The new agri-tech paradigm

From innovation to integration for a future-ready agriculture in India

November 2025

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Foreword

Manish Singhal
Secretary General,
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Globally, the agriculture sector is witnessing a paradigm shift driven by digital transformation, data-centric decision-making, and a growing emphasis on sustainability. Nations are increasingly leveraging agri-tech innovations to address challenges of climate change, resource scarcity, and food security while ensuring economic inclusivity and environmental resilience.

In India, agriculture is undergoing rapid modernization, moving beyond traditional practices to embrace climate-resilient and technology-enabled solutions. The country's agri-tech ecosystem has expanded significantly, powered by policy reforms, digital infrastructure, and increasing private sector participation. Startups and agri-enterprises are enabling smallholder farmers to adopt precision technologies, access real-time data, and connect with markets more effectively, contributing to higher productivity and income stability.

Key growth drivers such as digital platforms, farm mechanization, AI-led analytics, remote sensing, and blockchain are transforming operations from farm to fork. Equally important is India's focus on sustainability imperatives, promoting efficient resource utilization, renewable energy integration, soil health improvement, and carbon footprint reduction. As global trade and cooperation deepen, Indian exhibitors and agribusinesses can gain immense benefits from exploring new markets, leveraging regional partnerships, and tapping into Free Trade Agreements (FTAs) that facilitate market access, export diversification, and technology exchange.

Accelerating this transformation requires robust public–private partnerships and a thriving innovation ecosystem. India aims to build a sustainable and self-reliant agricultural framework. To support this vision, ASSOCHAM and EY LLP have jointly published 'The new agri-tech paradigm: From innovation to integration for a future-ready agriculture in India'.

This document sets out an agenda for elevating the digital and climate-smart agriculture to the next grade and recommends ideas and strategies that could guide the stakeholders—farmers, businesses, and policymakers—to the sectoral growth that is real and is a positive effect of their work.

We acknowledge the contributions with the highest gratitude to the panel of experts and contributors whose invaluable support made this report possible. We hope the report serves as a guiding light for building an environmentally sustainable, tech-driven, and future-ready agriculture sector for a Viksit Bharat.

Foreword

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India's agriculture sector is undergoing a significant transformation, driven by innovation, policy reforms, and a growing need for climate resilience. Supporting nearly 58%[1] of the population and contributing approximately 18%[2] to the national GDP, agriculture remains central to India's socio-economic landscape. The sector is evolving beyond traditional practices, embracing digitalization, sustainability, and inclusive growth to unlock its potential.

The new wave of agri-tech marks a new chapter in this journey, where innovation is not just an enabler but a strategic imperative. It integrates smart technologies, regenerative models, and data-driven systems across the agricultural value chain. From climate resilient inputs and AI-powered farm management to digital supply chains and circular economy frameworks, India is moving toward a future-ready agricultural ecosystem. These innovations are redefining how food systems are built, scaled, and sustained, enhancing productivity, reducing resource use, and improving market access.

The momentum is strong, but scaling these agri technologies remains a challenge. Agri-tech providers must navigate a highly fragmented user base due to majority of small landholders. Diverse agro-climatic zones, crop patterns, and socio-economic conditions demand hyper localized solutions, making it difficult to achieve consistent product market fit.

India's agri-tech sector stands at a turning point where innovation is abundant, but adoption remains uneven. To move from innovation to integration, structured mechanisms are needed to validate, de-risk, and scale technologies sustainably.

This paper explores India's evolving technology-driven agricultural landscape, its drivers, challenges, and enablers. It highlights key innovations, policy frameworks, and collaborative models that can accelerate adoption and impact. We hope this thought paper inspires meaningful action to build a resilient, inclusive, and future ready agriculture for India.

Executive summary

Indian agriculture is at the threshold of a transformative period where **higher productivity, greater efficiency, deeper inclusivity, and stronger sustainability** must converge to shape the sector's next phase of growth. Contributing nearly **18% to national GDP**[3] and supporting **over half the population**[4], the future of this sector depends on how effectively innovation and technology can be integrated to build resilient, profitable, and inclusive systems. This transformation represents a shift from fragmented innovation toward integrated, scalable, and sustainable agricultural modernization.

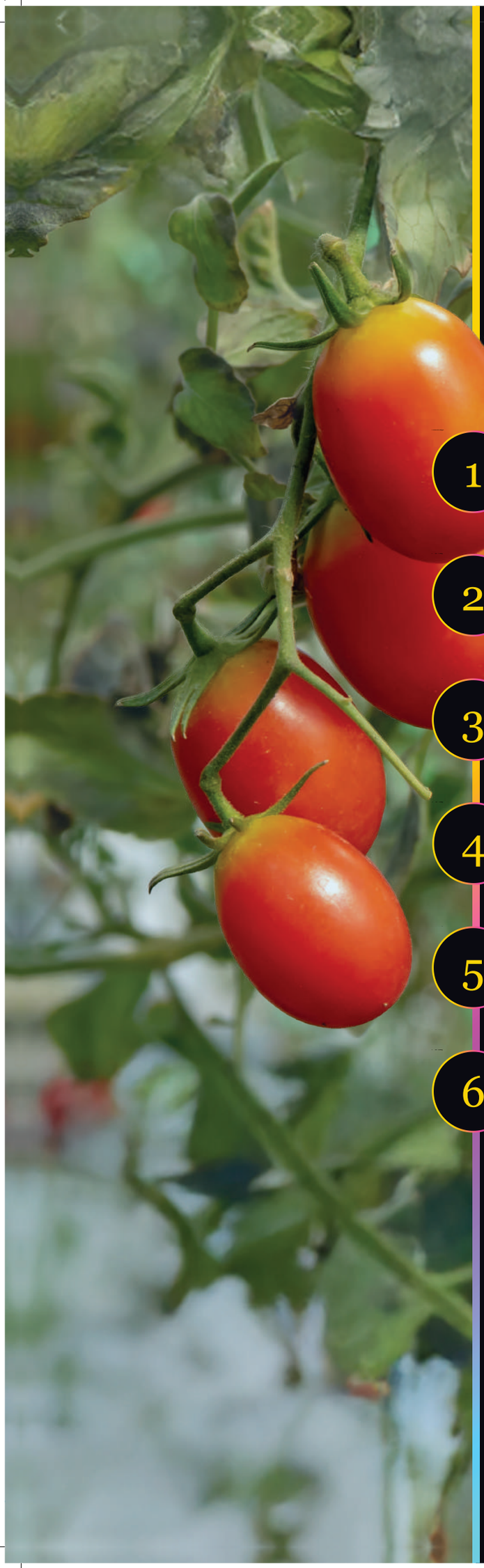
The new agri-tech paradigm embodies a future ready approach to Indian agriculture, **powered by digitalization, advanced technologies, and collaborative ecosystems**. India's agri-tech landscape is rapidly evolving, with startups reimagining input systems, precision farming, supply chain transparency, and circular economy models. Technologies like AI, IoT, robotics, and blockchain are redefining how food is produced, managed, and marketed, improving yields, optimizing inputs and reducing costs. Parallelly, the growth of innovations in bio-based inputs, waste-to-value models are positioning agriculture as a key pillar in India's circular and low carbon economy.

This transformation is being accelerated by **three core enablers. First, India's Agricultural Digital Public Infrastructure**, including AgriStack, Krishi Decision Support System (DSS), Virtually Integrated System to Access Agricultural Resources (VISTAAR), Open Network for Digital Commerce (ONDC), are building digital rails that streamline service delivery and innovation development. **Second, a vibrant agri-innovation ecosystem** comprising over **7,000 agri-startups** and multiple incubators is nurturing next-generation solutions[5]. **Third, rising capital inflows**, over **US$1.28 billion in FY22**[6], reflect investor confidence in India's agri-tech potential, particularly in supply chain and digital marketplace solutions. Together, these forces are creating the foundation for systemic, scalable, and inclusive agri-tech growth.

However, the path to scale remains constrained by persistent barriers. Agri-tech providers face structural challenges around **affordability, financial access, institutional coordination, and last-mile delivery**. The ecosystem faces limited integration between technology developers and end users, insufficient convergence between public and private institutions, and data systems that are not yet interoperable or easily accessible. Strengthening these linkages and aligning incentives across stakeholders would be essential for allowing innovation to translate into broad-based adoption and measurable impact.

To unlock the next wave of agri-tech growth, **three strategic pathways** are critical. First, **state-level agri-tech sandboxes** could be established as collaborative testbeds for validating and scaling technologies in real world settings. Second, **common data protocols and interoperable digital frameworks** must be advanced to enable secure, seamless data exchange and build intelligence across systems. Third, **new-age business models**, including service-based solutions, community-led delivery, and outcome-linked financing, could redefine how agri-tech solutions reach farmers, enabling inclusion and profitability to go together.

The new wave of agri-tech thus represents more than a technological evolution, it signals a systemic integration of innovation, institutions, and digital infrastructure to create a resilient, inclusive, and sustainable agricultural future. By embedding collaboration, open innovation, and data intelligence at its core, India can move from innovation to integration, transforming its agriculture into a globally competitive, climate smart, and a future ready ecosystem.



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The need for a new **agri-tech paradigm in Indian agriculture**

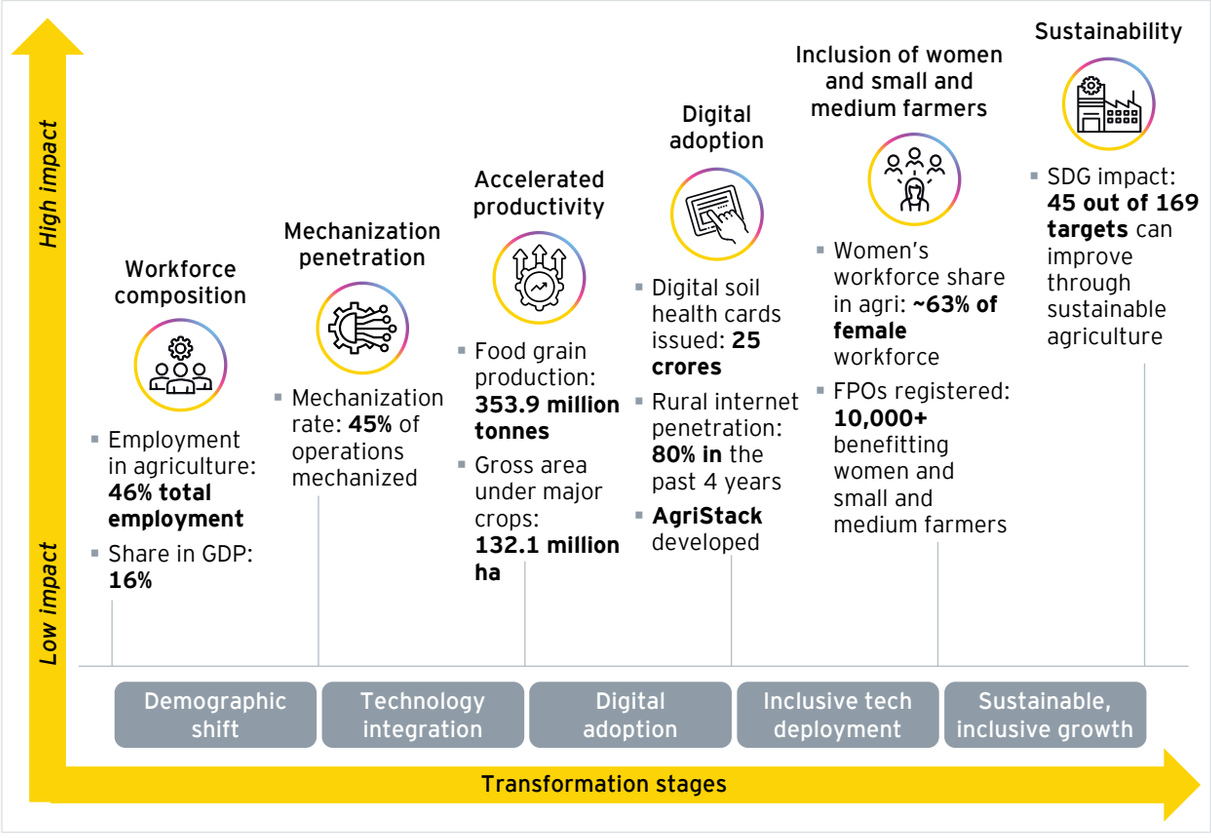
The evolving landscape of Indian agriculture

India's agriculture sector today stands transformed through concerted government efforts, targeted innovations, and comprehensive reforms

Supporting **nearly 58%[7] of the population and** contributing approximately **18%[8] to the national GDP**, the sector has evolved beyond traditional practices, achieving record production levels, diversifying into high value commodities, and expanding its export basket. The sector's evolution is underpinned by strategic policy reforms, institutional support, and a surge in agri innovation. Digital technologies, precision agriculture, and data driven platforms are increasingly intersecting with traditional systems, enhancing efficiency, resilience, and inclusivity.

This transformation is progressing *(Figure 1)* through distinct stages from shifting workforce composition supported by growing mechanization, digital inclusion and sustainable growth.

Figure 1: India's agriculture journey through innovation and inclusion[9]

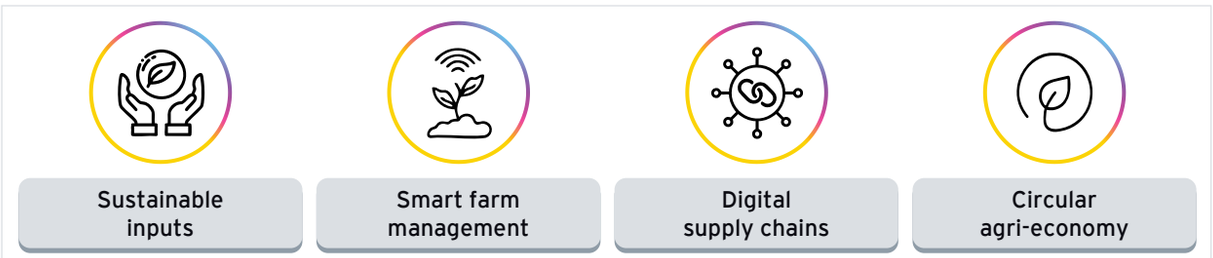


The cumulative impact of recent shifts has created fertile ground for a more innovative, sustainable, inclusive and future-ready agriculture sector.

