India’s Unfolding Agri-Tech Story

Updates and emerging themes in India's agricultural technology sector

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Abstract

Since the release of FSG’s report What's Next for Indian Agri-Tech? in September 2022, the global funding winter has continued to affect the investment climate in the country. While FY22 saw a boom in agri-tech start-up investments, which drove valuations to unprecedented heights, there has been a correction in FY23, owing primarily to global interest rate hikes and increased investor caution, leading to a more prudent investment climate.

This report presents the latest investment trends from FY22 and FY23, including insights split by stage of the agri-value chain, investment round, and key investors. The report also covers the investment/ M&A activity of start-ups and traditional agriculture companies over the last five years.

The update includes a special focus on the recent rise in adoption of sustainable solutions and climate-smart agriculture, and its drivers. The impact of recent policy measures taken by the government to foster a conducive agribusiness environment, as well as a forward-looking view of the government’s agriculture policy, is also covered in a dedicated analysis.

Investment trends in Indian agri-tech

India's agri-tech sector witnessed an investment boom in FY22, its most successful year attracting venture capital funding, with investments totaling US$ 1,279 million. This surge was followed by a sharp contraction in FY23, a trend aligned with the broader global slump in agri-tech investments (See Figure 1). Between FY22 and FY23, investments in Indian agri-tech fell by a staggering 45% to US$ 706 million, while global agri-tech investments saw a decline of 10% from US$ 19.6 billion to US$ 17.7 billion between calendar years 2022 and 2023.

There are several contributing factors for this slump, chiefly the hike in global interest rates and an increase in investor caution due to rising uncertainty. After keeping interest rates anchored near zero since the beginning of the COVID-19 pandemic, the US Federal Reserve raised interest rates nine times between March 2022 and March 2023 to counter rising inflation, reducing the capacity and appetite of VC funds for investing. Additionally, investors kept their purse strings tight in FY23, stockpiling a massive amount of dry powder, in response to the volatile market conditions created by economic uncertainties and geopolitical tensions.1 Domestic VC firms have been particularly cautious in investing their capital, and this trend has continued into FY24 as well. According to a recent survey of ~70 active VC firms in India, as of August 2023, Indian VCs have only invested 26% of the capital they have accumulated and allocated for FY24.2

1 Kaushal, B., 2023. Late-stage funding in Indian start-ups sees 52% decline in CY22; VCs sitting on $590 bn dry powder globally. Business Today, 16 January
The mid-stream agri-tech category has consistently had higher ticket sizes when compared with upstream start-ups. The most prominent output linkage players in this category (e.g., Ninjacart, WayCool) raised significantly large amounts in funding in FY20 when investors saw a spike in demand for such models (e.g., B2B marketplaces for vegetables) in the immediate aftermath of the COVID-19 lockdowns.

In an encouraging trend, start-ups operating in the mid-stream category are now starting to mature. The bulk of investments (~75%) in this space are now in growth (Series B and C) and late (Series D+) stages. For example, 56% of investments in start-ups focusing on output linkages and quality management were in their growth and late stages. The corresponding figure for other mid-stream start-ups, such as those offering agri-carbon or agri-fintech solutions, was as high as 91% (See Figure 2).

Mid-stream tech start-ups have also begun to expand inorganically. For example, in FY22, agri-commerce and agri-finance player Samunnati acquired Kamatan, a producer and supplier of agricultural products. WayCool, launched in 2015 to provide output-market linkages through B2B sales of fresh produce, has gradually begun moving upstream since 2020. In FY22, it acquired GramworkX, an IoT- and AI-enabled farm resource management tool provider. In FY23, Arya.ag acquired Prakshep, a provider of AI-based satellite imagery solutions for agribusinesses (See Figure 5).

