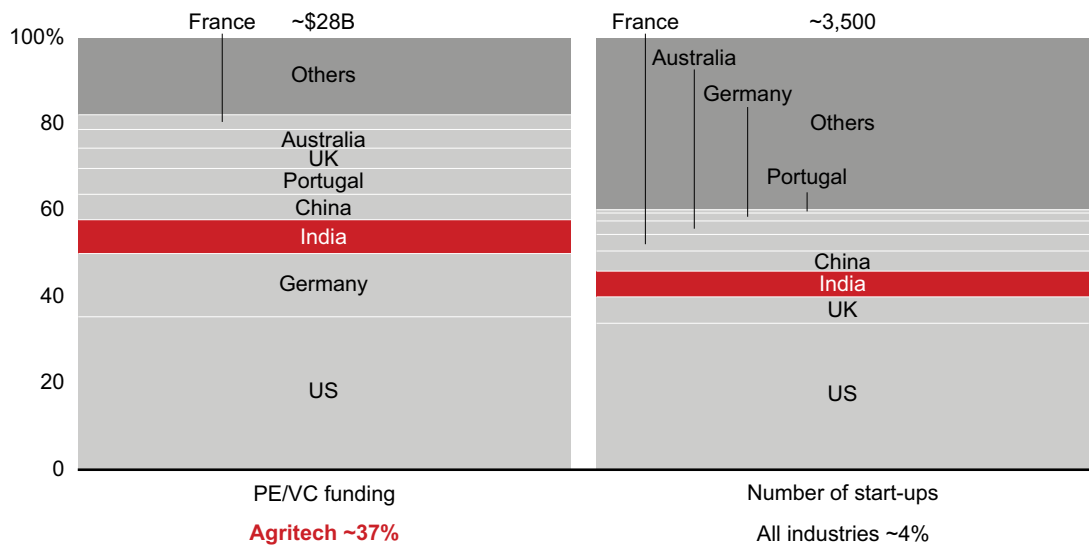
The idea of doubling farmer incomes in the next few years is likely to become a reality based on the technological and regulatory changes in this sector. In addition, the agritech and agri-ecosystem sectors have seen significant interest from the investor community over the past few years. India is the third-largest nation in terms of funding received and start-ups in the agritech space (see Figure 1). We believe there will be significant value creation in agricultural value chain across the entire ecosystem over the next two decades, which will fundamentally change the way we produce and consume food in India and globally.

There is no turning back from the road ahead. Indian agriculture is ripe for disruption (see Figure 2). We see the sector benefitting from a 'today forward, future back' approach, where organisations can maximise the potential of the current business by becoming cheaper, better, faster, broader, and greener while taking the first steps towards a future vision. These technological changes, capabilities, and investment on the anvil will fundamentally change the productivity and landscape of Indian agriculture. In fact, our estimates indicate that approximately \$30 billion to \$35 billion of value pool will be created in agri-logistics, offtake, and agri-input delivery by 2025 (see Figure 3).

Indian Agriculture: Ripe for Disruption

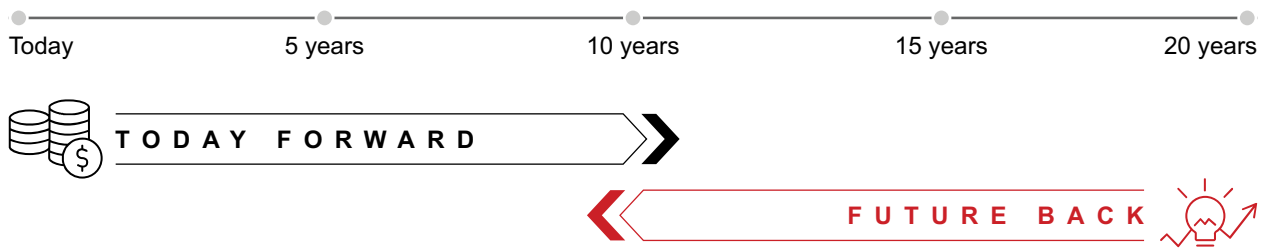
Figure 1: India was already the third largest nation in terms of agritech funding and number of agritech start-ups over the past few years

Agritech landscape (2016 to 2020)



Note: CAGR figures are from 2016 to 2020
 Sources: Pitchbook; Tracxn; Bain analysis

Figure 2: In the next few years, we will be at the cusp of massive disruption in the food and agriculture ecosystem globally



Disrupting traditional agriculture

Precision agriculture, agritech services, biotech, marketplaces, farmer services platforms, monitoring and analytics, farm management

For example: DeHaat, Ninjacart, Indigo Agriculture

New farming models and sustainability

Vertical farming/controlled environment agriculture, regenerative agriculture, sustainability services, carbon trading

