The Pakistan Business Council

FOSTERING ECONOMIC GROWTH

UNLOCKING AGRI-TECH'S POTENTIAL IN PAKISTAN

Lessons from the Field

Policy Brief

June 2025

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POLICY BRIEF

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The Pakistan Business Council (PBC)

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Author

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The Pakistan Business Council (PBC) is a research-based business policy advocacy platform, supported by over 100 private sector companies, local and multinational, that have significant and long-term commitment to sustainable growth of the country. They come from 17 major sectors of the formal economy, generate 40% of annual exports, contribute a third of Pakistan's total tax revenues and employ three million. Their combined sales represent every 9th Rupee of Pakistan's GDP. PBC's major thrust is "Make-in-Pakistan" with three pillars: "Grow More/Grow Better", "Make More/Make Better" and "Serve More/Serve Better," all with the objective of generating jobs, promoting exports and reducing imports. This study is under the "Grow More/Grow Better" pillar. (www.pbc.org.pk)

The Pakistan Business Council: An Overview

The Pakistan Business Council (PBC) is a research-based business advocacy platform established in 2005. It is now supported by over 100 private sector local and multinational businesses with significant investment in, and long-term commitment to sustainable growth of the country. They come from 14 countries, have leading roles in 17 major sectors of the formal economy, generate 40% of annual exports, contribute a third of Pakistan's total tax revenues and employ three million. Their combined sales represent every 6th Rupee of Pakistan's GDP.

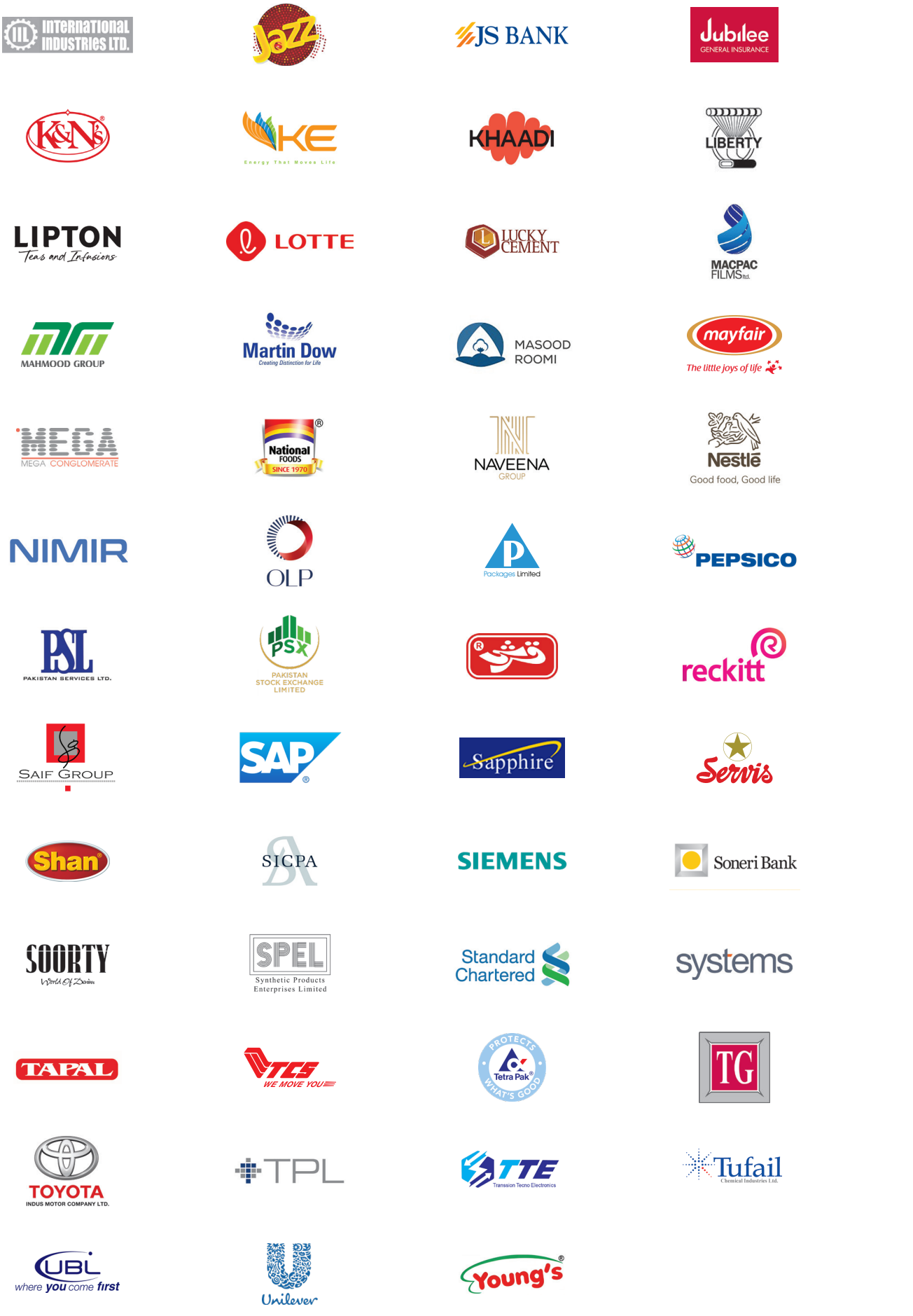
PBC's major objectives are to advocate polices that lead to creation of jobs, value-added exports and reduction in import reliance through improved competitiveness of manufacturing, services and the agriculture sectors. It also promotes formalization of the economy.