The next frontier of agricultural innovation is pivotal to realizing India's US$1 trillion agriculture vision[10], driven by smart, inclusive, and sustainable innovations that transform the sector's future

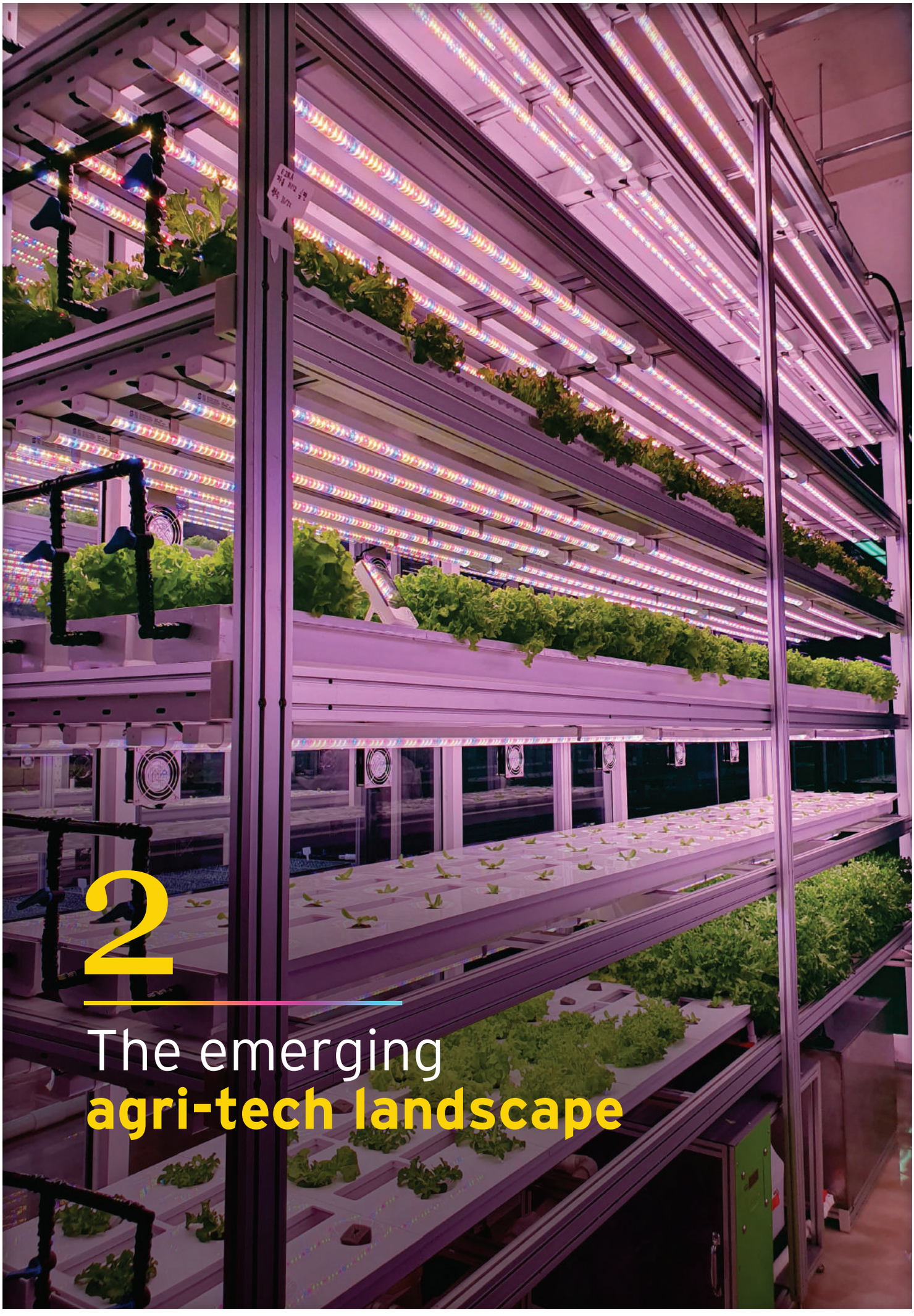
The next chapter of transformation is rooted in deepening and scaling innovations. A future focused agri-tech would include climate resilience, long-term sustainability, inclusive growth, and regenerative economic models as illustrated in *Figure 2*.

Figure 2: The new agri-tech paradigm: Key areas



India's push toward agri-tech is motivated by four interconnected, high-impact drivers which are shaped by data driven insights into evolving consumer preferences and opportunities for climate-smart and sustainable growth.

Source: Data derived from published research, field trials and reports, including ScienceDirect, World Economic Forum, NITI Aayog, NCCD analysis and others. Figures are subject to regional variability; Detailed references are cited in the endnotes[11]



2

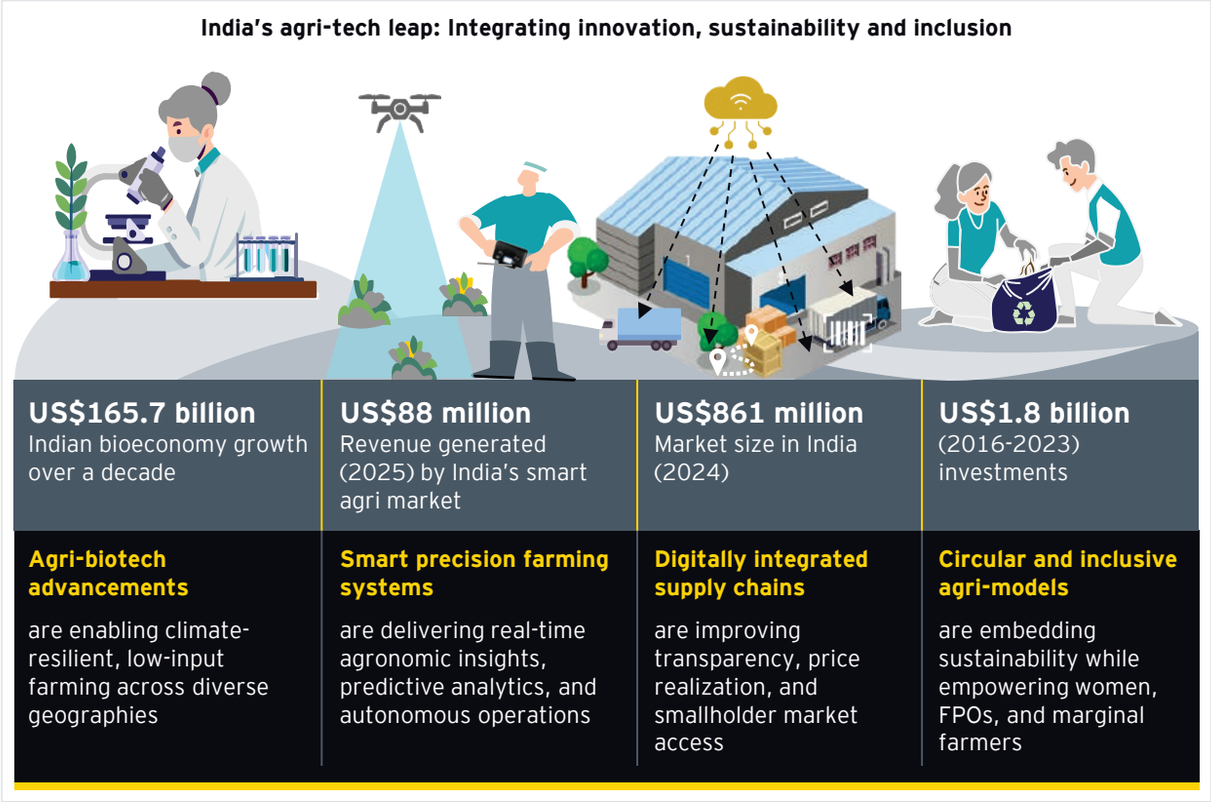
The emerging **agri-tech landscape**

The new wave of agri-tech is reshaping India's agricultural landscape through convergence of data-driven innovations, sustainable input systems, and digital value chain governance, driving a climate-resilient, technology-enabled, and an inclusive agri-economy

It moves beyond incremental improvements to create an integrated ecosystem where AI-powered analytics, climate smart practices, and blockchain-enabled supply chains work together. This focuses on resilience, inclusivity, and scalability, redefining how food systems are produced, distributed, and sustained in a resource conscious, technology ecosystem.

This transformation is creating new opportunities for agri-tech entrepreneurship, promoting climate smart practices, and enabling data-driven policymaking while positioning agriculture as a dynamic engine of inclusive growth and progress.

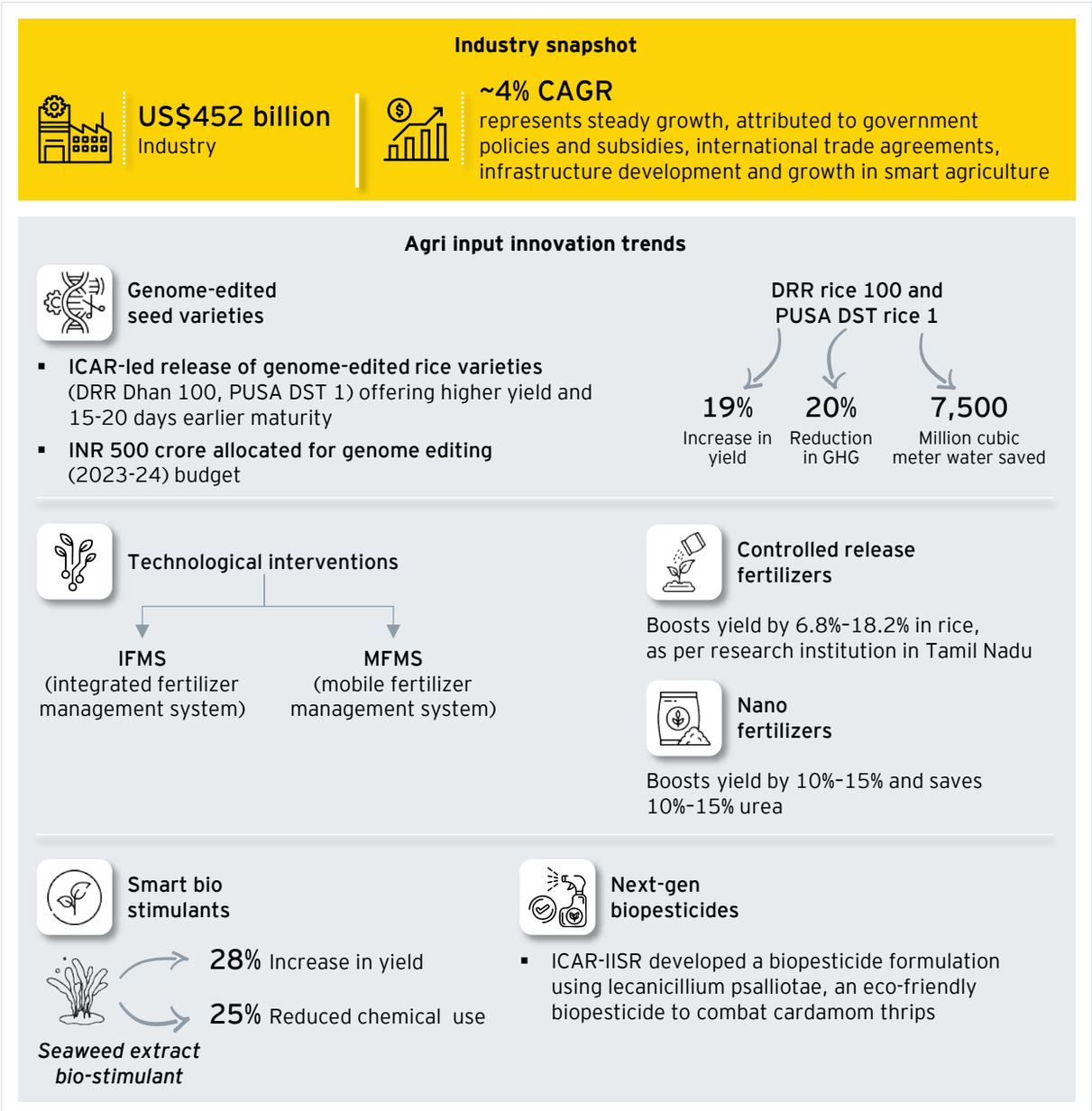
Figure 3: Evolving landscape of agri-tech[12]



Sustainable inputs including advanced seed technologies and eco-friendly agro-chemicals are emerging as key enablers of climate resilience and productivity, driving a shift toward more adaptive and sustainable farming systems

India's agri future is being shaped by genomics, gene editing, and bio-enhanced inputs that enhance productivity while building a climate-resilient sustainable farming ecosystem.

Figure 4: Key Advancements in Agri input industry



Sources: Data derived from published research, field trials and reports, including ICAR, Dept. of Fertilizers, IFFCO and others; Figures are subject to regional variability; Detailed references are cited in the endnotes [13]

Innovations in farm management are setting new benchmarks for precision, enabling data-led decision-making, optimized resource use, and enhanced operational efficiency

India's agricultural operations are being revolutionized by **IoT-enabled monitoring**, **AI-driven advisory**, and **robotic automation**, moving towards a new era of **precision, efficiency, and scalability**. With growing IoT adoption (27%–37%[14]), **83 lakh ha**[15] under smart irrigation, and **15,000+ drone-operating women SHGs**[16], technologies like **AI pest detection**, **drone-assisted spraying**, and **sensor-guided harvesting** are delivering **up to 20% increase in crop yield and a 40% reduction in water and fertilizer usage**[17]**.** The key innovations in farm management are illustrated in *Figure 5*, shaping how India grows, manages, and harvests its crops.