For example: Plenty, Root AI, Infarm

New food products and uses

Alternative proteins, alternative feed, ocean farming, cell-based food/ingredients, green ammonia/hydrogen

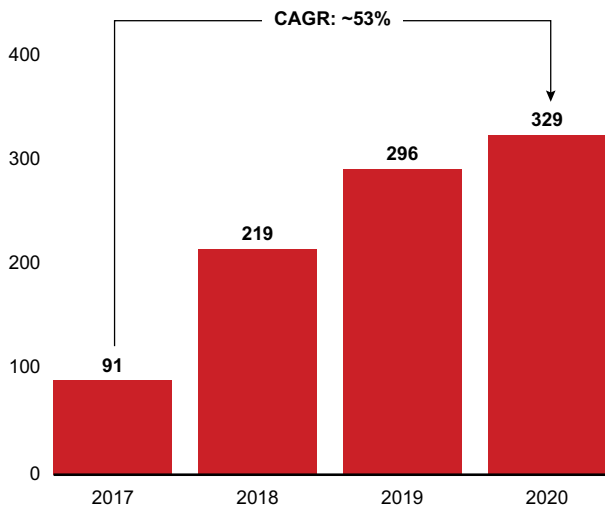
For example: Air Protein, Impossible Foods, Memphis Meats

Source: Bain analysis

Figure 3: As a result of regulatory changes and Covid-19’s impact, agritech will see significant investment and is projected to grow to a \$30B–\$35B market by 2025

Investments in Indian agritech have increased over the past few years; this trend is expected to continue

Private equity/venture capital investments in agritech in India (\$M)



\$30B–\$35B market with e-sales of produce, inputs, and digitally enabled logistics as key segments

		FY19	FY25	Growth
Online offtake	Online grocery buyers (M)	~30	~150	5x
	Average spend per consumer (\$)	~65	~130	2x
	Online offtake market (\$B)	~3	16–18	6x
Online farm inputs	Farm inputs (\$B)	~85	~150	2x
	Online sales penetration	Limited	5%	
	Online farm input market (\$B)	<1	7–8	Nonlinear
Digital logistics	Agri-logistics (\$B)	~50	~100	2x
	Digital penetration	1%–3%	8%–10%	3x
	Digital logistics market (\$B)	~1	7–10	Nonlinear

Sources: Tracxn; Bain PE deals database; Bain analysis

With the scenario above, we believe that there are three key ways for firms across sectors to capitalise on the opportunity to reinvent Indian agriculture by leveraging the technology ecosystem:

- Companies in the agriculture sector could build an integrated agritech platform
- Companies in the agriculture sector could digitally transform internal business processes to adapt to regulatory and technological changes
- Companies in other sectors could exploit the rapidly developing agritech ecosystem through a corporate venture capital centre of excellence (CoE)

Changing regulatory landscape

In September 2020, the parliament passed three bills on agriculture-focused reforms. The first aimed at broadening sales channels other than through the Agriculture Produce Market Committee (APMC), enabling seamless interstate and intra-state movement where farmers are free to sell their produce to anybody, anywhere. The second was a bill on price assurance, which transfers the market risk from the farmer to the sponsor. The third was an amendment to the Essential Commodities Act (ECA) deregulating commodities like cereals, oilseeds, pulses, onions, and potatoes. All these are

intended to encourage investment in direct farmer purchase by corporates (without APMC tax), free movement of food items from production to consumption centres, and private investment in storage. When the above three reforms come into operation, there will be a host of new business opportunities.

Digital disruptions

Even though technology is in its early stages in the industry, it is driving innovations in a variety of ways throughout the agricultural value chain. Large farms have adopted automation and mechanisation of operations, and data-backed services across the value chain are leading to positive outcomes. For example, insurance, credit rating, and loans are contributing to increased funding for this sector. In farming activities, weather prediction and smart crop management are leading to higher output while sensors and the Internet of Things are enabling better tracking and visibility of farming activities. Direct sourcing, demand forecasting, and inventory management are fuelling agricultural produce sales. Digital engagement is promoting the 'uberisation' of services, creating online communities and marketplaces and even driving e-commerce. Vertical farming and controlled environment agriculture are leading to regenerative agriculture, sustainability services, and carbon trading. The consumption pattern is also changing to alternative proteins, alternative feed, ocean farming, cell-based food and ingredients, and the use of green ammonia and hydrogen.

Additionally, firms can save 5% to 10% or more on procurement costs of food items through a concerted national strategy (see Figure 4). The APMC reforms will enable corporates to buy directly from the farmer. The ECA reform incentivises investment in storage and transportation infrastructure, resulting in supply chain efficiencies.