While the upstream agri-tech category has seen a sharp rise in total investments over the last two years, early-stage deals (pre-seed to Series A) continue to be the dominant investment stage in this category, accounting for ~50% of total investment. Upstream funding has increased from 17% of investments across the value chain in 2020 (US$ 54 Mn of US$ 312 Mn) to 58% in 2022 (US$ 743 Mn of US$ 1,279 Mn), and now constitutes 44% in 2023 (US$ 310 Mn of US$ 706 Mn) (See Figure 3). However, upstream agri-tech start-ups focusing on input and equipment linkages or in-farm solutions have significantly smaller deal sizes of US$ 2 million and US$ 3 million, respectively. In fact, for in-farm solutions, only five deals (three for Ecozen and two for CropIn) are in the growth stage, while 24 deals (e.g., Fasal, InDrones, Fyllo, BharatAgri) are early-stage or debt deals.
Over the last two years, **the Indian agri-tech space has also seen significant new investment by several non-traditional investors and alternative investment platforms** such as micro venture capitalists and private investment platforms, plugging the fall in investment from traditional investors to a certain extent. These include AngelList, Mumbai Angels, LetsVenture, and Trifecta Capital (See Figure 4).

**Going forward, we expect the funding slump to continue into FY24, before investments spring back in FY25.** In a recent survey of investors, over 50% of respondents said they expect the funding winter to continue for the next 6-12 months\(^3\). Given this context, we expect start-ups to continue focusing on profitability to tide over the next financial year. Investors are likely to continue being cautious, and direct their limited funding toward established business models, such as follow-on funding for companies in the mid-stream agri-tech category and companies with strong unit economics and a clear path to profitability.

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\(^3\) Soni, S., 2023. Funding winter: Investors expect ‘spring’ to return in 6-12 months for startups, says report. Financial Express, 10 August
Traditional agriculture companies have expanded their footprint across the agriculture value chain through inorganic expansion, spin-offs, and pilot projects. For instance, UPL, a crop protection company, launched nurture.farm in 2020 for solutions in Crop Residue Management (CRM), carbon sequestration, and market linkage. Key agrochemical companies, including IFFCO, Rallis India, BASF, and Zuari, invested in developing sustainable inputs and climate-resilient and sustainable seed traits. Coromandel, a crop nutrition company, expanded its retail presence to become the largest agri-retail chain, and Jain Irrigation set up Jain FarmFresh for direct procurement of output from farmers (See Figure 5).

However, over the last two years, several key players announced they would consolidate and streamline their pilot projects and try to re-focus closer to their core business. For instance, UPL announced that in FY23 its nurture.farm platform recorded a revenue of ₹ 72 cr (US$ 8.6 Mn), and a loss of ₹ 284 cr (US$ 34 Mn) at the EBITDA level. In their plans for FY24, UPL has announced that it would strive to reduce EBITDA level loss by 50% through value pricing of services and overheads optimisation. Additionally, UPL has paused its pilots for CRM and carbon sequestration. It will focus on expanding farmer reach, driving higher uptake of farm services, and onboarding more retailers and brands in the online agri-input retail business. Similarly, Mahindra announced in April 2022 that it would be doubling down on resources in the farm equipment business, including product and service offerings, to complement growth in its core business. In keeping with this, in FY23 Mahindra increased its stake in Mitra, a provider of pesticide spraying robots, from 47% to 100%.

We expect this trend to continue into FY24, with traditional companies continuing to adopt a cautious approach. They will likely expand into areas adjacent to their core business line rather than place big bets in new value chain stages where they have limited expertise, resources, and farmer networks.

Note: Of the 140 deals in FY 2023, investor names were disclosed for 131 deals. Angel investors were involved in 52 of these deals (40%), Corporate investors were involved in 68 deals (52%), and Investment Funds were involved in 90 deals (69%). | Source: FSG analysis based on data from Tracxn
Increased focus on sustainable solutions and climate-smart agriculture

In recent years, extreme weather occurrences have become more common across the country, and are disrupting the normal cycle of agricultural activities. Excessive rainfall has been one of the leading causes of crop damage. A case in point is the state of Telangana, where a prolonged wet spell delayed the Rabi season in 2022. Further, untimely precipitation also causes an increase in moisture, providing a conducive environment for pest infestations. Pest attacks on crops in Punjab, for instance, are a direct result of untimely rains and increasing temperatures. Excessive moisture in fields has even led to seed germination failure for numerous farmers across the country, forcing them to re-sow.