Figure 5: Key Advancements in Farm Management

Smart farm innovation trends

1. **Land prep**
   Soil sensors for pH, moisture, Electrical Conductivity (EC) ; Geographic Information System (GIS) mapping; smart tillers
2. **Input**
   AI-based crop recommendation; GPS-guided seeders
3. **Nutrient management**
   Automated dosing via fertigation; IoT-release; drone-based spraying
4. **Water management**
   IoT soil moisture probes; wireless valve actuators; predictive AI irrigation
5. **Weed detection**
   AI smartphone weed ID, drone scouting, robotic weeders
6. **Crop growth**
   In-field multi-spectral cameras; satellite Normalized Difference Vegetation Index (NDVI)/analytics
7. **Microclimate control**
   IoT climate sensors, hydroponics, climate automation
8. **Harvest**
   AI harvest timing/logistics, drone yield estimation
9. **Post harvest**
   Mobile imaging for quality grading, AI sorting
10. **Resource optimization**
    Integrated dashboards, AI monthly analytics

Digitalization of supply chain and markets with emerging traceability innovations is optimizing the agricultural value chain, enabling real-time data capture, product authentication, and end-to-end visibility

Seamless integration of blockchain, e-market platforms, and real-time quality grading is transforming India's agri value chain, enhancing product credibility, accelerating transactions, and unlocking premium market access.

Figure 6: Key innovations in agri supply chain

Agri supply chain innovation trends

Areas	Technology	Evolving scenario
Blockchain and record creation	▪ Blockchain platforms creating tamper-proof records ▪ QR/barcode tagging of crop lots	▪ Pilot use by over 500 plots in spice (chilli, cumin) value chains; expanding to cotton and oilseed traceability
Cold chain and logistics monitoring	▪ GPS-enabled transport tracking ▪ IoT sensors monitoring temperature, humidity; blockchain logging	▪ Cold Chain Infrastructure remains limited but total opportunity for CCI deployment of US$19.1 billion by 2030 ▪ 15%–20% reduction in spoilage
Digital warehousing and inventory systems	▪ IoT-enabled warehousing with environment sensors ▪ Blockchain-based receipt and lien issuance	▪ Over 10,727 warehouses digitized supporting US$2,045 million collateralized credit
Digital marketplaces and supply chain integration	▪ Digital platforms with logistics optimization and transparent transaction recording	▪ 17.5 million farmers digitally linked to marketplaces with improved pricing transparency
Consumer-level transparency and QR code access	▪ QR/barcode scanning for product provenance accessed by consumers	▪ Rising adoption of QR and barcode-enabled digital provenance systems for farm-to-market agricultural products

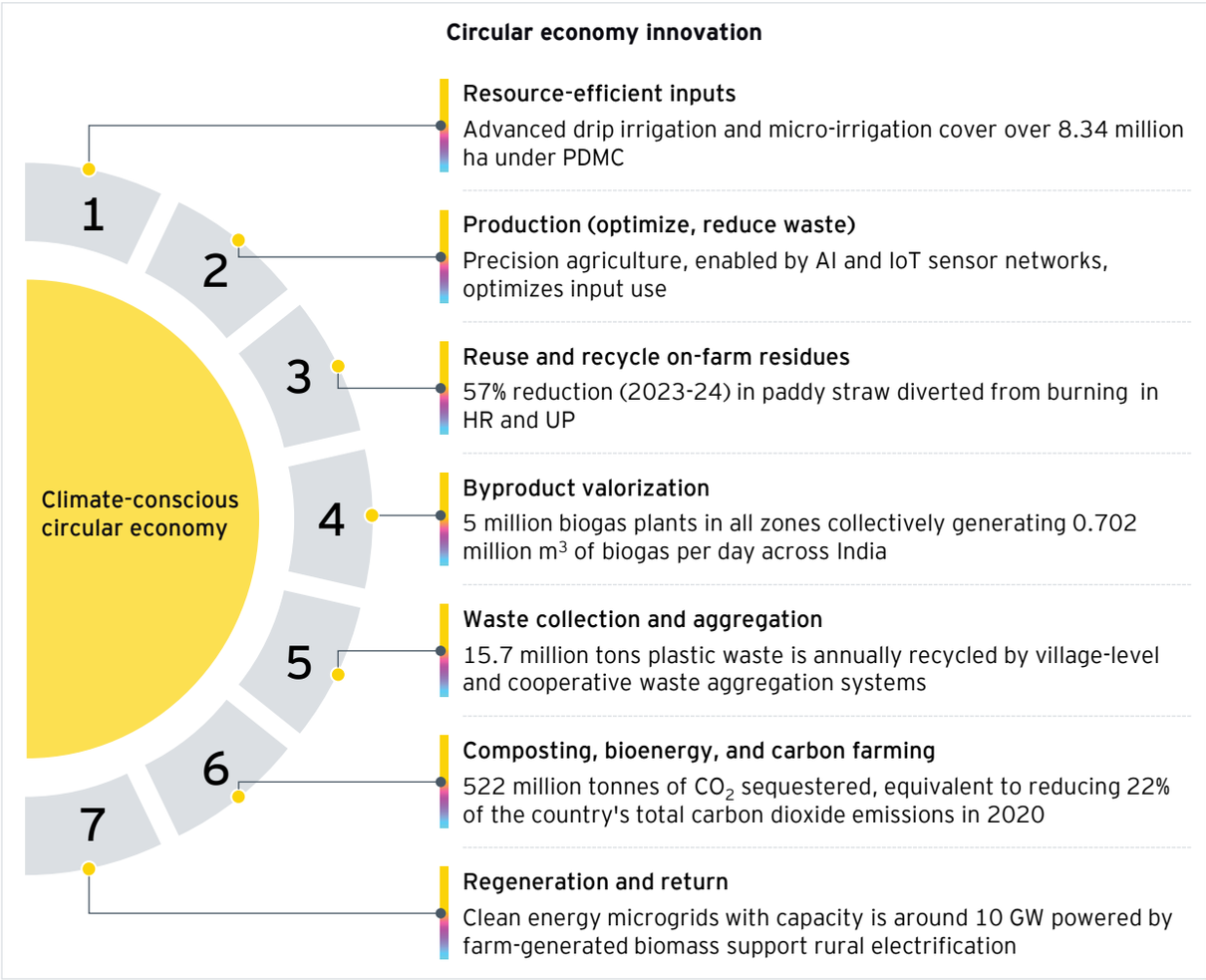
Source: Data derived from published research, field trials and reports, including Department of Food and Public Distribution, PIB, ScienceDirect, and others; Figures are subject to regional variability; Detailed references cited in endnotes[18]

India's circular economy in agriculture is advancing through government-backed initiatives that emphasize sustainability, resource efficiency, and climate resilience

Currently, India has more than **5 million biogas plants in all zones collectively generating 0.7 million m^3** of biogas per day converting crop residues into renewable energy and organic fertilizers. Additionally, India has 22 bio-CNG plants producing 84,759 kg per day of compressed biogas and 201 waste plants generating 330.9 MW of electricity. By some estimates, excess biomass can fully satisfy energy requirements in 39% of districts if used locally. Integrating animal waste with this excess can generate 3,011 TJ day−1, meeting over 100% of energy needs in 55.6% of rural areas[19].

As illustrated in *Figure 7*, India's circular economy framework positions agriculture as a key driver of resource efficiency, low emissions, and inclusive growth aligned with national climate goals.

Figure 7: Innovations in Circular Economy[20]



These emerging trends signal a promising future for Indian agri-tech and are being further accelerated by India's strong policy momentum and digital push.

3

Key enablers transforming the **agri-tech ecosystem**

India's agri-tech transformation is being driven by the convergence of digital infrastructure, a vibrant innovation ecosystem, and rising capital inflows

India's agri-tech landscape is rapidly evolving, characterized by the emergence of cutting-edge, new-age solutions that addresses diverse user needs across the value chain, as outlined in the previous chapter.

This evolution is **set on three foundational enablers: open digital systems, innovation ecosystem, and capital-enabled scale**, that are converging to shape the sector's future trajectory.

Together, these enablers are bridging the gap between technology development and their sustained commercialization at scale. This synergy is expected to transform India's agri-tech sector into its next phase of systemic, scalable, and inclusive growth.

1. Digital Public Infrastructure: Building digital rails for the next agri-tech wave

India's agricultural transformation is being redefined by Digital Public Infrastructure (DPIs), foundational digital systems serving as the 'rails' for innovation and efficient service delivery. Through the **Digital Agriculture Mission**, digital systems such as **AgriStack, Krishi DSS, VISTAAR, ONDC** and others are functioning as shared digital public goods.

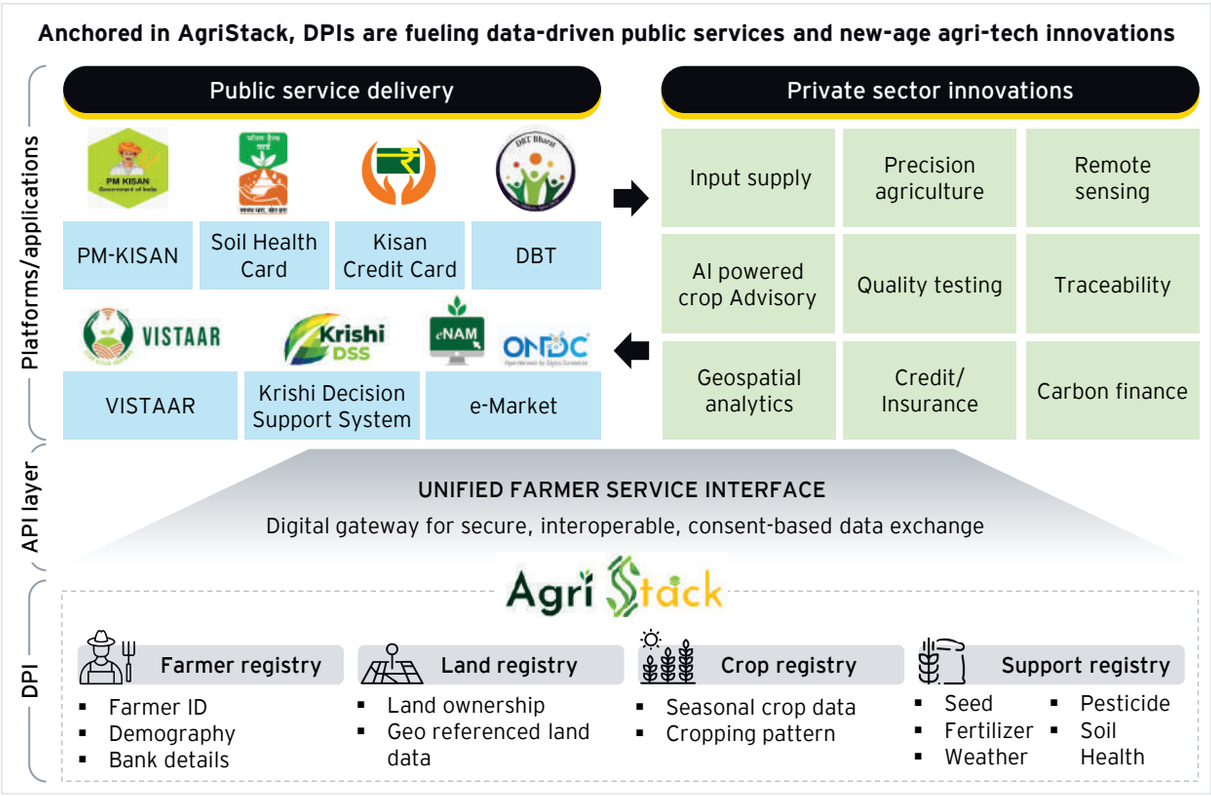
Designed on **open standards**, these systems enable **data interoperability, secure exchange, and plug-and-play innovation** across government and private players.

The digital agriculture push is streamlining public services and turning agri-tech startups into engines of growth and innovation

At its core, **AgriStack integrates farmer, land and crop data** under a unified, consent-driven architecture. Complementary platforms, **Unified Farmer Interface Service (UFIS) for secure data exchange, Krishi DSS for real-time analytics, and VISTAAR for digital extension**, collectively create a decentralized ecosystem where data becomes a shared public asset. *Figure 8* shows how AgriStack-anchored digital agriculture ecosystem is driving public service delivery and innovations.

This digital backbone gives startups access to **verified, high-quality datasets and APIs** that were earlier inaccessible, **enabling faster, low-cost development of innovations** across the value chain.

Figure 8: India's agriculture digital ecosystem pushing innovations



Centre for Research on Start-ups and Risk Financing at IIT Madras, in collaboration with the Ministry of Agriculture, is integrating a database of 12,000+ agri startups into the VISTAAR platform. This integration would enable farmers and extension to seamlessly access verified startup solutions across crop management, input optimization, and market linkages.[21]

DPIs are a game changer for agri-tech startups that can now plug into open, verified, and low-cost public data ecosystems to scale their innovations

Instead of building proprietary data systems, startups can now **develop on top of public digital data and** integrate with AgriStack, VISTAAR, ONDC and others to train AI models, **deliver hyper-local advisories, automate credit and insurance, and build digital marketplaces** with traceability and trust. This 'public-private data collaboration' model enables innovation to scale inclusively, empowering both smallholders and agri-tech startups through a common digital backbone.

Figure 9 illustrates key use cases of DPIs across key agricultural domains, ranging from digital agronomy and post-harvest to market and supply chain systems, showcasing how integrated digital frameworks enable smarter, data-driven, and scalable agri-tech solutions.

Figure 9: Key use cases for DPI-enabled solutions

Area	DPI integration	Use cases
Digital agronomy	AgriStack + Krishi DSS + VISTAAR + IoT and Drone APIs	▪ AI-based crop and pest monitoring using real-time soil and weather data ▪ Hyper-local and personalized advisories through digital extension interfaces ▪ Precision nutrient and irrigation leveraging sensor data
Post harvest intelligence	AgriStack + IoT + Computer Vision + ONDC	▪ AI and computer vision for grading and quality certification ▪ Blockchain traceability systems ▪ Quality-linked trade and digital warehouse receipt mechanisms
Market and supply chain	AgriStack + ONDC + IoT registries	▪ Open digital marketplaces connecting farmers, FPOs, and institutional buyers ▪ Input e-commerce platforms for traceable agri-input supply ▪ End-to-end supply chain visibility, logistics coordination, and real-time price dissemination
Agri-fintech	AgriStack + Credit APIs	▪ Automated KCC and crop-loan underwriting using verified farmer and land data ▪ Parametric and index-based insurance claim settlement ▪ Data-driven credit scoring, risk profiling, and embedded finance solutions

Figures 10 and *11* highlight state-led digital initiatives, UP FPO Shakti Portal and Project on Climate Resilient Agriculture (PoCRA), which demonstrate how digital platforms are driving agri-tech adoption and enhancing service delivery in Uttar Pradesh and Maharashtra, respectively.