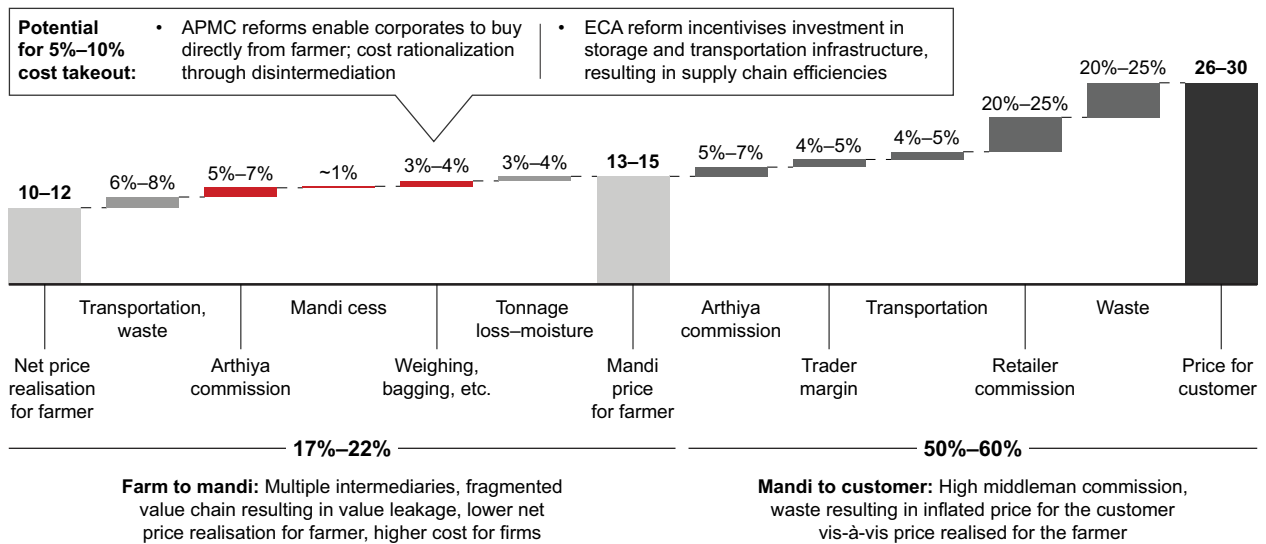
All of the above indicates that we are at the cusp of a massive disruption in the food and agriculture ecosystem over the next few years—despite the fact that Indian agriculture is one of the least digitised industries today. Investments in agritech have increased over the past few years and this trend is expected to continue. Between 2017 and 2020, India received about \$1 billion in agritech funding. The top deals in agriculture were investments into companies like Ninjacart, AgroStar, Mahyco Grow, Husk, WayCool Foods and Products, Jumbotail, Vahdam, and DeHaat (Green AgRevolution).

The technology and policy changes will create a market of \$30 billion to \$35 billion in e-sales of produce, farm inputs, and digital logistics for agricultural products. We are at a key moment when we can leapfrog from the traditional methods to a new, technology-friendly way of growing, processing, and selling food. While the traditional form of agriculture will be completely disrupted and overhauled, significant value is likely to be created in new value pools across the agricultural value chain.

Indian Agriculture: Ripe for Disruption

Figure 4: Firms and corporations can save at least 5%–10%+ in food item procurement costs through a concerted national procurement strategy

Value leakage across agriculture supply chain (INR/Kg)
Illustrative perishable commodity



Note: Costs indicated are illustrative
Sources: Industry experts; market participant interviews; Bain analysis

An agritech company’s path to digital transformation

An illustration of how a large agriculture firm transformed itself would be useful at this stage. When the change management process began, the company had multiple subscale digital initiatives. There was lack of a digital innovation agenda to leapfrog competition, the approach towards prioritisation of initiatives was unclear, and in-house digital talent and capabilities were limited. Finally, there was no concrete approach for orchestrating a comprehensive digital programme.

In this environment, the firm decided to follow a digital transformation process. Over time, it has scaled multiple global digital initiatives to improve its supply chain and customer experience.

The first transformation involved setting up a digital buying platform that connects thousands of farmers directly with the company to enable traceability, price transparency, and the ability to capture data on sustainability. It connected close to 40,000 farmers on the platform.

The second transformation involved setting up the Farmer Information System (FIS), which uses handheld devices to capture rich data from farmers on farm size, location, crops, infrastructure, and eco-support systems.

The third was a traceability programme run through an application in which suppliers can register farmers they buy from in return for a small premium, record farmer transactions and crop information, and trace deliveries.

Fourth, the firm implemented a digital warehouse solution in which warehouses that are digitally enhanced house goods or lots that are tagged with identifiers that can be read by mobile devices.

