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THE FUTURE OF AGRITECH IN BANGLADESH

Awakening the Slumbering Giant

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The Future of AgriTech in Bangladesh
Awakening the Slumbering Giant

CES WHITE PAPER
November 2023

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Executive Summary

I. A growing crop of agritech startups has been slowly but surely changing Bangladesh's slumbering agriculture sector. Agritech is a nascent sector, with the first few significant players in the vertical being less than a decade old. However, the sector has made meaningful headway, raising nearly \$14 million in total funding. Companies in the sector are dealing with some of the most pressing challenges that Bangladesh's agriculture sector is facing today.

Adorsho Pranisheba, one of the players in the space, has developed an IoT-enabled solution to monitor cattle health in real-time. The company uses the data to generate health insights and, based on the data, offers insurance and credit facilities to farmers.

Khaas Food, a player operating in the output market linkages, works directly with farmers to collect produce and sell directly to customers via its e-commerce website and retail chain.

Agroshift, a B2B player in the output market linkages segment, takes orders from B2B customers and micro-retailers, collects produce from farmers through its collection centers, and distributes directly to customers. The company raised \$1.8 million in pre-seed investment last year. Fashol, another player in the output linkage vertical, uses a similar model and has built a thriving B2B business. It has also raised \$1 million in investment this year.

Output linkage agritech players address a number of challenges plaguing the agriculture value chain in Bangladesh, such as a fragmented supply chain that diminishes the earnings of farmers, price volatility in the output market due to information asymmetry, lack of traceability, wastage in the supply chain, etc. The vertical has so far the highest number of agritech players. Prominent players include Fashol, Agroshift, Khaas Food, Neofarmer, Ghorerbazar, GreenGrocery, etc.

Financial solutions for farmers is another important vertical within the agritech that has seen meaningful activities.

iFarmer, one of the early agritech players, started as an agri-fintech company, providing low-cost credit facilities to farmers by connecting farmers with retail and institutional investors. The company has since evolved into a full-stack player with operations in output linkage, input linkage, and advisory. It is one of the highest-funded startups in the vertical with over \$3.5 million in total funding.

Wegro is another player in the financial services space, connecting investors with farmers.

Access to quality input and advisory is another challenge that agritech companies have been looking to address. Right and high-quality inputs are often expensive and not widely available.

Bhalo is a leading player in the vertical, working directly with input manufacturers and distributors to aggregate inputs and collaborates with retailers to sell inputs to farmers bundled with advisory services to help them choose the right inputs and best practices.

The companies in this segment are addressing challenges related to access to high-quality inputs at fair prices and providing knowledge and information about choosing the right input and the correct approach to usage.

As the agritech ecosystem matures, players are likely to expand horizontally across agritech segments to own the end-to-end relationship with farmers. A few companies have already started working toward this ambition.

Grocery and retail players have also entered the space. Chaldal, the leader in online grocery, now has a meaningful output market linkage play under its CDVN segment.

Traditional agribusiness companies have also started paying attention. ACI, one of the prominent players in the agribusiness space, has launched a comprehensive app that combines commerce and information.

Over the last two years, agritech has seen accelerated activity. The number of companies has increased, and the vertical has attracted growing investor interest. However, the sector is still in its infancy, and the potential of the vertical has barely been scratched.

II. With the rise of urbanization and the proliferation of industrial and service sector jobs, agriculture might not appear as tangible as it once did. Fresh vegetables may seem like something Chaldal or Foodpanda prepares upon receiving our on-demand orders, while fresh fish might appear as products made by Shwapno or Agora. Modern humans might have lost their connection to the food system, but agriculture continues to exert an outsized influence on their lives.

Agriculture stands as a crucial pillar in Bangladesh's socio-economic story. Despite the gradual ascent of industrialization and the service sector over the past several decades, the sector is a dominant force in the country's economy. In 2021-22, agriculture contributed 11.66% to the nation's total GDP¹. Additionally, in 2022, the sector employed 45.3% of the total workforce in the country².

The sector plays an essential role in reducing poverty and ensuring food security in the country.

The second-order impacts of agriculture are even more pronounced, serving as the backbone for many thriving industries by supplying raw materials and providing backward linkages. It makes the village economy work across Bangladesh.

¹ Bangladesh Bureau of Statistics, 2023

² BBS, 2023, Quarterly Labor Force Survey 2022 Provisional Report

For those concerned about existential challenges like major pandemics or great power struggles such as significant wars, agriculture serves as the ultimate hedge, as evidenced during the recent coronavirus pandemic.

The relative importance of agriculture may have diminished in the lives of modern urban-dwelling individuals. However, its true significance as the linchpin of the economy, ecology, and livelihood remains unaltered.