Such drastic changes in weather patterns disproportionately affect small and marginal farmers due to their limited capacity to absorb shocks, compared to larger farmers, in terms of access to adequate inputs for cultivation in uncertain climatic conditions, in-farm support, and insurance cover in case of crop failure from climate change.

A majority of farmers now recognize climate change as a serious issue. A recent report found that rain is the top concern for 75% of unirrigated farmers. This study further highlights that 70% of smallholder farmers in the sample had lost 50% or more of a crop due to climate-related issues in the last

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6 Singh, I.S., 2023. India’s Agriculture Is Feeling The Effects Of Extreme Weather Events. The Wire, 14 March
three years. There is cause for serious concern, with recent data published by the World Bank indicating that 25% of Indian agriculture could be at risk due to dropping groundwater levels.

As a heightened awareness of these climate-related challenges grows, farmers have begun realizing the inadequacy of available farm input offerings to address the evolving demands of farming under erratic climatic conditions. Small farmers who started using new categories of chemicals (e.g., weedicides) in the last five years feel their soil has deteriorated ever since. A majority of them reported a deterioration of soil fertility and a major reduction in the earthworm population in their fields.

As a result, sustainable solutions and climate-smart agriculture have emerged as priority considerations in the Indian agri-tech sector, driven by a growing focus on environmental conservation and climate resilience. Recognizing the growing need for farmers to mitigate and adapt to climate risks, agri-tech businesses in India are offering solutions that can bridge the gap between small farmers and climate-resilient agriculture on multiple fronts.

In the category of climate-resilient inputs, companies like Inera, which is backed by Xenesis – the R&D arm of Absolute, offer tailored biological inputs for growers to improve soil quality, plant immunity, disease resistance, pest protection and overall crop health, in a diverse range of agro climatic conditions. Gramophone and Nurture.farm are providing farmers with knowledge and exposure to environmentally friendly and climate-resilient agricultural supplies through their network of on-ground agronomists and retail centres.

When it comes to in-farm solutions, WayCool has partnered with the Indian Institute of Technology-Madras to deliver technological solutions for the seeding and expansion of the Regenerative Agriculture Sustainable Architecture (RASA) tech stack. It will use sensor technology and data science techniques to raise agricultural productivity, minimize waste, and boost farmer income.

Another agri-tech player in this space is Kheyti, which provides a greenhouse-in-a-box solution to enable smallholder farmers to protect their crops from the effects of harsh heat.

To monitor the effects of weather-related changes, DeHaat, Skymet, and WRMS have expanded access to advanced weather monitoring systems to support climate-smart agriculture. DeHaat offers regular weather updates on various agri-based parameters with the forecast for the coming fortnight, helping farmers plan their crop sowing and harvesting in a better manner. Skymet offers weather predictions, agricultural risk evaluations, and tailored guidance to farmers via its platform by harnessing meteorological data, satellite imagery, and sophisticated modeling methods to provide precise and location-specific weather forecasts with actionable insights. Similarly, WRMS offers a climate outlook and weather forecasting service, generating and broadcasting weather forecasts for different time ranges.