PBC's over-arching theme, **"Make-in-Pakistan"** consists of three pillars: **"Grow More/Grow Better", "Make More/Make Better"** and **"Serve More/Serve Better."** Its evidence-based advocacy is backed by over a hundred studies to date through its full-time research team, supplemented by collaborative research with renowned industry experts and economists. Through its Centre of Excellence in Responsible Business (CERB), PBC works to build capacity and capability of businesses beyond its membership, to adopt high environmental, social and governance standards. PBC holds conferences, seminars and webinars to facilitate the flow of relevant information to all stakeholders in order to help create an informed view on the major issues faced by Pakistan. Through its presence in Islamabad and Karachi, it works closely with relevant government departments, ministries, regulators and institutions, as well as other stakeholders including professional bodies, to develop consensus on major issues impacting the economy.

PBC is a pan-sectoral, not-for-profit, Section 42 entity. It is not a trade body; therefore, it does not advocate for any specific business sector. Rather, its key advocacy thrust is on easing barriers that thwart competitiveness of businesses in Pakistan. Further information on the PBC is available on: www.pbc.org.pk. The PBC's founding objectives are:

- To provide for the formation and exchange of views on any question connected with the conduct of business in and from Pakistan.
- To conduct, organize, set up, administer and manage campaigns, surveys, focus groups, workshops, seminars and fieldwork for carrying out research and raising awareness in regard to matters affecting businesses in Pakistan.
- To acquire, collect, compile, analyze, publish and provide statistics, data analysis and other information relating to businesses of any kind, nature or description and on opportunities for such businesses within and outside Pakistan.
- To promote and facilitate the integration of businesses in Pakistan into the World economy and to encourage in the development and growth of Pakistani multinationals.
- To interact with governments in the economic development of Pakistan and to facilitate, foster and further the economic, social and human resource development of Pakistan.

The PBC Member Companies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LMC Lucky Motor Corporation

Pakistan Cables

Tri-pack
Tri-Pack Films Limited

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Executive Summary

Pakistan's agriculture sector—home to over **8 million farm holdings**—faces persistent **challenges: low productivity, fragmented markets, limited access to finance, and growing climate stress**. Agri-tech holds real promise in addressing these issues. Startups and larger agribusinesses are now experimenting with tools that range from **satellite-based crop intelligence** and **remote irrigation control** to **digital payments**, **input marketplaces**, and **smart warehousing**.

This policy brief maps the current agri-tech landscape in Pakistan, highlighting the areas where innovation is gaining ground: **digital platforms for market access**, **smart irrigation and water management**, **precision agriculture**, **financial inclusion**, and **real-time advisory services**. Drawing from in-depth case studies—including **Farmdar, RemoteWell, Godaam Tech,** and **Engro's UgAi platform**—the brief examines what's working, what's scalable, and where bottlenecks remain.