Figure 10: Case study of UP FPO Shakti portal

Case study

UP FPO Shakti portal: A digital governance platform for FPOs in Uttar Pradesh

Challenges	Initiative	Key digital systems	Outcomes
▪ Low collaboration among FPO and stakeholders in UP ▪ Limited agri-tech adoption ▪ Information gap on government services ▪ Weak private sector collaboration	▪ UP FPO Shakti portal developed by Govt. of Uttar Pradesh in collaboration with Gates Foundation ▪ Serves as a one-stop digital platform for all FPO ecosystem actors for collaboration and seamless digital governance	▪ Seed Information System for digitized seed supply chain ▪ Unified agri-tech startup webspaces ▪ Agri-tech benchmarking ▪ Agri-tech automated promotion (digital connects for field demos, dealerships) ▪ E-Resource centre for FPO digital trainings	▪ 2 million farmers reached for government services across ~4,000 FPOs ▪ INR 29 crore+ FPO revenue through 350+ market linkages ▪ 25+ agri-tech adopted by 2 lakh farmers ▪ 14+ departments converged for service delivery

Figure 11: Case study of Project on Climate Resilient Agriculture (PoCRA)

Case study

PoCRA : Digital system for climate resilient agriculture in Maharashtra

Challenges	Initiative	Key digital systems	Outcomes
▪ Climate vulnerability of smallholder farmers ▪ Inadequate data driven planning ▪ Low access to govt. services for climate resilient farming ▪ Insufficient agri-extension for climate adaptation	▪ Govt. of Maharashtra in collaboration with World Bank under Project on Climate Resilient Agriculture (PoCRA) developed a digital platform for driving climate resilient agriculture in the state.	▪ DBT platform for direct financial assistance ▪ GIS based village planning system ▪ Weather advisory and warning system ▪ Farm Field School app for training management	▪ Increased financial benefit reach through DBT account ▪ Precise weather advisory ▪ Improved water use through water budgeting ▪ Wider and targeted extension reach

DPI-enabled digital solutions could unlock US$65 billion additional value by 2030

According to the **Ministry of Electronics and IT (MeitY)**, DPI-enabled digital solutions can potentially generate over US$65 billion *(Figure 12)* in additional value driven by public and private sector advances in digital finance, precision farming, and agri-marketplace efficiencies.

Figure 12: Potential value creation through DPI-enabled solutions[22]

Area	Potential impact	Scope of impact	Gains
Digital finance	US$15 billion	40%–60% of farmers to access institutional credit	10% point reduction in cost of borrowing
Precision agriculture	US$25 billion	Adoption by 20% smallholders, 60% large farmers	15% yield improvement
Digital market	US$25 billion	60% of agricultural surplus via digital markets	10% higher price realization

US$65 billion in value creation through DPI-enabled agri-digital solutions by 2030

Policy focus should be on institutionalizing DPIs as Governance Anchors

The government could focus on **institutionalizing DPIs** as the governance backbone of agricultural digitization—enabling **interoperability standards, consent-driven data sharing, and regulatory oversight** for secure innovation.
The **Ministry of Agriculture & Farmers Welfare** could anchor sectoral integration and farmer registry design; **MeitY** could lead on digital standards, APIs, and cyber-security frameworks; **NITI Aayog** could coordinate inter-ministerial alignment and policy innovation; while state governments can operationalize adoption through local platforms.

Together, these agencies can maintain **open-source compliance, data ethics, and federated governance** to enable long-term resilience and trust in agricultural DPIs.

2. Agri-innovation ecosystem: Scaling agri-tech growth and transformation

Building on the momentum of DPI, India's agri-innovation ecosystem is undergoing a rapid evolution, powered by the rise of new-age startups, expanding incubation networks and progressive policy support. Together, these are creating an integrated agri-innovation ecosystem enabling wider growth and scale of startups.

India's agri-tech startup landscape is expanding rapidly reflecting strong depth and demand for innovations

Valued at over **US$600 billion**, the country's agriculture sector is among the world's largest commercialization opportunities for agri-tech innovation.[23] With **rural internet penetration surging by over 80% in the past five years**, rising demand for **high-value commodities**, **expanding export potential**, the agri-tech sector is undergoing rapid transformation.[24] *Figure 13* highlights the rise of agri-startups in the country with ~7,000[25] agri startups in 2023 and US$24 billion market potential for agri-tech in India *(Figure 14)*. These shifts are creating fertile ground for innovation across the value chain, from **precision farming and smart inputs** to **digital marketplaces and supply chain intelligence,** enabling an innovation driven agricultural economy.

Figure 13: Number of agri startups in India[26]

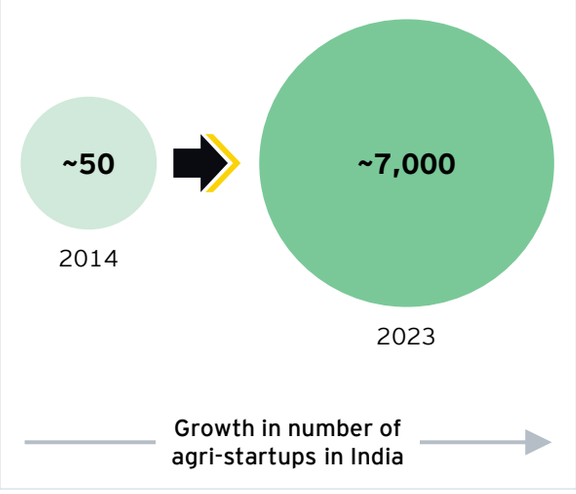
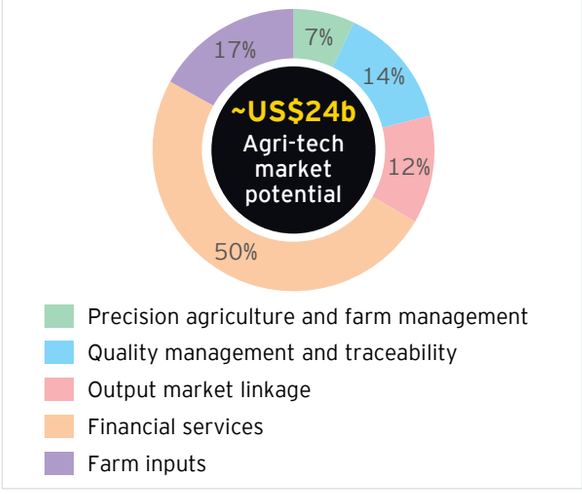


Figure 14: Market potential of agri-tech segments[27]



A growing incubation infrastructure is strengthening the foundations of agri-innovation and entrepreneurship

The government's sustained focus on **incubation** has significantly strengthened the agri-startup support ecosystem with 100+ agri incubators in India currently *(Figure 15)*. Under Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied Sectors Rejuvenation (**RKVY-RAFTAAR**), **24 agribusiness incubators** are providing **seed funding, mentorships** to early-stage ventures, helping them transition to market-ready solutions. *Figure 16* illustrates the distribution of RKVY-RAFTAAR supported startups across key states. Further, **incubators hosted by Indian Council of Agricultural Research (ICAR) institutions, State Agricultural University (SAU), and private accelerators** are deepening outreach by engaging **farmers, Farmer Producer Organizations (FPOs), and grassroots innovators**, enabling innovation diffusion to integrate into production systems.

Figure 15: Agri Incubators in India[28]

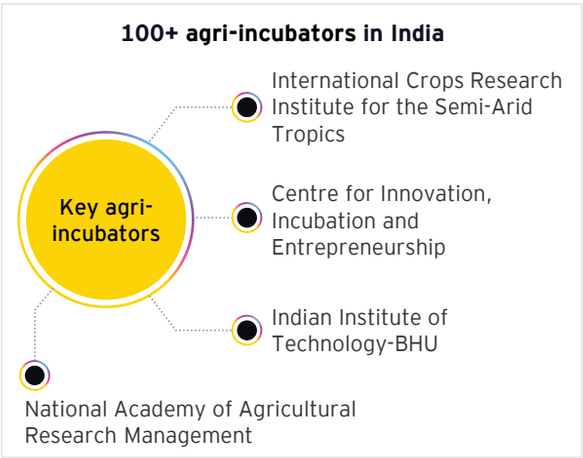
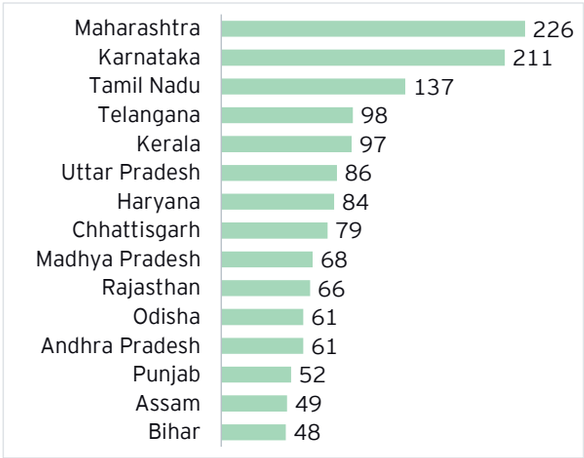


Figure 16: RKVY startups across leading states[29]



Targeted policy measures and blended financing models are de-risking innovation and enabling scale

India's innovation momentum is reinforced by **targeted policy and financial mechanisms**. The recently launched **INR750 crore-AgriSURE Fund acts as a blended-capital vehicle to de-risk early-stage agri ventures**. Further initiatives through National Bank for Agriculture and Rural Development **(NABARD)**, Small Industries Development Bank of India (SIDBI), and Small Farmers Agribusiness Consortium **(SFAC)** are building a blended finance architecture that bridges innovation risk with market readiness.

Figure 17: RKVY-RAFTAAR and AgriSURE schemes for agri-startup promotion

RKVY-RAFTAAR and AgriSURE are empowering agri-innovators with capital, risk mitigation, and partnerships to achieve sustained growth and scale

RKVY-RAFTAR

Funding
Seed support for early-stage for technology development

Infrastructure development
Development of rural infrastructure and tech integration

Training and capacity building
Skill-building and knowledge for successful innovation

Networking
Facilitates partnerships with industry, investors to achieve scale

AgriSURE FUND

Funding
Capital to agri-tech for R&D, scaling operations, and market

Risk Mitigation
Loans and grants, for agri-tech to manage risks in new technology development

Fostering Innovation
Encourages investment in new tech by reducing financial risk

Partnerships
Collaborations among agri-tech companies, farmers, research institutions and other stakeholders

Policy focus should be on strengthening the innovation pipeline and scaling incubation networks

Government could focus on strengthening the **agri-innovation pipeline** through sustained funding and structured partnerships. Government programs such as **RKVY-RAFTAAR** and the **AgriSURE Fund** could be **scaled up through increased incubation centers, enhanced seed support and interlinked** for **early-stage incubation, seed funding, and growth capital** to nurture agri-startups into scalable enterprises.

States could implement **public-private incubation partnerships**, while national bodies like **NITI Aayog** and **Startup India** can facilitate **agri-tech sandboxes** frameworks for rapid technology validation, regulatory clarity, and field-scale piloting.

3. Capital inflow: Driving consolidation and maturity in agri-tech

As India's agri-innovation ecosystem matures, the role of capital is shifting from early experimentation to **ecosystem-scale growth and consolidation**. Continued capital flow is shaping business models, improving viability, and enabling expansion of agri-tech enterprises across the value chain.

Investments are continuing to flow and expand in India's agri-tech industry

India's agri-tech industry has witnessed a sustained flow of investments over the past few years, signaling strong market confidence in agricultural innovations. Total **funding reached US$1.28 billion in FY22** (Figure 18), marking one of the highest annual inflows to date. While funding levels moderated in 2023 in line with the broader global trends due to volatile market conditions, the ecosystem continues to attract diverse investors.[30]

Figure 18: Investment trends in India's agri-tech[31] (US$ million)

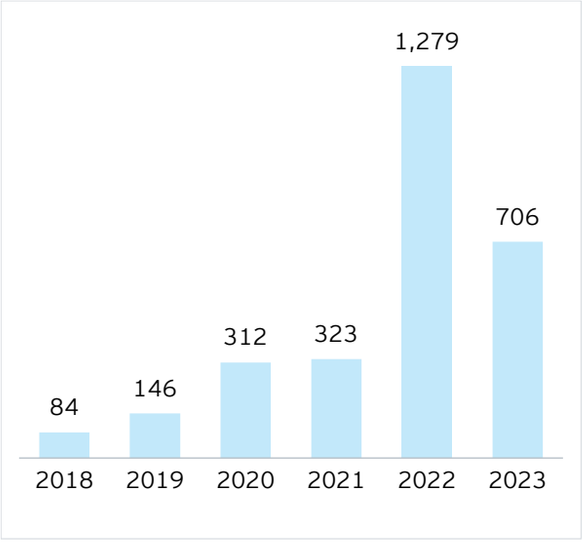
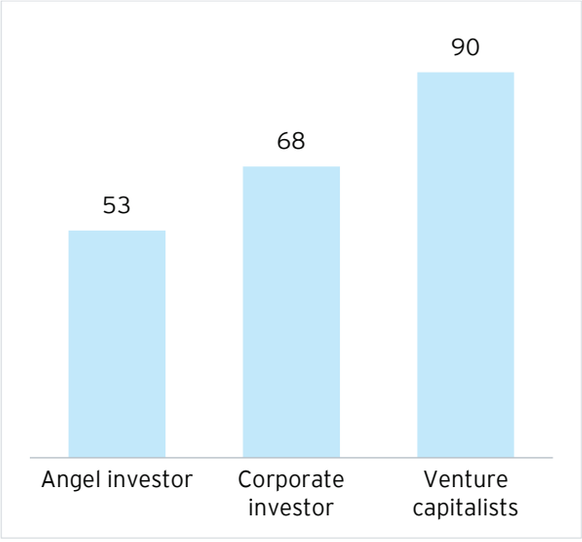