Next, digital customer engagement can now be achieved through an online self-service portal that allows customers to research products, place orders, view order history, produce traceability data, and track delivery status. This can have the biggest impact for small and midsize businesses globally.

Finally, through big data analytics, algorithms were designed to analyse images produced by aerial vehicles that fly over plantations to ascertain weather conditions and collect agronomical data. This helps to improve precision farming and reduce labour.

How can companies leverage the impending developments in the agritech ecosystem across the value chain?

At the macro level, there are three potential plays for companies in the agritech ecosystem. The first involves setting up an integrated agritech platform by bringing together all the offerings across the value chain and providing a future-ready, end-to-end platform. The second play is to set up a CoE and incubation wing for new business models and agritech start-ups through strategic investments and partnerships. The third play is to digitally reinvent current businesses by identifying priority use cases across the value chain that would complement the current businesses and capabilities. With greater regulatory and technological advances on the anvil, it is critical to plan now to stay ahead of the competition.

Key elements for developing an agritech platform

This backbone of the agritech platform should be built around the strategic bedrock that could comprise multiple themes, such as a digital marketplace, supply chain management, or smart services across the agricultural value chain. Bain believes that the life cycle of building an integrated platform will require sustained investment across multiple phases.

For example, the first phase could involve building the hook to get the farming community onto the platform through, for example, an input marketplace, certification and quality assessment, or smart input management. The second and third phases could comprise contract farming, transportation services, warehousing for non-perishables, and crop insurance services.

That ecosystem could then be expanded to real asset sharing for small farmer ecosystems via pay-for-use mechanised sowing and harvesting, a national produce and product (perishables) marketplace, export trading of produce, and data-backed long-term loans with customised credit terms.

The holistic digital platform at this stage would therefore include e-trading and an online marketplace; seamless supply chains; and smart farming and data-backed advice on risks and mitigation steps, such as short-term weather and long-term soil condition predictions.

The seeds of growth

The future of agriculture is very important to India's development, its policy planners, and other stakeholders. Reforming Indian agriculture is also critical from an environment, sustainability, and climate change perspective. Agricultural marketing reforms started in 2003, but the pace of transformation across the value chain only gathered steam in the past few years.

But we have only touched the tip of the iceberg. Companies and farmers are vital components in this value chain—one complements the other. We will be able to lift millions of farmers from subsistence farming and poverty, allowing them to become wealth creators. Increasingly, many young entrepreneurs are entering the agriculture start-up space. Adopting technology-friendly practices across the agricultural value chain is critical to transforming this critical sector of India's economy.

The Indian agricultural sector is at the cusp of a significant disruption based on technology, regulation, and investment. Companies need to be ready to address the challenges in this journey of change while exploiting the opportunity it represents over the coming years. We will see significant value being created in the sector, and this is the best time for companies to invest and build capabilities to exploit the opportunities that lie ahead.

Indian Agriculture: Ripe for Disruption

Bold ideas. Bold teams. Extraordinary results.

Bain & Company is a global consultancy that helps the world's most ambitious change makers define the future.

Across 59 offices in 37 countries, we work alongside our clients as one team with a shared ambition to achieve extraordinary results, outperform the competition, and redefine industries. We complement our tailored, integrated expertise with a vibrant ecosystem of digital innovators to deliver better, faster, and more enduring outcomes. Our 10-year commitment to invest more than \$1 billion in pro bono services brings our talent, expertise and insight to organizations tackling today's urgent challenges in education, racial equity, social justice, economic development, and the environment. Since our founding in 1973, we have measured our success by the success of our clients, and we proudly maintain the highest level of client advocacy in the industry.



For more information, visit www.bain.com

AMSTERDAM • ATLANTA • BANGKOK • BEIJING • BENGALURU • BERLIN • BOGOTÁ • BOSTON • BRUSSELS • BUENOS AIRES • CHICAGO • COPENHAGEN • DALLAS
DOHA • DUBAI • DÜSSELDORF • FRANKFURT • HELSINKI • HONG KONG • HOUSTON • ISTANBUL • JAKARTA • JOHANNESBURG • KUALA LUMPUR • KYIV • LAGOS
LONDON • LOS ANGELES • MADRID • MELBOURNE • MEXICO CITY • MILAN • MINNEAPOLIS • MOSCOW • MUMBAI • MUNICH • NEW DELHI • NEW YORK • OSLO
PALO ALTO • PARIS • PERTH • RIO DE JANEIRO • RIYADH • ROME • SAN FRANCISCO • SANTIAGO • SÃO PAULO • SEATTLE • SEOUL • SHANGHAI • SINGAPORE
STOCKHOLM • SYDNEY • TOKYO • TORONTO • WARSAW • WASHINGTON, DC • ZURICH