The findings are clear: while innovation is alive and growing, **scaling remains difficult**. Most adoption is still concentrated among **large, progressive farmers**. **Hardware-based models face high transaction costs**. Farmer trust is built slowly, often through repeated exposure and word-of-mouth. And without foundational infrastructure—like **rural connectivity**, **digital land records**, and **interoperable data systems**—most solutions remain local and fragile.

The brief offers targeted recommendations including **strengthening digital payments and warehouse receipt financing**, **investing in shared infrastructure**, **co-funding demonstration plots**, **clarifying regulatory roadmaps**, and **supporting ecosystem builders** with long-term capital. A standout insight is that **agri-tech adoption in Pakistan is often driven not by information, but by finance—and not by promotion, but by proof**.

Agri-tech is not a silver bullet, but it can be a catalyst. With the right enabling environment, it has the potential to **improve yields, reduce losses, expand financial access**, and **strengthen supply chains**. The opportunity now is to **move from pilots to platforms**—and to ensure that digital agriculture works not just for the few, but for the **millions who need it most**.

Introduction

Agriculture remains the backbone of Pakistan's economy, contributing nearly 20% to the national GDP and employing more than 37% of the country's labor force. Yet, the sector faces persistent challenges, including stagnant yields, inefficient resource use, climate vulnerability, and weak market linkages. To address these issues and unlock greater productivity and resilience, agricultural technology—**agri-tech**—is emerging as a key driver of transformation.

Agri-tech encompasses a wide spectrum of innovations, broadly categorized into **software-based solutions** (such as mobile apps, satellite imaging, precision advisory platforms, and digital marketplaces) and **hardware-based solutions** (such as modern machinery, irrigation systems, drones, and on-farm sensors). In Pakistan, while software-driven initiatives are making notable inroads, the country lags in hardware adoption. Mechanization levels remain low, with many small and medium-scale farms continuing to rely on manual sowing, transplanting, and harvesting. An investment fund operating in Pakistan recently noted that **98% of the global agritech investment opportunities they assess center around hardware (e.g., soil sensing, remote irrigation, mechanization)**, underscoring a global recognition that physical technology remains a critical backbone for sustainable agricultural development. In comparison, software solutions, while promising, require heavy investments in infrastructure, ground-truthing, and broader government support to scale effectively.

International experience reinforces that successful agricultural modernization demands progress on both fronts: countries like the United States, Brazil, and the Netherlands have simultaneously advanced mechanization (hardware) and leveraged digital technologies (software) to optimize farm operations and supply chains.

This policy brief examines the evolving agri-tech landscape in Pakistan. It is structured as follows:

- **Section 2** provides an overview of the key areas where agri-tech is gaining traction.
- **Section 3** presents case studies of companies leading innovation across these areas.
- **Section 4** identifies major challenges impeding broader adoption.
- **Section 5** outlines policy recommendations to foster a more robust and inclusive agri-tech ecosystem.
- **Section 6** offers a concluding reflection on the way forward.

By providing a comprehensive understanding of where the sector stands today and what it needs to thrive, this brief aims to guide policymakers, investors, and industry stakeholders toward effective actions that can help modernize Pakistan's agriculture for the future.

Areas Where Agri-Tech Is Making Inroads

While Pakistan's agricultural sector continues to grapple with structural inefficiencies, a wave of innovation is beginning to reshape parts of the landscape. Agri-tech startups and service providers are addressing key bottlenecks, offering solutions that range from improving market access to optimizing resource use.

These innovations fall into five broad areas:

- **Digital Platforms for Market Access**, which connect farmers directly with buyers, input suppliers, and warehousing services, reducing reliance on traditional middlemen.
- **Smart Irrigation and Water Management**, where IoT and automation tools are helping farmers optimize water use and energy costs.
- **Precision Agriculture**, using satellite and drone imagery combined with AI analytics to monitor crop conditions, detect issues early, and improve input targeting.
- **Information Services**, such as weather forecasting, crop advisory, and market pricing tools, many of which are localized in regional languages.
- **Agri-Fintech**, which focuses on credit scoring, input financing, digital payments, and post-harvest financing models.

The next section dives into specific case studies across these categories to understand what's working, what's scalable, and what lessons can inform broader sector development.