Despite its incredible importance, agriculture faces a series of critical challenges that have intensified over the past few decades, such as productivity challenges, access to finance, market, and information for farming communities, wastage across the value chain, lack of technology adoption, etc. The shifting economic landscape has exacerbated these challenges by draining the sector of its human resources. Declining arable land and natural resources have added to that challenge, underscoring the importance of developing new agricultural technologies, such as submergence-tolerant seed varieties, and novel farming technologies to enhance productivity.

Agriculture is an exceptionally resilient sector, an example of true anti-fragility.

There is now a growing realization of the critical importance of agriculture. Policymakers are paying meaningful attention to it, and interest in the sector is on the rise. The trend of return to farming has even captured the elite educated class and is poised to become mainstream.

In this context, agritech startups are seeking to disrupt Bangladesh's agriculture sector, particularly in response to the major challenges the sector faces. Starting with market linkages, these innovators are introducing financial and insurance solutions for farmers, efficient input and output market linkages, information services, precision agriculture, and a host of other solutions.

Investments in Bangladesh's food and agri-tech startups have also been consistently growing, with several estimates suggesting that the total investment in the food and agritech sector has reached a cumulative US\$14 million over the last few years³.

III. While Bangladesh's agri-tech scene has been growing consistently, the sector is still in its early days. This is reflected in the number and type of companies in the vertical. The total funding in the vertical is also meager compared to other markets such as India or Indonesia. Several factors contribute to this. First and foremost, Bangladesh's startup ecosystem remains relatively small and is in its early stages. The activities in agritech are reflective of this reality.

A large number of agritech companies are focused on business model innovation aimed at addressing fragmented supply chain challenges in the middle and downstream parts of the agriculture value chain, financial services for farmers, market linkages, and information

³ Bangladesh Startup Ecosystem Funding Dashboard. (n.d.). LightCastle Partners. Retrieved September 30, 2023, from <https://www.lightcastlebd.com/bangladesh-startup-ecosystem-dashboard/>

asymmetry challenges. A smaller number of companies operate in precision agriculture and the use of advanced technologies in agriculture.

This represents a significant distinction between Bangladesh's agritech ecosystem and markets like India and more advanced markets like the US, which have a greater diversity of companies across the value chain, including those working on pioneering technological innovations addressing more fundamental aspects of agriculture.

While agritech in Bangladesh like its overall startup ecosystem is just getting started, we need more actions in the sector. The pool of promising agritech startups with meaningful growth potential, lucrative business models, and compelling product offerings is slim. Many companies are operating in similar markets with homogenous business models. The sector needs more diverse players across the value chain. Similarly, existing agritech startups should prioritize sustainable growth while pursuing opportunities to scale.

Given the challenges faced by agriculture in Bangladesh, we believe that solutions to improve productivity will have significant potential to improve farmers' incomes and ensure food security in the future.

Meanwhile, the government has begun to focus on agritech. As part of recent policy developments. Smart agriculture has become a critical component of the government's upcoming industrial policies.

Traditional agriculture companies should take note of the unfolding and rapidly evolving landscape of agritech. Traditional agriculture companies in Bangladesh have shown little inclination toward business model innovation. Only recently have some of these players started to address this gap by increasing their investments in innovation, as agritech players slowly shake the sector.

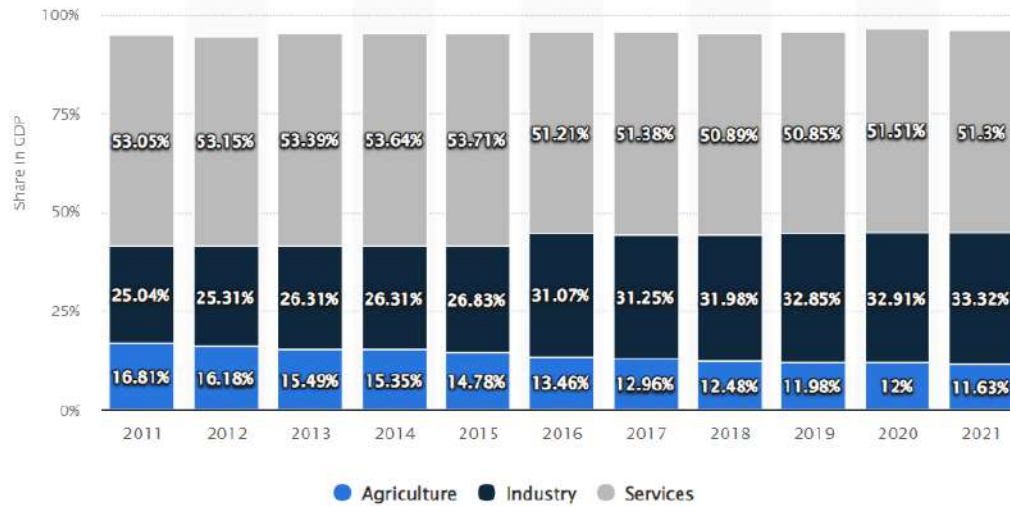
We believe that the untapped market potential and opportunities in agritech will continue to drive growth in this space over the next decade. In that vein, there should be more investment in R&D and greater collaboration between research organizations such as Universities and agritech players. Efforts should be made to create an innovation cluster aka ecosystem around the agritech. Overall, the sector deserves more attention from both investors and relevant public and private stakeholders.