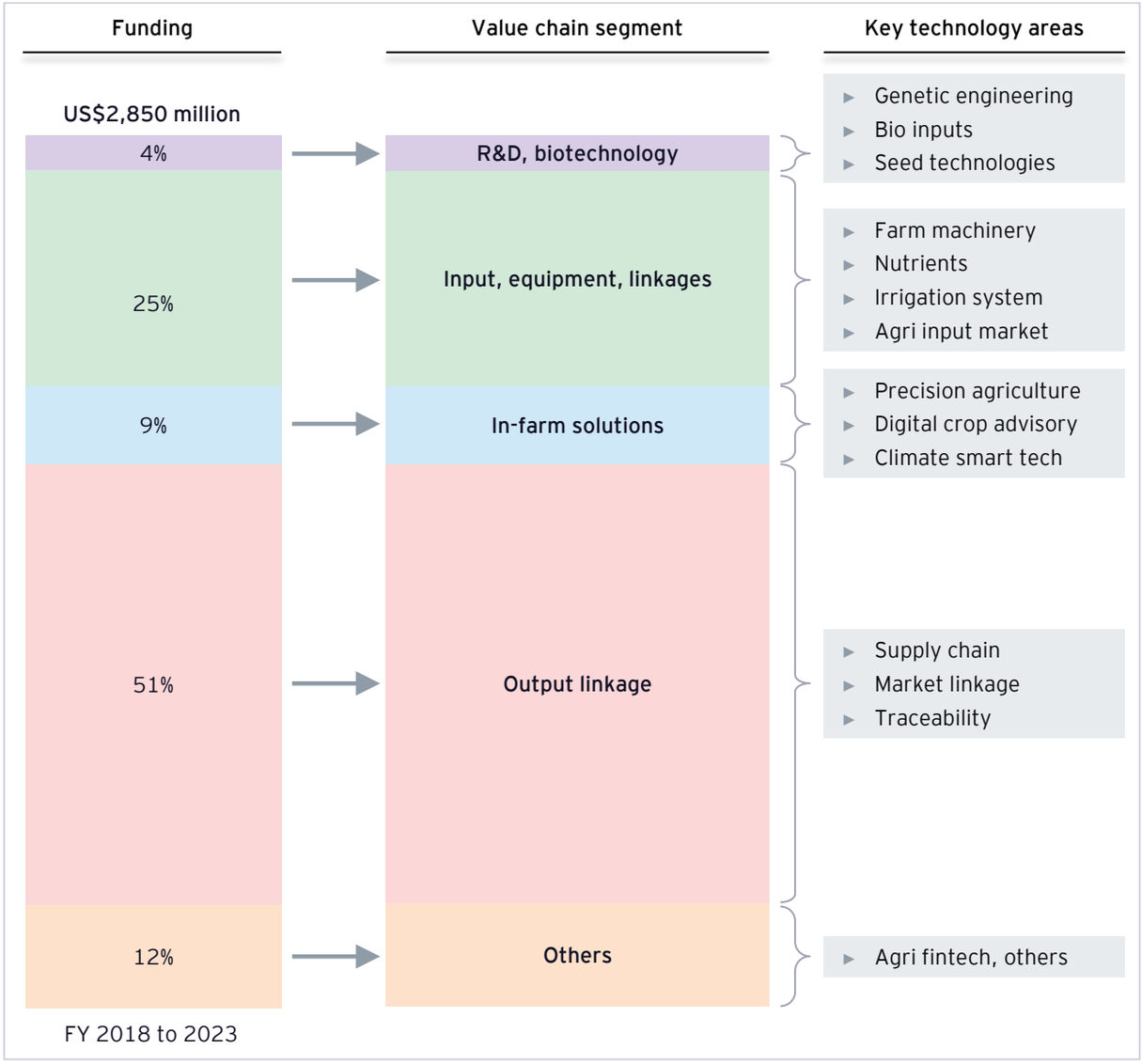
Figure 19: Number of deals by investment sources (2023)[32]



Supply chain and output linkage platforms attract the largest share of investments

Investment activity in Indian agri-tech is dominated **in supply chain technology and output market linkage segments** which address fundamental inefficiencies in farm-to-market value chains. Startups offering integrated solutions across **procurement, logistics, digital marketplaces, and traceability** are emerging as investment leaders (*Figure 20)*. The **agri-input technology segment** ranks next, drawing growing investor interest in platforms delivering **data-driven advisory, precision agriculture, and digital input distribution**.

Figure 20: Investments across technology areas[33]



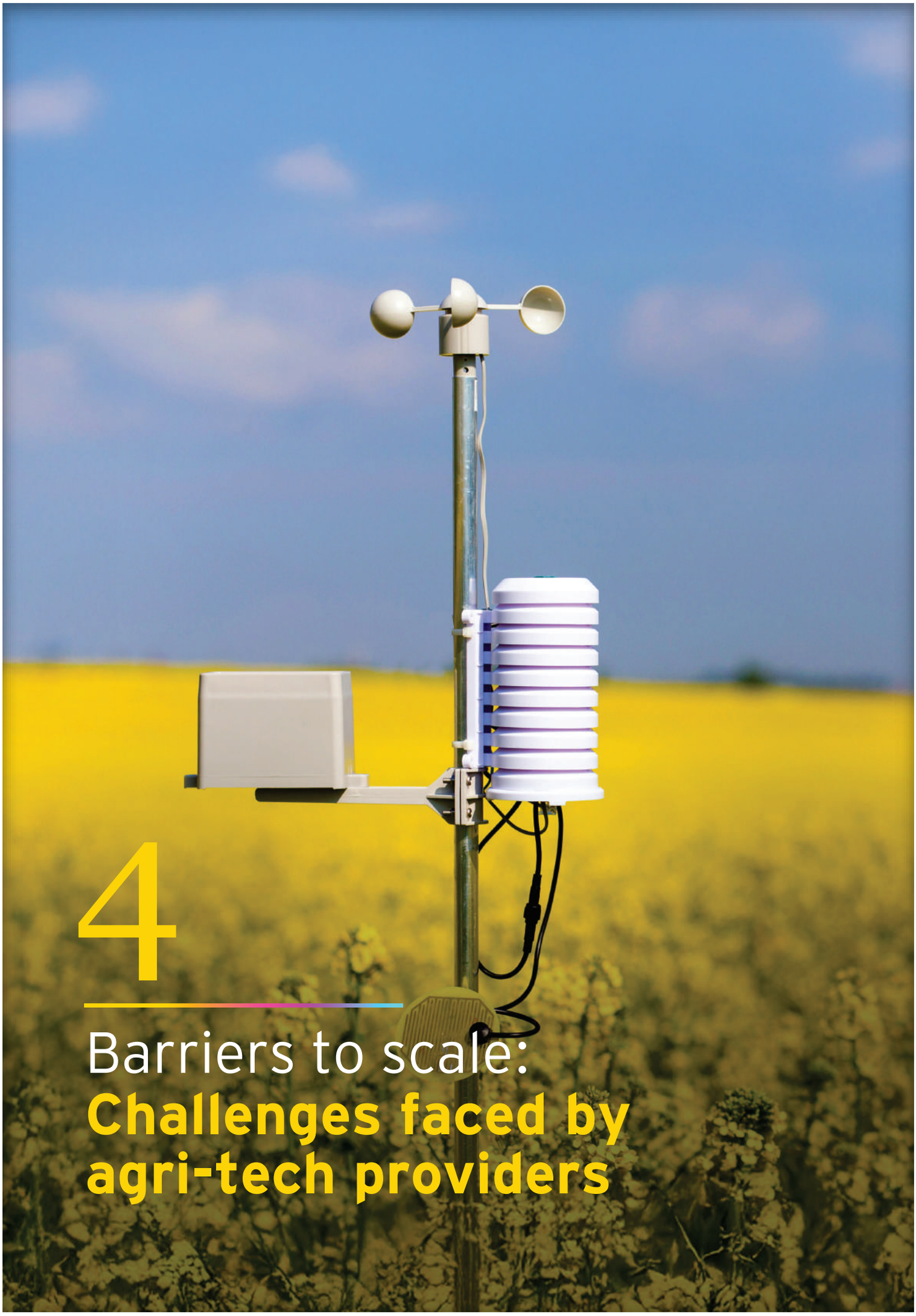
With deepening investor confidence, expanding market potential, capital inflow is becoming a critical enabler for transforming innovations into scalable enterprises driving value across India's agricultural ecosystem.

Policy focus should be on mobilizing capital and enabling financial models

The government may consider incentivize blended-finance models, targeted tax benefits, and risk-sharing mechanisms to attract institutional and private capital into agri-tech.

Clear and enabling regulations are essential to facilitate fintech–FPO integration, expand digital credit delivery, and recognize alternative collateral models such as produce-based lending, warehouse receipts, and cash-flow underwriting. For example, the Ministry of Finance, NABARD, and SIDBI can jointly design instruments that mobilize private capital into priority agri-tech sectors while enabling transparency, accountability, and impact measurement.

As outlined in this chapter, the foundational enablers are strengthening India's agri-tech ecosystem and positioning it for accelerated growth. However, the sector's **ability to achieve scale and sustainability** depends on addressing persistent structural and operational challenges. The next chapter examines these **barriers to scale**, the constraints that limit agri-tech providers from fully realizing their transformative potential across India's agricultural value chain.



4

Barriers to scale: **Challenges faced by agri-tech providers**

While strong policy push and enablers are driving India's agri-tech ecosystem towards growth, significant structural barriers continue to constrain scale and impact

The sector struggles with a **fragmented farmer base**, structural gaps in **financial inclusion**, and the **absence of secure, interoperable data frameworks** limiting agri-tech penetration. Further issues related to **siloed technology validation processes**, and **last-mile infrastructure gaps** limit technology credibility, erode user trust and prevent large scale commercialization.

Challenge 1:
Difficulty in achieving product-market fit across diverse smallholder contexts

Contextual product innovation

Designing agri-tech products for India's fragmented farms and diverse cropping systems proves difficult, limiting relevance and adoption

Limited validation networks

Restricted access to multi-regional pilots causes slow and costly product testing and refinement

Low adoption due to engagement gaps

Lack of scalable, culturally adapted digital-literacy and extension systems hinders farmer uptake

1. **With over 85% of Indian farmers operating on less than 2 ha of land[34], agri-tech solutions must navigate a highly fragmented user base characterized by diverse agro-climatic conditions, crop patterns, and socio-economic profiles.**

This heterogeneity makes it challenging to design scalable products that align with localized needs, usage behaviors, and affordability threshold, posing a critical barrier to achieving consistent product-market fit.

Challenge 2:
Barriers to monetization and financial inclusion

Limited affordability among smallholder farmers

Low purchasing power restricts adoption of technology while limiting market reach of startups

Absence of tailored financial products for farmers

Existing financial services often fail to meet the unique needs of smallholder farmers

Income volatility due to seasonality

Farmers' earnings are tied to crop cycles and market volatility, affecting their financial stability

2. **Despite growing investments in the agri-tech ecosystem, limited financial inclusion among farmers remains a critical barrier, making it difficult for startups to scale.**

Many farmers still struggle with low purchasing power, making it difficult for them to afford the products and services that startups offer. This affordability gap is compounded by the lack of tailored financial products, seasonal income fluctuations and limited access to formal credit systems.

Challenge 3:
Fragmented data ecosystems and privacy concerns

Fragmented data standards and interoperability

Diverse, siloed data protocols inhibit seamless integration of advisory, finance, and market services

Complex consent and data governance

Low rural digital and legal literacy complicates transparent, consent-based data sharing

Absence of transparent oversight

Lack of independent audits and grievance redress escalates data misuse fears, reducing trust

3. **Despite good digital penetration, Indian agri-tech startups face persistent challenges in leveraging diverse agriculture data due to lack of secure, interoperable data ecosystems.**

Limited open APIs and uniform standards across government, private, and research make it difficult to integrate advisory, market, and financial services at scale.