Agri-tech businesses are also collaborating with insurance companies to promote farmer enrolment in crop insurance. These platforms, such as WRMS and Gramcover, provide farmers with

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7 The Rockefeller Foundation and The/Nudge Institute, 2023. Climate Change’s Impact on Smallholder Farmers in India, s.l.: s.n
9 The Rockefeller Foundation and The/Nudge Institute, 2023. Climate Change’s Impact on Smallholder Farmers in India, s.l.: s.n
information, advice, and a quick and easy way to obtain insurance coverage to ensure protection from losses incurred from crop failure in the future. With an increased number of cases of seed failure in recent years, agri-tech businesses are now bundling seed germination insurance with the sale of seeds, or offering parametric insurance that protects farmers and seed breeders against losses in seed costs. For example, Upaj by Absolute in collaboration with Digisafe launched the ‘Seed Germination Protection Cover’, wherein farmers receive a predetermined payment if the germination rate of the seed is below a certain threshold.

Policy measures to foster a conducive agribusiness environment

The Indian government is playing a pivotal role as a facilitator of private-sector participation in the agriculture sector. To this end, the government has ushered in various regulatory initiatives and pilot projects to boost agricultural technology and innovation, and nurture a conducive business environment. This facilitative approach involves the rollout of several initiatives aimed at mechanizing farms, diversifying farmer incomes, and achieving self-sufficiency in fertilizer production.

Farm mechanization has become a key part of the government’s agenda over the last two decades. Between 2004 to 2019, there has been a significant reduction (~20 p.p.) in the proportion of working-age population engaged in agriculture, as the youth have continued to migrate to nearby cities for better-paying non-farm jobs. This has led to a labor shortage in the peak sowing/ harvest seasons. To counter this shift, the central government has been continually investing in farm mechanization, providing 50 to 80 percent subsidy to farmers to purchase agricultural machinery and equipment, and establishing Custom Hiring Centers (CHCs) where farmers can rent machinery on a per-hour basis. Additionally, the government is leveraging Farmer Producer Organizations (FPOs) as intermediaries, by offering them subsidies for procuring and renting modern agricultural machinery to farmers.

Farmer income diversification has become a priority area for the government, as focusing solely on a small number of cereal crops has diminished profitability, diverted investment, and stifled growth within the agricultural sector. A key goal of promoting diversification is shifting farmers’ incomes from cyclical to perennial. The government plans to achieve this through several initiatives, including raising the agricultural credit target to ₹ 20 lakh crore (US$ 242 Bn) in FY24 to support farmers in diversifying into animal husbandry, dairy, and fisheries. Additionally, the government has launched schemes to promote the cultivation of horticultural crops, oilseeds and oil palm, pulses, and millets. Benefits under these schemes include subsidies for high-quality inputs, modern machinery, and initiatives to build the value chain for these crops to improve price realization for farmers. In addition to promoting such non-staple lucrative crops, the government has also been placing restrictions on quantities of traditional crops sourced through the public distribution system. It has also limited the increase in MSPs for specific staple crops to discourage excessive production and redirect farmers towards other crops.
With the strategic objective of achieving fertilizer self-sufficiency, the government is also making substantial investments in the production of nano-urea and nano-DAP (Di-Ammonium Phosphate), which have been developed by the Indian Farmers and Fertilizer Cooperative (IFFCO). The aim is to gradually replace the dependence on imported urea with indigenously manufactured nano-urea fertilizers by 2025. The envisioned target is a significant transition from 8.5 million tonnes of conventional urea to 170 million bottles of nano urea. This strategic shift can help promote domestic production and potentially reduce the subsidy bill of nearly ₹ 2.25 lakh crores (US$ 27 Bn) for conventional fertilizers in 2022-23. However, several concerns have been raised regarding the lack of scientific evidence supporting the effectiveness of these fertilizers, and the limited number of trials and data to support their claims.

While its policies so far have primarily focused on farmer income diversification, farm mechanization, and self-sufficiency in fertilizer production, the government has now also begun crafting a forward-looking strategy to empower farmers. This emerging plan focuses on newer themes such as: (a) sustainable agriculture, (b) developing the digital public infrastructure (DPI) for agriculture, and (c) augmenting the effective farm size.