Case Studies of Agri-Tech Companies

While agri-tech innovation in Pakistan is fairly broad-based, some specific examples provide critical insight into how different models are being implemented. In this section, we look at companies that are doing the hard work of getting technology into the hands of farmers, agribusinesses, and other supply chain players. Whether it is helping farmers pay and get paid faster, improving on-farm irrigation, or using satellite data to predict harvests, these startups and platforms are tackling deeply embedded problems in creative ways. Some focus on small but critical fixes. Others are building full ecosystems. Each story sheds light on what it really takes to move the needle.

But before diving into individual company examples, it's worth reflecting on some sector-wide lessons. Karandaaz, one of the few organizations to work closely with agri-tech companies in Pakistan, has drawn useful insights from its experimentation with startups across the value chain.

Karandaaz: Lessons from Investing in Agri-Tech

Since 2021, Karandaaz has worked with a range of agri-tech startups across Pakistan— testing ideas, supporting pilots, and seeing firsthand what tends to stick in this space. Instead of trying to reinvent farming through flashy apps, the focus has been on helping build the financial and digital backbone that agriculture actually runs on.

Here's what they've learned:

1. **Upstream matters more than downstream**
   Startups that focused on payments, lending, and supply chain digitization fared better than those chasing last-mile e-commerce or direct-to-consumer apps. The sweet spot was in plugging into existing agricultural flows and making them work better.

2. **Finance opens the door—tech comes later**
   Farmers don't download apps because they want advice—they engage when it helps them get inputs, credit, or better payment terms. The lesson: solve a real pain point first, then layer on the tech.

3. **Market-led solutions are (usually) more resilient than policy-dependent ones**
   Karandaaz tried exploring policy levers like e-mandis and standardization, but with limited success. The real traction came from working directly with agri-businesses, NBFCs, and players who already had farmer relationships. It's slower, but it works.

Big picture?
Support for agri-tech should be built around what's actually working on the ground: bundled solutions, financial linkages, and tools that make life easier for the farmer—not just digital for digital's sake.

Agri-tech in Pakistan is often driven by startups—but one major move has come from an industry heavyweight. Engro Fertilizers is now experimenting with a direct-to-farmer digital platform called **UgAi**. By combining

product delivery with precision advisory tools, Engro is trying to change how farmers make decisions. The initiative is still early-stage, but it reflects a growing realization: **meaningful change may require established players to reinvent themselves too.**

Engro Fertilizers – UgAi and the digital resetting of farmer relationships

The Problem They're Tackling

Engro Fertilizers is one of Pakistan's largest input suppliers, but its outreach has traditionally been limited to ~2,200 dealers, who in turn sell to local input providers that eventually reach the country's 8 million farmers. Most small and mid-sized farmers rely on informal credit, often face delays in access, and risk receiving counterfeit or poor-quality fertilizer. At the same time, national yields remain low (e.g. Pakistan produces roughly half the global average for wheat). Engro saw both a business and sectoral opportunity to reach farmers directly and improve agronomic outcomes at scale.

The Solution and How It Works

In 2023, Engro launched **UgAi**, a digital platform that allows farmers to purchase fertilizer directly from the company, ensuring **timely delivery and product authenticity**. But the app is more than just a digital storefront—it also provides bundled services such as **weather forecasts, nitrogen uptake reports, irrigation timing alerts, and satellite or drone-based crop imagery**. Engro curated these features from multiple providers, integrating only those that could offer **clear, immediate value** to farmers. All services are provided free of charge, and field teams help with onboarding and interpretation.

What's Working

UgAi has started with a focus on 300–400 large, cash-paying farmers in Sindh, providing a reliable testing ground for advisory tools and digital ordering. The ability to purchase authentic fertilizer directly has been the strongest incentive for adoption—technology, in this case, rides on the back of a trusted product and brand. Engro also took the unusual step of advising farmers on optimal (not maximum) fertilizer use, helping reduce costs and build long-term trust. The app is fully integrated with Engro's SAP system and banking partners, making it ready to scale operationally once proof of concept is established.

Key Takeaways for the Sector

Farmers adopt technology when it is tied to something they already value—timely inputs, transparent pricing, and trust. UgAi shows that when a large player like Engro leverages its credibility and pairs tech with essential services, adoption becomes easier and more meaningful. **Rather than selling technology, the model succeeds by solving real, immediate pain points**—and building a platform around those.