Challenge 4:
Technology validation and last-mile infrastructure gaps

Lack of unified technology validation mechanisms

Complex and siloed validation processes, lack of standardized metrics, regulation unclarity hinder credibility and slow down commercialization

High cost and complexity of managing field operations

High operational expenses and logistical complexity in demonstrating, deploying, monitoring, and servicing solutions at remote locations

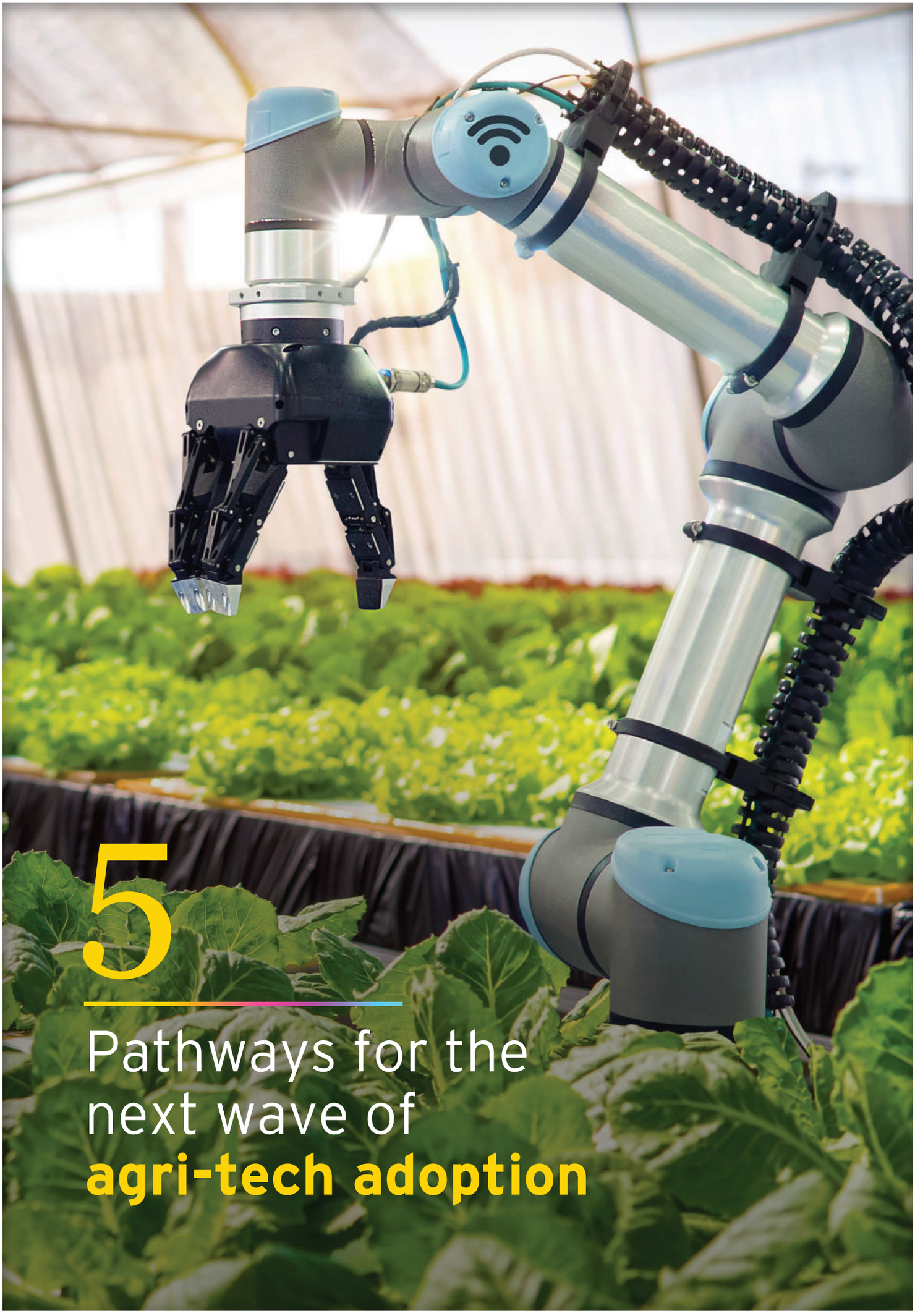
Difficulty achieving efficient supply chain integration

Fragmented local procurement, and coordination when delivering bundled solutions—such as devices, inputs, advisory, and output linkages

4. **Agri-tech startups continue to struggle in scaling up and farmer reach due to complex validation mechanisms and last-mile infrastructure gaps.**

These include limited field trials, lack of standardized performance metrics, and weak benchmarking which makes it hard to prove the effectiveness of innovations, reducing credibility while slowing down commercialization. Additionally, inadequate physical infrastructure, fragmented policy support, and limited grassroots connectivity across supply chains restricts the overall reach.

Unlocking the next wave of agri-tech adoption would require rethinking of how innovations are validated, commercialized, and delivered at scale. The following chapter explores strategic approaches that could convert these structural constraints into opportunities for inclusive growth and long-term resilience.



5

Pathways for the next wave of **agri-tech adoption**

Scaling the next wave of agri-tech adoption in India: From innovation to integration

India's agri-tech sector stands at a turning point, **innovation is abundant but adoption remains fragmented**. Most solutions struggle to align with the economic realities **of small and marginal farmers**, with high upfront costs, low financing options and limited customized service-oriented business models restricting uptake. Complicated validation systems and **risks of scaling technologies** in new geographies further slow dissemination. At the same time, India's agricultural data ecosystem remains **deeply fragmented**, limiting the ability of innovators to leverage verified datasets for developing their innovations.

To move from **innovation to integration**, India could establish structured mechanisms that enable technologies to be **tested, trusted, and scaled sustainably** through three strategic pathways:

- **Collaborative sandboxes** to validate and de-risk innovations,
- **Unified data ecosystems** to power intelligence and interoperability, and
- **New-age business models** to enable last-mile access and sustainable scale.

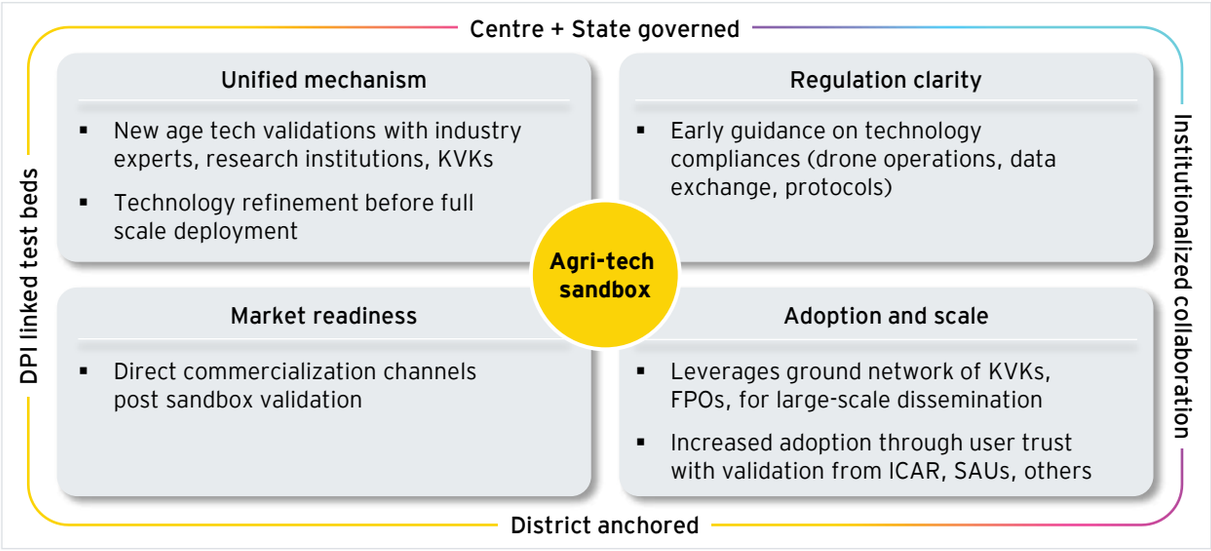
Together, these pathways can unlock the new wave of **agri-tech**, where innovation translates into inclusion, efficiency, and impact across agriculture.

1. Establishing agri-tech sandboxes as collaborative platforms to validate, de-risk, and scale emerging technologies

India has over 90 ICAR institutes, 60 State Agricultural Universities, and 700+ (Krishi Vigyan Kendras) KVKs, however lacks a unified system to test and validate emerging agri-technologies.[35] Existing mechanisms remain fragmented, slow, and leave new-age innovations without clear pathways for validation or regulatory alignment.

State-level agri-tech sandboxes can bridge this gap by providing controlled, collaborative testbeds for piloting and validating technologies in real-world conditions without full-scale risk. *Figure 21* highlights the core functions and benefits of agri-tech sandboxes in enabling innovation, validation, and scale.

Figure 21: Agri-tech sandbox for unified testing and collaboration

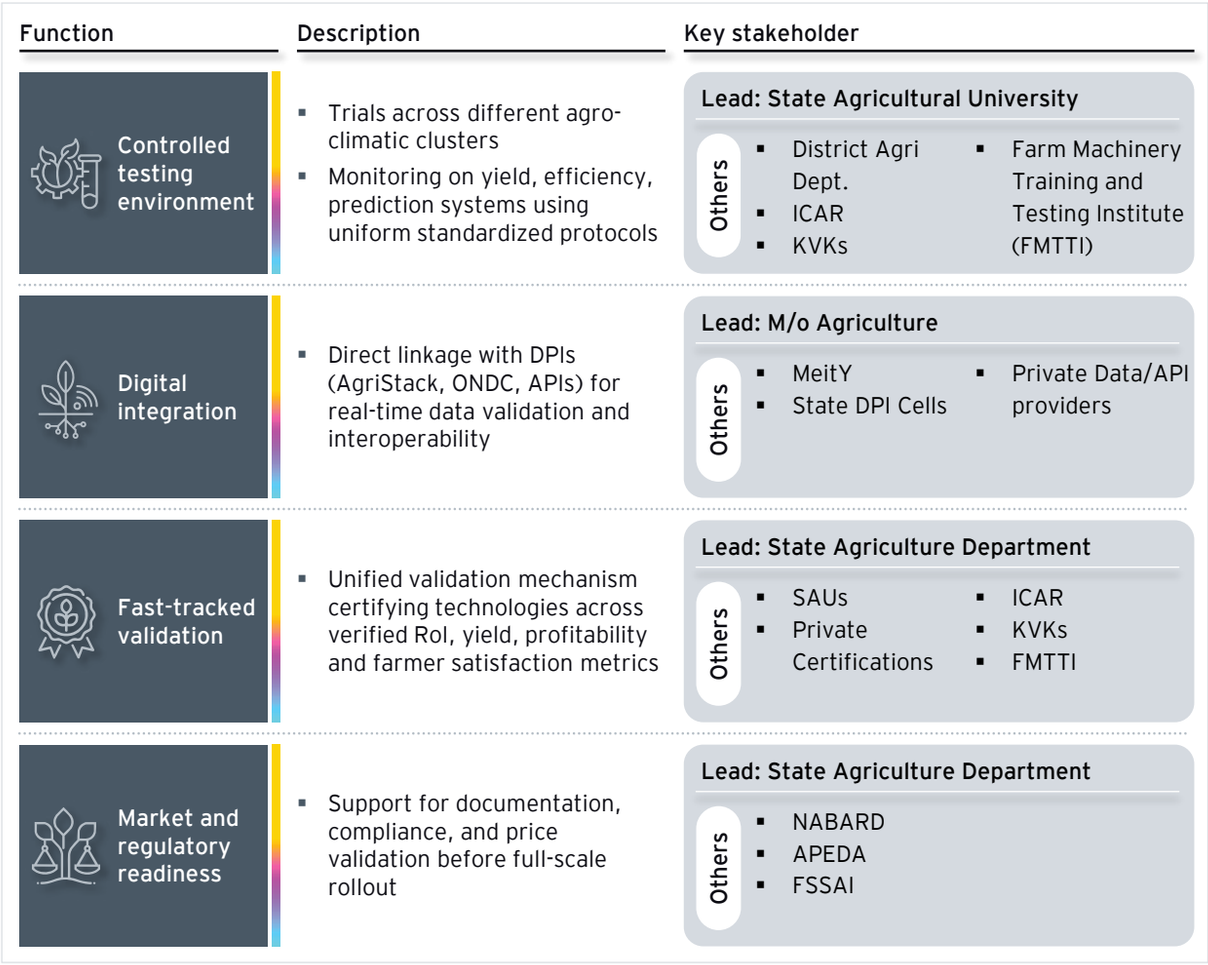


These **'innovation testbeds'** institutionalize collaboration among start-ups, KVKs, SAUs, ICAR, and industry players, creating an integrated ecosystem for faster and scalable deployment.

By using **independent evaluation under standardized protocols**, sandboxes can build credibility and farmer confidence in emerging solutions. This institutional 'stamp of trust' can help reduce farmer hesitation, shorten adoption cycles, and enable faster commercialization.

Furthermore, by leveraging existing infrastructure—KVKs, district agri offices, and FPO clusters—the sandbox system can serve as the **grassroots deployment platform** for testing and scaling innovations directly with end users.

Figure 22: Key functions and stakeholders of an agri-tech sandbox



Sandbox Governance Mechanism

Each **state agri-tech sandbox** can be **anchored within the Department of Agriculture**, with participation from allied departments such as **Horticulture, Animal Husbandry, and Rural Development**, alongside key partners including **ICAR institutions, State Agricultural Universities (SAUs), NABARD and others**. *Figure 22* outlines the major functions and key stakeholders involved in the agri-tech sandbox implementation.

The sandbox could align pilot and validation activities with **national validation frameworks**, enable **data interoperability**, and provide a **regulatory interface** to fast-track certifications through agencies such as **BIS, FSSAI, APEDA**, and private certification agencies.

At the national level, a **Steering Committee on Agri-Tech Sandboxes**, co-chaired by the **Ministry of Agriculture** and **NITI Aayog**, could oversee **governance, funding flows, and scale-up across states**, enabling coherence, accountability, and uniform implementation standards.

2. Standardizing diverse agricultural datasets through common and open protocols for seamless exchange and access across the agri-tech ecosystem

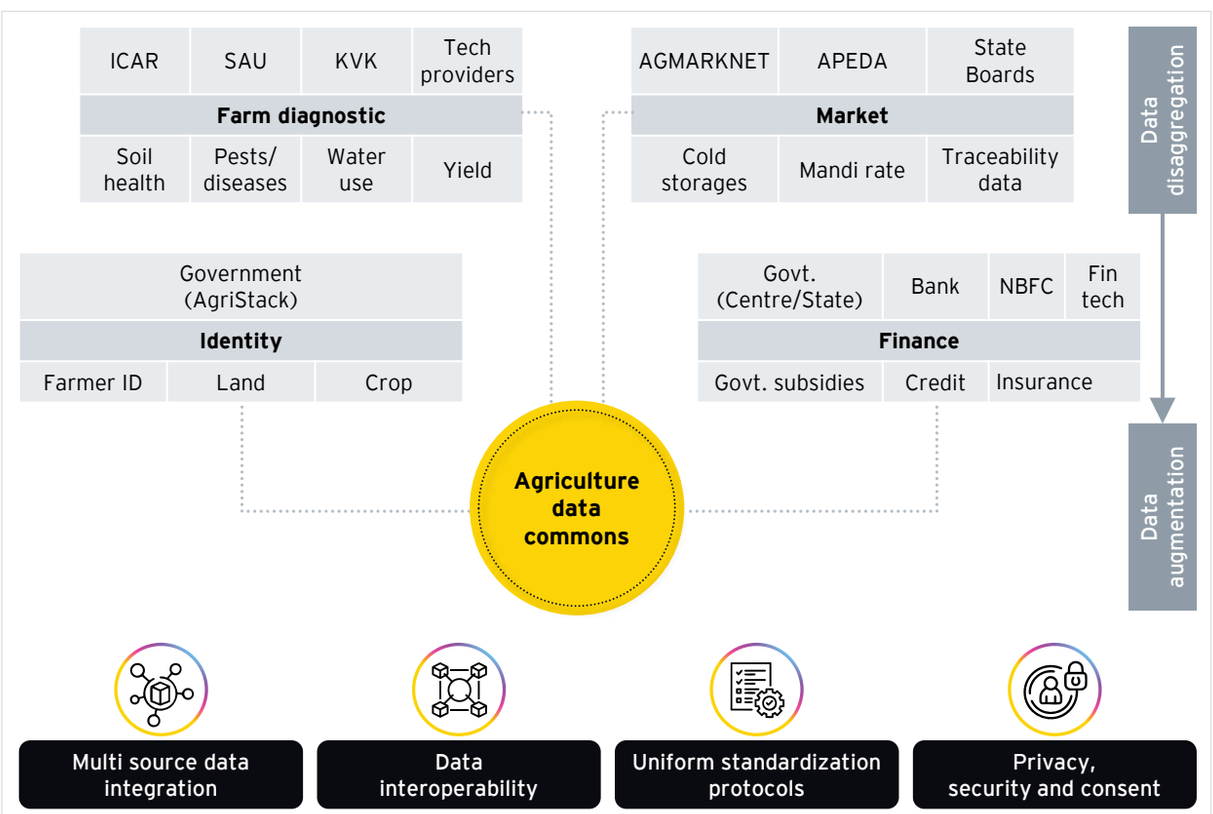
Currently, agricultural data exists in silos, research trials with ICAR and SAUs, market and price data with state marketing boards, farm-level data with private agri-tech startups. This disaggregation limits the potential of development of cutting-edge innovations that depend on verified and credible data.