The Union Budget 2023-2024 reflects the government’s commitment to sustainable agriculture, with various initiatives announced around this theme to promote natural farming, reduce reliance on chemical fertilizers, and encourage efficient resource utilization.

The government intends to promote natural farming, which involves utilizing bio-inputs sourced from the local farm and ecosystem, rather than relying on purchased inputs. To this end, the government has set aside ₹ 459 crore (US$ 55.4 Mn) in the annual budget for 2023-24. As per the plans unveiled in the budget, 10 million farmers will be encouraged to take up natural farming over a span of three years, and 10,000 Bio Input Research Centres will be established across the country.

Another recent significant undertaking is the PM-PRANAM Yojana (PM-Programme for Restoration, Awareness, Nourishment, and Amelioration of Mother Earth), which encourages states to decrease reliance on chemical fertilizers in favor of alternative fertilizers by offering them financial incentives to reduce their subsidy bill.

The government has also recently proposed to develop the Green Credit Program. This program will allow individuals, industries, Farmer Producer Organizations (FPOs), Urban Local Bodies (ULBs), gram panchayats, and the private sector to earn tradable green credits for eco-friendly activities like tree planting, water conservation, waste management, and air pollution reduction. These credits can later be sold on a proposed domestic market platform.

Developing the Digital Public Infrastructure (DPI) for agriculture is another key focus area for the government. In recent years, the government has introduced several schemes to support India’s digitization journey for agriculture, such as development of the Agri Stack, digital soil health certificates, eNAM, Agricultural Accelerator Fund, and traceability programs for exports. The government aims to provide the necessary DPIs to start-ups and traditional agriculture companies as an open source, open

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13 Das, P., 2023. Nano-urea will help India save ₹15-20k cr, claims govt. Live Mint, 5 April
14 Singh, S., 2023. India is betting the farm on nano urea. Experts say its science is “dubious”. The Ken, 16 August
15 IndiaBudget.gov.in, 2023. [Online] Available at: https://www.indiabudget.gov.in/
standard, and interoperable public good, to enable them to develop inclusive, farmer-centric solutions leveraging the DPIs.

A pivotal initiative, **Agri Stack**, envisions integrating diverse agricultural data—weather patterns, crop specifics, market dynamics, and more—into a unified platform, offering real-time insights and empowering well-informed decisions.

Additionally, the government aims to capture the **Geographic Information System (GIS)** signature of each farmer’s land parcel, to demarcate farm boundaries and establish a link between land records and subsequent farm-related data. This approach will enable the government and other stakeholders to analyze cropping patterns and provide highly specific inputs and services tailored to the unique needs of each farm, based on their insights.

There is a growing recognition that the current average landholding size per farmer in India is unsustainably small, which leads to lesser productivity of the land, and makes it economically unviable to continue farming in the long run. The government is trying to counter this challenge by working towards collectivization of farmers through the formation of Farmer Producer Organisations (FPOs), and **increasing the effective farm size**. Such collectivization efforts will enhance farmers’ bargaining power, build economies of scale, and thereby increase productivity and economic viability of farming practice. The government is also granting licenses to private firms for undertaking cluster farming. Under this pilot initiative, five private firms have been granted licenses to undertake cluster farming across approximately 50,000 hectares, wherein focus crops have been assigned to each cluster. Each firm would invest ₹ 750 cr (US$ 91 Mn), including a subsidy of up to ₹100 cr (US$ 12 Mn)\(^{16}\) to build the crop value chain in the cluster assigned to them. As a result, farmers in the cluster would be encouraged to grow the assigned crop, enabling the sharing of resources and expertise, enhancing market linkage, and increasing accessibility to improved technology and inputs.

We expect the Government of India to sustain its efforts in digitizing, collectivizing, and mechanizing Indian agriculture.

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\(^{16}\) Anon., 2022. Govt allows 5 Pvt firms for cluster farming in 50,000 hectares with Rs 750cr investment. The Economic Times, 10 April
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