While Engro's UgAi focuses on direct farmer engagement, other innovators are tackling agriculture from the opposite end—using data and precision intelligence to optimize decisions at a macro and micro level. Farmdar exemplifies how crop intelligence platforms are helping large agribusinesses and input suppliers drive smarter, faster interventions on the ground.

Farmdar – Building Trust through Data, Not Hype

The Problem They're Tackling

Farmdar set out to solve a dual challenge: **large agribusinesses lacked reliable, real-time data on what was being grown, where, and at what scale**, while farmers had no way of accessing precise, field-level insights to guide input use. The result was widespread uncertainty across the value chain—from millers and processors trying to plan procurement, to seed and fertilizer companies aiming to target their advisory and input distribution. Technologies like satellite and drones existed—but without clear applications and integration, they rarely translated into actionable insights for the sector.

The Solution and How It Works

Farmdar positions itself as a **B2B crop intelligence platform**, using satellite imagery and AI models to generate actionable data on crop type, acreage, stress levels, irrigation needs, and nitrogen uptake. Their system can estimate when a crop was sown, how it's progressing, and when it's likely to be harvested—down to the union council level. This data is used by agribusinesses/processors (mainly sugar mills), seed and fertilizer companies, and increasingly, exporters to make informed supply chain and procurement decisions.

Unlike many agri-tech startups, Farmdar made a conscious decision to avoid going direct to small farmers. Instead, they partner with companies that already have farmer relationships—like sugar mills, fertilizer companies, and soon, rice exporters—who use Farmdar's insights to guide field teams and improve input targeting. They also developed micro-level tools for individual farms, including boundary mapping and cost-saving input plans, but always through an intermediary (like customers of fertilizer companies or sugar mills).

What's Working

Farmdar now supports clients in sugarcane, wheat, maize, and rice—both in Pakistan and in other markets like Vietnam, Brazil, and Thailand. They've achieved over 95% accuracy in crop intelligence through ground-validated models and are becoming a critical part of procurement and planning workflows for large buyers. Their work with sugar mills, for instance, helps validate acreage claims and optimize farmer outreach. Just as important is Farmdar's work with agronomists from companies like FFC—helping them interpret the data so they can deliver more targeted, trusted advice to the farmers they already serve. This layered, B2B approach helps overcome both technical and behavioral adoption barriers.

Key Takeaways for the Sector

Data alone doesn't drive change—distribution and credibility do. Farmdar's model shows that agri-tech companies don't need to work directly with every farmer to have impact. By plugging into existing networks—sugar mills, input companies, large exporters—they can deliver value at scale without overwhelming smallholder systems. The lesson: scaling agri-tech isn't about flashy tools, it's about building quiet infrastructure that helps the rest of the system work better.While platforms like Farmdar focus on data and planning, another pressing need lies in day-to-day farm operations—particularly in basic infrastructure like water management. RemoteWell is addressing this gap by making irrigation smarter, more efficient, and less vulnerable to the risks of manual management and unstable electricity.

RemoteWell – Water Management at the Push of a Button

The Problem They're Tackling

For many farmers in Pakistan, irrigation still depends on electric tubewells tapping into groundwater—often the only available water source during critical crop stages. But this setup is fragile: frequent power fluctuations and lack of remote controls mean farmers have to physically visit fields just to switch pumps on or off. If the water table is low or electricity unstable, motors can burn out—a repair that takes weeks and costs thousands. These delays directly impact crop health and yield. At a broader level, Pakistan is extracting groundwater at three times the rate of natural recharge, raising urgent concerns about long-term water sustainability.

The Solution and How It Works

RemoteWell offers an **IoT-enabled device** that lets farmers control their tubewells via mobile phone and monitor motor performance remotely. The system helps prevent motor burnouts by detecting dry-run conditions, reduces energy costs through better scheduling, and improves overall water-use efficiency. The company also integrates soil moisture advisory which helps farmers align irrigation with actual crop needs.

Farmers pay a one-time installation fee and a small monthly subscription, while RemoteWell handles the backend—data connectivity, server management, and user support. The tech is designed to be simple, farmer-friendly, and low-maintenance.