A strategic national push towards establishing **Agricultural Data Commons** *(Figure 23)* is essential to bridge these divides. This could be **developed as a trusted, federated ecosystem built on FAO recommended FAIR principle**, such that data is *Findable, Accessible, Interoperable,* and *Reusable*.[36]

In practice, this means that datasets must be **easily discoverable through standardized metadata, accessible under secure and consent-driven protocols, interoperable across systems and platforms through open data standards**, and **reusable for innovation and research** with clearly defined governance and attribution.

It is noteworthy that the **Government of Telangana**, in partnership with the **World Economic Forum**, has already demonstrated this approach through the **Agricultural Data Exchange (ADeX).** Modelled on the India Urban Data Exchange (IUDX) framework, ADeX provides a secure and standards-driven platform for seamless exchange of agricultural data between providers such as government agencies, research institutions, and private firms and users, including agri-tech startups and developers. Through democratizing and standardizing access to diverse data sources, ADeX enables innovators to focus on building intelligent, data-driven solutions for the farming ecosystem.[37]

Figure 23: Agri-data ecosystem for seamless data exchange among stakeholders



Building on such state-led innovations, a national Agricultural Data Commons could extend this model across the country, enabling uniformity, accessibility, and quality of agricultural data. In doing so, the commons would empower startups and innovators to build smarter and scalable solutions for farmers and institutions, serving as the digital backbone for agri-tech development and promotion.

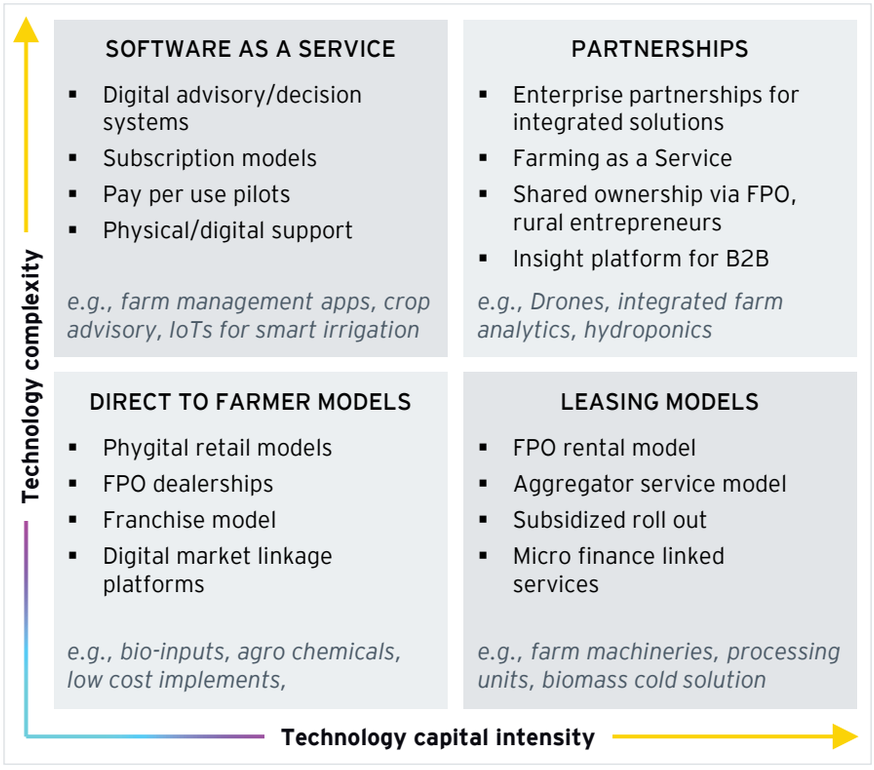
3. Agri-startups embracing new-age business models for last-mile access and sustainable scale

The key frontier for agri-startups lies in **reaching the last mile**, the 86% of farmers still beyond the reach of most innovations. To achieve scale sustainably, startups must transition from **product-centric models** to **context-fit business models**, aligning with the affordability of users and their capability to use it effectively.

Figure 24 presents a matrix illustrating how agri-tech business models could be designed based on the cost of technology and its complexity. It highlights the need for differentiated models, from grassroots retail networks to high-tech enterprise partnerships to drive scale and last-mile reach.

Figure 24 maps agri-tech business models across varying levels **of technology complexity and capital intensity**, highlighting the need for differentiated business models for last mile reach and scale. **Technologies which are low-cost with low-complexity** could focus on direct-to-farmer and retail-based approaches for rapid diffusion among farmers. **As complexity increases**, SaaS-driven models offer wider reach with low capital requirements. **For technologies with low complexity but high capital intensity**, leasing and service-based models can bridge access gaps by reducing individual investment burdens. **At the high end of both complexity and capital intensity**, advanced technologies require collaborative and shared ownership-oriented models to enable sustained adoption and deep value chain integration.

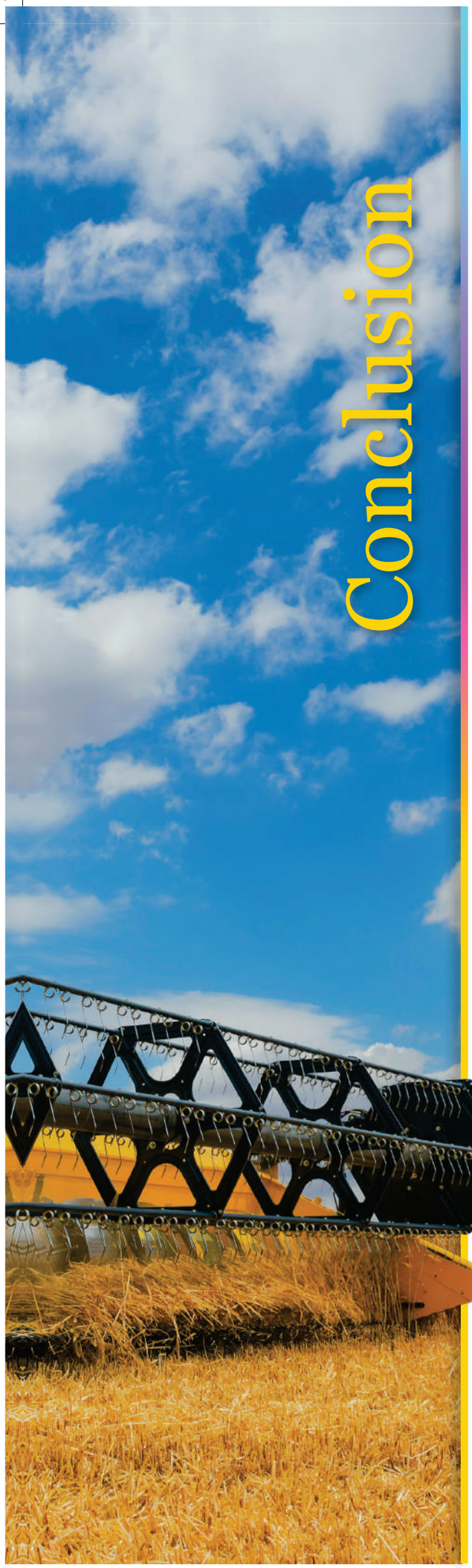
Figure 24: Agri-tech business model fit matrix



Startups can accordingly embrace **new-age commercialization pathways**—access-based services, community-led distribution, outcome-linked commercialization, portfolio diversification, and strategic collaboration that make technologies more affordable and accessible. Innovative financial instruments like **credit-linked technology adoption loans**, **crop-cycle-based repayments**, and tailored loan products could be implemented to further mainstream adoption.

Figure 25: Commercialization pathways for agri-tech

By embedding affordability, localized delivery, service-oriented approach, and innovative financing into their commercialization strategies, agri-startups can transition from limited adoption to scalable, high-impact, and sustainable solutions that effectively reach the last mile.



Conclusion

The new wave of agri-tech marks a defining shift in India's agricultural transformation, moving from fragmented innovation to systemic integration. To unlock its full potential, stakeholders must view agri-tech not as isolated interventions but as part of an integrated digital and institutional ecosystem. This next phase calls for scaling innovations through collaborations, unified data frameworks, and new-age commercialization models that enable inclusivity, resilience, and sustainability.

Some of the key recommendations for driving agri innovations integration are:

- **Establishing state-level agri-tech sandboxes and testbeds:** Create collaborative environments for technology validation and risk mitigation, enabling faster regulatory alignment and market readiness. These sandboxes could integrate government agencies, startups, and research institutions to test solutions under real-world conditions.
- **Build a Federated Agricultural Data Ecosystem:** Develop interoperable data frameworks and open standards for secure data sharing across public and private platforms. This ecosystem should support consent-driven protocols, enable real-time analytics, and foster plug-and-play innovation for advisory, credit, and market services.
- **Redefine commercialization pathways for last-mile adoption**: Shift from product-centric models to access-based services, community-led distribution, and outcome-linked commercialization. These approaches would deepen adoption among smallholders while enhancing affordability and inclusivity.

Further, policy and institutional priorities should also focus on complementary areas including innovative financing, last-mile infrastructure, and capacity building to enable sustained scale-up of agri-technologies. **Expanding blended-finance and risk-sharing mechanisms**, such as scaling the AgriSURE Fund and introducing tax incentives for agri-tech investments, can de-risk innovation and attract private capital. Parallelly, **strengthening rural infrastructure**, including cold chains, storage, and logistics networks, and integrating FPOs as last-mile partners would enhance supply chain efficiency and market reach. Equally critical is the need to **upskill farmers and FPOs on digital literacy and AI-enabled digital advisory tools** to enable technological advancements and translating into on-ground adoption.

India's journey toward a future-ready agricultural system would be defined by how effectively it integrates technology with inclusion, data with decision-making, and innovation with impact. By embracing new frontiers of agri-tech, India can transform agriculture into a digitally intelligent, sustainable, and inclusive ecosystem where innovation evolves into integration, and integration drives impact.

References

1 Agriculture Population, Current Status of Agriculture in India: An Overview - Agriculture Notes by Agriculture.Institute, accessed 09 October 2025

2 Agriculture GDP contribution, Press Release:Press Information Bureau, accessed 09 October 2025

3 Agriculture GDP contribution, Press Release:Press Information Bureau, accessed 09 October 2025

4 Agriculture Population, Current Status of Agriculture in India: An Overview - Agriculture Notes by Agriculture.Institute, accessed 09 October 2025

5 Business Standard, Number of Agri startups jumps multifold to 7,000 in last 9 years, https://www.business-standard.com/companies/start-ups/number-of-agri-startups-jumps-multifold-to-7-000-in-last-9-years-report-124051500777_1.html, accessed on 16 October 2025

6 India's Unfolding Agri-Tech Story, FSG, https://www.fsg.org/wp-content/uploads/2023/09/FSG_Indias-Unfolding-Agri-tech-Story_Sep-2023.pdf

7 Approximately 58% of the population engaged in farming and related activities, Current Status of Agriculture in India: An Overview - Agriculture Notes by Agriculture.Institute, accessed 09 October 2025

8 Agriculture and Allied activities contributes approximately 18% to the economy (GDP) Press Release:Press Information Bureau, accessed 09 October 2025

9 Employment in agriculture: 43.5% total employment, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2113720, accessed on 09 October 2025

Share in GDP: 18%, Press Release:Press Information Bureau, accessed on 09 October 2025

Mechanisation rate: 47% of operations mechanized, https://agriwelfare.gov.in/en/MechanizationDiv#:~:text=Mechanization%20is%20crucial%20in%20the,on%20precision%20agriculture%20in%20India, accessed on 09 October 2025

Food Grain Production: 353.9 Million Tonnes, https://www.pib.gov.in/PressReleseDetail.aspx?PRID=2132263#:~:text=The%20Third%20Advance%20Estimates%20of,6.5%25%20increase, accessed on 09 October 2025

Gross area under major crops, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2098424#:~:text=The%20annual%20growth%20rate%20of,and%20diversification%20in%20agricultural%20activities.&text=The%20real%20GVA%20for%20agriculture,role%20in%20India's%20economic%20development.&text=Comparison%20of%20yield%20between%202013,a%20substantial%20increase%20in%20productivity.&text=The%20decade%20from%202014%2D15,05%20to%202013%2D14

Internet In India 2024, https://www.iamai.in/sites/default/files/research/Kantar_%20IAMAI%20report_2024_.pdf, accessed 09 October 2025