What's Working

RemoteWell has installed multiple units across 33 districts and is now scaling rapidly through a distribution partnership with Fauji Fertilizer Company (FFC), which will embed the product into its national network of Sona Centers. This shift from direct-to-farmer sales to B2B distribution has significantly lowered customer acquisition costs and improved farmer trust. Farmers are increasingly recognizing the value—not just in automation, but in protecting costly equipment and improving input timing. The product also has strong potential for downstream value: water usage data could eventually be used for sustainability/traceability reporting or even water credit markets.

Key Takeaways for the Sector

Smart hardware solutions can deliver immediate value—but scaling them requires trusted distribution and low-friction support. RemoteWell's experience shows that farmers are willing to adopt new tools when the benefits are tangible and the interface is simple. But the real breakthrough came when the company partnered with a large agri-player—making the tech available where farmers already shop and eliminating the need to build trust from scratch.

It's a story of appropriate technology, strategic partnerships, and the quiet, patient work of rebuilding trust in technology at the field level.

Alongside production efficiency, another often overlooked—but crucial—area is post-harvest management. Godaam Tech is pioneering the digitization of agri-warehousing, connecting storage capacity with financing and market access, and helping farmers preserve value beyond the farm gate.

Godaam Tech – Reinventing Agricultural Storage for the Digital Age

The Problem They're Tackling

Every harvest season in Pakistan, farmers are forced to sell early—or lose part of their crop—not due to poor production, but simply because they don't have a place to store it safely. Most farmers still rely on informal, makeshift spaces or sell immediately to avoid spoilage, missing the opportunity to wait for better prices. Meanwhile, the country produces over 50 million tons of key grains with an estimated storage capacity of only 32 million tons—and much of that isn't suited for agricultural use. Without secure storage, farmers have limited access to post-harvest financing, export channels, or even basic price stability.

The Solution and How It Works

Godaam Tech is building a digital warehousing network—**leasing and upgrading agricultural warehouses, connecting them to buyers and banks, and making storage bookable and traceable through a digital platform**. Each warehouse is strategically located near mandis and crop-producing hubs to ensure accessibility, and is staffed by a lean team that handles intake, documentation, and inventory.

The company generates revenue through three key channels: storage fees (charged monthly based on volume), commissions from financing partnerships with banks, and sell-side commissions from linking stored produce to buyers or exporters. The model is designed to be capital-light, with warehouses leased rather than owned, enabling faster scale-up across key grain-producing regions. Facilities are prioritized based on cropping intensity, access to infrastructure, and proximity to financial institutions.

What's Working

The model is designed for rapid expansion—Godaam Tech leases rather than owns its facilities, allowing for lower capital intensity and flexibility. Warehouses are prioritized in areas with diverse cropping patterns, access to finance, and logistical support. The company is piloting financing partnerships with banks and planning to issue Electronic Warehouse Receipts (EWRs), enabling farmers to use stored grain as collateral. Initial traction has come from farmers, small traders, and processors who benefit from more reliable, formalized storage and potential financing opportunities.

What's equally notable is Godaam Tech's focus on **building trust in a behaviorally resistant market**—where many farmers are used to instant cash sales. By placing warehouses near mandis and offering flexible terms, the company is trying to gradually shift mindsets toward post-harvest value optimization.

Key Takeaway for the Sector

Storage isn't just about infrastructure—it's about enabling liquidity, price timing, and financial access. Godaam Tech's model shows how digitizing warehousing and linking it to buyers and banks can unlock real value for farmers and traders. But success depends on ecosystem alignment—banks, exporters, and policymakers must treat storage as the backbone of a more functional grain economy.

Godaam Tech's story reminds us that **agri-tech is not just about drones, apps, or sensors**. Sometimes, the biggest innovations come from **making old, ignored parts of the system—like warehousing—work better, faster, and smarter**.

By linking storage, finance, and market access through technology, Godaam Tech is building quiet but critical infrastructure for a more resilient agricultural economy.

Together, these case studies show that agricultural transformation in Pakistan is not driven by a single technology or actor. Rather, it is emerging through a network of initiatives—across production, finance, logistics, and advisory—each addressing specific bottlenecks in the agricultural value chain. The next section will examine the common challenges these innovators face, and what policy interventions could help unlock their full potential.