Digital soil health cards issued: Over 25 crore till July 2025, https://www.pib.gov.in/PressNoteDetails.aspx?NoteId=155036&ModuleId=3#:~:text=Health%20and%20Fertility'.-,As%20of%20July%202025%2C%20over%2025%20crore%20Soil%20Health%20Cards,land%20in%2040%20aspirational%20districts, accessed on 10 October 2025

Women's workforce share in agri: ~63% of female workforce In rural areas, https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1911142, accessed on 10 October 2025

FPOs registered: 10,000+ directly benefitting SME and women farmers, https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2106913#:~:text=Formation%20&%20promotion%20of%20FPOs%20is,job%20creation%20and%20economic%20resilience, accessed on 10 October 2025

45 out of 169 targets under Sustainable Development Goals (SDGs) can be improved by scaling up sustainable agriculture, https://www.ceew.in/research/sustainable-food-systems#:~:text=The%20Sustainable%20Food%20Systems%20team,Only%205, accessed on 10 October 2025

10 Goal of a developed India by 2047 in the agriculture sector, Press Release:Press Information Bureau, accessed on 10 October 2025

11 Yield enhancement due to precision agriculture, https://www.sciencedirect.com/science/article/pii/S2772375524000881, accessed on 11 October 2025

Next-gen biotech seeds are boosting climate resilience by 18%–22%, https://farmonaut.com/asia/india-agriculture-sector-growth-7-innovations-for-2025, accessed on 11 October 2025

Smart logistics, IoT-enabled supply chains, and digital integration are reducing post-harvest losses by 20%, New Technologies and Innovations to Minimize Post-Harvest Losses in India, accessed on 11 October 2025

The rise in the proportion of skilled agriculture labourers among women (from 48% in 2018-19 to 59.4% in 2022-2325) indicates a growing trend of women taking up more specialized roles in agriculture WEF_Agritech_for_Women_Farmers_2024.pdf, accessed on 11 October 2025

Water-saving irrigation in India (17%–50%), https://www.niti.gov.in/sites/default/files/2023-03/Efficiency%20of%20Micro Irrigation%20in%20economizing%20water%20use%20in%20India%20Learning%20from%20potential%20and%20under%20explored%20states.pdf, accessed on 11 October 2025

Microbially enhanced bio-inputs, CH4 (31%–60%) % less emission, https://www.frontiersin.org/journals/plant-science/articles/10.3389/fpls.2024.1432460/full , accessed on 11 October 2025

12 US$165.7 billion Nation Bioeconomy, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2115882, accessed on 11 October 2025

India's smart agri market revenue, https://www.grandviewresearch.com/horizon/outlook/smart-agriculture-market/india, accessed on 11 October 2025

India's digital market size, https://www.marketresearchfuture.com/reports/india-digital-logistics-market-60450, accessed on 11 October 2025

Investments in circular economy, https://www.chase-advisors.com/media/qqfc0xyh/startup-accelerating-circular-economy-report-revised.pdf, accessed on 11 October 2025

13 US$452 billion industry, India Agriculture Market Size, Analysis, Share & Forecast Report 2030, accessed on 11 October 2025

~4% CAGR represents steady growth, Farm Inputs Market Report 2025 - Research and Markets, accessed on 11 October 2025

ICAR release 19% yield increase Union Agriculture Minister Shri Shivraj Singh Chouhan Announces Two Genome-Edited Rice Varieties Developed in India | ICAR, accessed on 11 October 2025

Boosts yield by 6.8%–18.2% in rice, as per ground research in Tamil Nadu, https://www.researchgate.net/publication/368446575_Slow_and_Controlled_Release_Nitrogen_Fertilizers_Options_for_Improving_Rice_Productivity_A_Review accessed on 11 October 2025

Nano Fertilizers https://www.pib.gov.in/PressNoteDetails.aspx?NoteId=154966&ModuleId=3, accessed on 11 October 2025

Seaweed Extract Bio-stimulant: https://sagarika.com/, accessed on 11 October 2025

ICAR-IISR developed a biopesticide to combat cardamom thrips, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2139534, accessed on 11 October 2025

[14] IoT adoption, https://gujarat.coe-iot.com/wp-content/uploads/2021/09/IoT-Adoption-in-Indian-Agriculture-A-2020-Landscape-April-2021-vF.pdf, accessed on 12 October 2025

[15] Area under smart irrigation, https://www.netafimindia.com/blog/micro-irrigation-systems-government-subsidies-benefits-and-setupguide/#:~:text=Beyond%20this%2C%20many%20State%20Governments,as%20reported%20by%20PMKSY%20itself, accessed on 12 October 2025

[16] Drone operating SHGs in India, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2149706#:~:text=The%20Government%20has%20approved%20'Namo,%2D24%20to%202025%2D26, accessed on 12 October 2025

[17] Impact of drone usage on crop yield and input usage, https://www.researchgate.net/publication/388533978_Advancements_in_Precision_Agriculture_for_Maximizing_Crop_Yield_and_Minimizing_Waste_via_Innovative_Technological_Solutions, accessed on 12 October 2025

[18] Pilot use by over 500 plots in spice (chilli, cumin) value chains; expanding to cotton and oilseed traceability, Spice Value Chain - Blockchain for Food Safety, Traceability and Supplychain Transparency, accessed 12 October 2025

Cold Chain Infrastructure remains limited but total opportunity for CCI deployment of US$19.1 billion by 2030, https://www.clasp.ngo/wp-content/uploads/2023/06/Assessment-of-the-Cold-Chain-Market-in-India.pdf, 12 October 2025

Over 10.727 warehouses digitized supporting ₹17386.63 crore collateralized credit, https://dfpd.gov.in/warehousing-development-and-regulatory-authority/en, 12 October 2025

1.79 Cr farmers linked (17.9 million), https://www.pib.gov.in/PressReleasePage.aspx?PRID=2148525#:~:text=Mandis%20are%20approved%20and%20integrated,integrated%20with%20e%2DNAM%20platform, 12 October 25

10%–15% of traced farm-to-market agri products are equipped with QR/barcode-linked digital provenance systems, Recent Innovations In Indian Agriculture 2025: Top Trends, 12 October 2025

[19] Status of Indian circular economy: Sustainable agricultural waste management in India: Innovations, challenges, and future perspectives - ScienceDirect, accessed on 12 October 2025

[20] Advanced drip irrigation and micro-irrigation cover over 83.46 lakh haunder PDMC, https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2003188, accessed on 12 October 2025

57 percent reduction (2023-24) in paddy straw diverted from burning in HR and UP,

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2112397#:~:text=of%20paddy%20straw.-,Under%20this%20scheme%2C%20financial%20assistance%20@%2050%25%20of%20the%20cost,for%20further%20ex%2Dsitu%20utilization, accessed on 12 October 2025

5 million biogas plants in all zones collectively generating 0.702 million m3 of biogas per day across India:

Sustainable agricultural waste management in India: Innovations, challenges, and future perspectives - ScienceDirect, accessed on 12 October 2025

Waste Collection and Aggregation,https://blog.mygov.in/editorial/explore-new-avenues-in-indias-circular-economy/

Accessed on 12 October 2025

Composting, Bioenergy, and Carbon Farming in India,https://www.pib.gov.in/PressReleasePage.aspx?PRID=2089589#:~:text=The%20energy%20sector%20contributed%20the,2%20equivalent%20has%20been%20created, accessed on 12 October 2025

Clean energy microgrids with capacity is around 10 GW powered by farm-generated biomass support rural electrification, https://reempowered-h2020.com/wp-content/uploads/2025/01/Electra-Paper_postprint.pdf, accessed on 12 October 2025

[21] IIT Madras to collaborate with Union Agriculture Ministry on Project VISTAAR, https://www.iitm.ac.in/happenings/press-releases-and-coverages/iit-madras-collaborate-union-agriculture-ministry-project, accessed on 16 October 2025

[22] Advancing Digital Public Infrastructure for the Agriculture Sector, World Economic Forum, https://www3.weforum.org/docs/WEF_Advancing_Digital_Public_Infrastructure_Agriculture_Sector_2024.pdf, accessed 12 October 2025

[23] International Monetary Fund, 2025

[24] Internet In India 2024, https://www.iamai.in/sites/default/files/research/Kantar_%20IAMAI%20report_2024_.pdf, accessed 10 October 2025

[25] Business Standard, Number of Agri startups jumps multifold to 7,000 in last 9 years, https://www.business-standard.com/companies/start-ups/number-of-agri-startups-jumps-multifold-to-7-000-in-last-9-years-report-124051500777_1.html, accessed on 16 October 2025

[26] Business Standard, Number of Agri startups jumps multifold to 7,000 in last 9 years, https://www.business-standard.com/companies/start-ups/number-of-agri-startups-jumps-multifold-to-7-000-in-last-9-years-report-124051500777_1.html, accessed on 16 October 2025

[27] Agritech-towards transforming Indian agriculture, https://aspirecircle.org/wp-content/uploads/2022/01/ey-agritech-towards-transforming-indian-agriculture-AGRI.pdf, accessed on 16 October 2025

[28] Agri-startups in India: Opportunities, Challenges and Way Forward, https://naas.org.in/Policy%20Papers/policy%20108.pdf, accessed 13 October 2025

[29] Agri-startups in the country, PIB, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2037658, accessed 17 September 2024

[30] India's Unfolding Agri-Tech Story, FSG, https://www.fsg.org/wp-content/uploads/2023/09/FSG_Indias-Unfolding-Agri-tech-Story_Sep-2023.pdf, accessed 10 October 2025

[31] India's Unfolding Agri-Tech Story, FSG, https://www.fsg.org/wp-content/uploads/2023/09/FSG_Indias-Unfolding-Agri-tech-Story_Sep-2023.pdf, accessed 10 October 2025

[32] India's Unfolding Agri-Tech Story, FSG, https://www.fsg.org/wp-content/uploads/2023/09/FSG_Indias-Unfolding-Agri-tech-Story_Sep-2023.pdf, accessed 10 October 2025

[33] India's Unfolding Agri-Tech Story, FSG, https://www.fsg.org/wp-content/uploads/2023/09/FSG_Indias-Unfolding-Agri-tech-Story_Sep-2023.pdf, accessed 10 October 2025

[34] Operational land holding of farmers, 3.-Annual-Survey-for-Marginal-Farmers.pdf, accessed on 15 October 2025

[35] ICAR Institutions, https://icar.org.in/en/institutes, accessed 15 October 2025

[36] Farm data management, sharing and services for agriculture development, https://openknowledge.fao.org/server/api/core/bitstreams/7043933b-dd27-4674-92ec-4bbfef8a4d48/content, accessed 12 October 2025

[37] ADeX Overview, https://adex.org.in/wp-content/uploads/2023/08/ADeX-Overview.pdf, accessed on 16 October 2025

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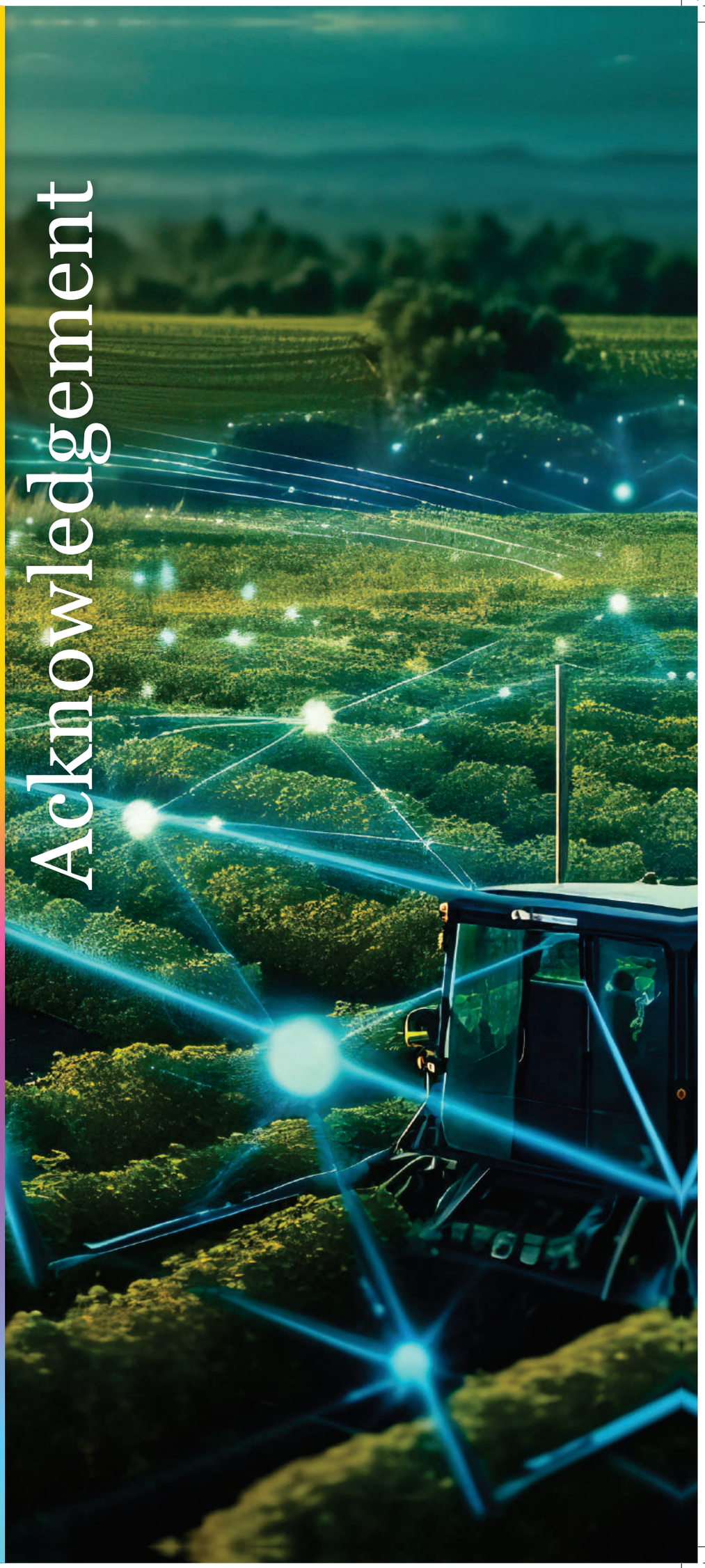

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