Challenges to Scaling Agri-Tech in Pakistan

Despite promising innovations and early signs of traction, agri-tech in Pakistan faces several persistent barriers that slow adoption and limit scale—particularly among small and mid-sized farmers. These challenges are not only technological, but behavioral, financial, and structural.

Farmer Adoption Is Driven by Familiarity, Not Just Awareness

Even when technology is available and relevant, adoption is gradual. As Farmdar and Engro's UgAi experience shows, farmers are not necessarily skeptical of tech—they're cautious. They tend to trust what they've seen work in their own fields or communities. This makes **familiarity and proof of concept** essential, especially for tools like satellite imaging or app-based agronomic advice.

Credit, Not Tech, Is Often the First Entry Point

Several examples highlight the same insight: for most farmers, the first real incentive to engage with digital platforms is **access to finance**—not advice or analytics. Platforms that lead with financing or input supply are more likely to retain users, with value-added services like advisory coming later.

High Transaction Costs for Smallholders

Most platforms—especially hardware or logistics-based ones like RemoteWell and Godaam Tech—find it **easier to pilot with large farmers**, who can pay upfront, absorb risk, and demonstrate outcomes. Extending these models to smaller farmers increases transaction costs significantly. Without a clear business model or strong public-private support, smallholder inclusion remains limited.

Lack of Shared Infrastructure

Agri-tech solutions often run into the **absence of foundational digital infrastructure**, such as:

- **Standardized land records** (to enable credit scoring or traceability)
- **Reliable internet access** in rural areas
- **Data integration** across systems for crop monitoring, payments, and storage

Without these, companies are forced to build much of the ecosystem themselves—limiting scale and raising costs.

Informal Market Norms Are Sticky

Whether it's storage, credit, or payments, **existing informal systems are deeply entrenched**. As Godaam Tech found, many farmers prefer immediate cash from a middleman over potentially higher profits from warehousing and delayed sale—even if they understand the math. Similarly, the credit habits tied to dealer relationships remain sticky and hard to displace. Changing these behaviors isn't just about better economics—**it takes time, repeated exposure, and trust-building** to shift long-standing practices.

Scaling Hardware Is Slower and Riskier

Hardware-led agri-tech models (like RemoteWell or smart irrigation) face additional hurdles:

- Higher upfront costs
- Longer onboarding and after-sales support
- While software solutions can scale quickly once adopted, hardware demands a slower, region-by-region rollout and often requires embedded services or distribution partnerships.

Fragmented Policy and Unclear Public Sector Role

Several organizations noted that while government stakeholders are interested and occasionally supportive, there is **no clear national framework for agri-tech adoption**. Public sector pilots like e-mandis or credit schemes often stall with political transitions. The **lack of policy continuity makes long-term alignment difficult**, prompting most serious actors to focus on market-based experimentation instead.

Recommendations: Unlocking Agri-Tech's Potential

While Pakistan's agri-tech sector is showing real promise, scaling its impact will require thoughtful interventions—ones that recognize where the private sector can lead, where government support is essential, and where farmers' incentives must come first. The following recommendations draw directly from the experiences of innovators already operating in the field.

I. Support First-Mile Financing and Payments Infrastructure

Why it matters: Access to finance—not tech—is often the most powerful entry point among farmers.
What to do:

- Expand digital lending schemes and CPR[1]-backed payments through partnerships with fintechs.
- Encourage warehouse receipt financing via accredited warehousing networks.
- Promote mobile wallet usage among farmers by linking it with payments, subsidies, and utility services.

II. Prioritize Infrastructure that Reduces Transaction Costs

Why it matters: Logistics, storage, and irrigation systems are essential enablers—but they need public support to be viable for smallholders.
What to do:

- Co-invest in smart irrigation pilots, especially in water-stressed regions.
- Expand rural internet and mobile connectivity with agri-tech needs in mind.
- Offer concessional finance or targeted support for shared services—like precision equipment, soil labs, or warehouse upgrades.

III. Build Trust Through Demonstration, Not Promotion

Why it matters: Farmer adoption is driven by proof and peer influence, not marketing.
What to do:

- Fund demonstration plots in partnership with trusted private actors.
- Leverage influential large farmers to create reference use cases.
- Encourage anchor buyers (e.g., mills, processors, exporters) to onboard their suppliers through bundled tech-finance offers.

1 Computerized Payment Receipt

IV. Strengthen Public–Private Alignment Without Heavy-Handed Control

Why it matters: Government support can unlock scale—but top-down pilots often fail without market alignment.
What to do:

- Clarify regulatory roadmaps for areas like EWRs, digital land records, and traceability.
- Focus on convening: enable structured engagement between startups, financiers, and agribusinesses.
- Channel public investment into digital public goods (e.g., open geospatial data, weather infrastructure, crop monitoring APIs).

V. Recognize That Hardware Needs a Different Support Model

Why it matters: Hardware-based agri-tech is capital-intensive, slower to scale, and often neglected by investors.
What to do:

- Offer R&D and scale-up grants tailored for hardware (e.g., soil sensing, remote irrigation, mechanization).
- Encourage partnerships between hardware firms and national distribution players.
- Use blended finance (grants, guarantees, concessional equity) to bridge pilot-to-scale transitions.

VI. Foster Long-Term Ecosystem Builders

Why it matters: Change takes time. Many players in the agri-tech space are building infrastructure, not just selling services.
What to do:

- Offer longer-term funding instruments (e.g., outcome-linked grants or milestone-based growth funding).
- Support organizations that enable cross-cutting services (data platforms, open APIs, rural logistics).

Conclusion and Way Forward

Agri-tech in Pakistan is no longer a niche—it's a growing field where startups, large agribusinesses, and financiers are actively experimenting with solutions to some of agriculture's toughest challenges. From digitizing warehousing and enabling smart irrigation to building direct-to-farmer platforms and precision advisory services, a new generation of innovators is showing that transformation is possible—even in a fragmented, under-resourced sector.

But transformation won't happen on the strength of innovation alone. Most models are still fragile, reliant on donor support, or viable only in narrow geographies or with large, progressive farmers. What they need now is a stronger enabling environment: infrastructure that lowers transaction costs, financing that supports early-stage scaling, and trust-building that helps convert one-off pilots into repeatable behavior change.

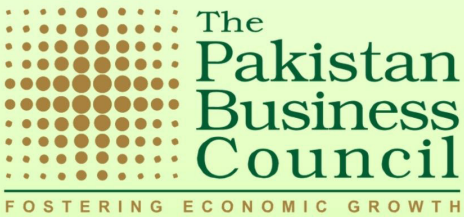
Government, development partners, and the private sector each have a distinct role to play. Policymakers don't need to design platforms—but they can create the rails for growth: clear regulations, digital public goods, and incentives that reward long-term ecosystem builders. Development partners can back risk-taking where commercial investors won't. And private players—especially large agri-businesses—can bring scale and reach that startups alone cannot achieve.

The opportunity is clear. If done right, agri-tech can improve yields, reduce losses, expand financial access, and strengthen resilience in the face of climate and market shocks. But this will require patient capital, smart policy, and a willingness to work across silos. The next chapter of Pakistan's agriculture story won't just be about inputs and acreage—it will be about data, design, and how quickly we learn what works.

Annexure

Comparison of case studies

Company	Problem Tackled	Solution Type	Scale / Stage	Key Enabler	Key Constraint
Engro UgAi	Low yield, poor input access, counterfeiting	App-based platform; bundled services (B2C)	Pilot: 300-400 large farmers in Sindh	Brand trust and bundled input sales	Farmer skepticism, tech seen as low priority
Farmdar	Lack of reliable crop data for agribusinesses	Satellite-powered crop analytics (B2B)	Growing: Operating across multiple crops and countries	Accuracy and relevance of satellite insights	Needs intermediaries for action
RemoteWell	Inefficient water use and motor damage	IoT hardware for tubewell control (B2C via B2B2C)	Mid-scale: now scaling with FFC	Partnership with FFC for scale	Hardware logistics and farmer onboarding
Godaam Tech	Post-harvest grain losses due to poor storage	Digital warehousing network (B2B)	Early scale: targeting 100+ in 2 years	Asset-light model and market need	Farmer habit change and financing alignment



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