This whitepaper provides an overview of the state and the future of the agri-tech industry in Bangladesh within this context. We have organized this paper into six sections: 1) the importance of agriculture for Bangladesh, 2) the agriculture opportunity, 3) the challenges in the agriculture sector, 4) the agri-tech play across the agriculture value chain 5) the current state of Bangladesh's agri-tech landscape, 6) observations and recommendations for going forward.

What agriculture means to Bangladesh's economy

Being a riverine and densely populated country, agriculture holds special significance for Bangladesh.

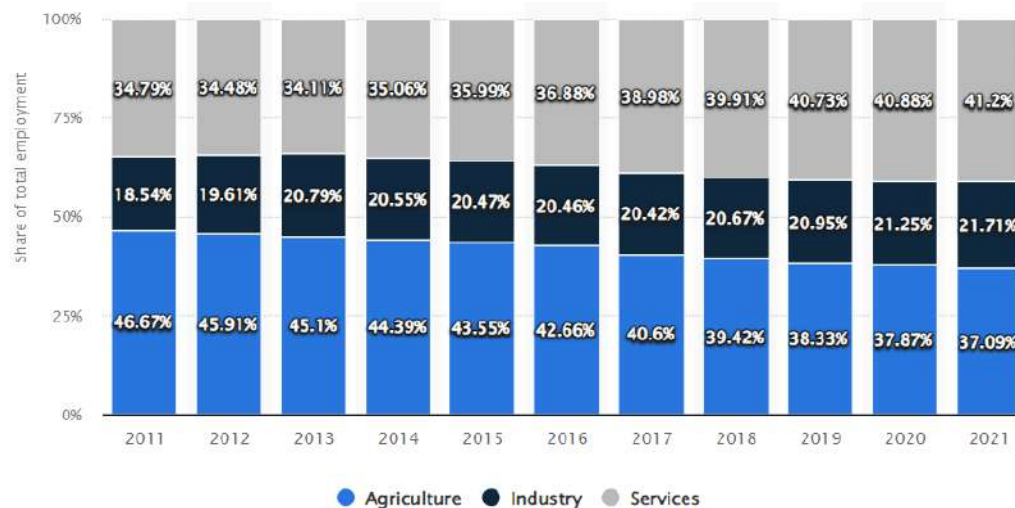
Graph: Share of economic sectors in the gross domestic product (GDP) from 2011 to 2021



Source: *Statista, Worldbank*

- The graph above illustrates the distribution of economic sectors within Bangladesh's GDP from 2011 to 2021. In 2021, agriculture accounted for 11.63% of Bangladesh's GDP.

Graph: Distribution of employment by economic sector from 2011 to 2021



Source: *Statista, Worldbank*

- The graph depicts the employment distribution in Bangladesh by economic sector from 2011 to 2021. In 2021, 37.09 percent of the workforce in Bangladesh were employed in the agricultural sector, while 21.71 percent were in the industrial sector, and 41.2 percent worked in the service sector.

Contribution to GDP: In 2021-22, agriculture contributed 11.66% to Bangladesh's total GDP. Historically, in most countries, the relative significance of income and employment from agriculture has diminished, and the same holds true for Bangladesh. However, the absolute contribution has not; in fact, it has increased.⁴

Largest Employer: Despite its declining share of GDP, agriculture is by far the largest employer in the country. In 2022, the sector employed 45.3% of the total workforce in the country, and approximately 70% of the population depends on agriculture in one form or another for their livelihood. Agriculture also stands out as the single industry that generates such a substantial number of jobs.

Export Earnings: Agriculture significantly contributes to the country's export earnings by exporting agricultural commodities, whether they are in their r

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⁴ Asaduzzaman, M. (2021, March 26). Agriculture in Bangladesh: The last and the next fifty years. *The Daily Star*. <https://www.thedailystar.net/supplements/celebrating-50-years-bangladesh/news/agriculture-bangladesh-the-last-and-the-next-fifty-years-2066689>

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While agritech in Bangladesh like its overall startup ecosystem is just getting started, we need a more processed form.

Second-Order Impacts: Agriculture's second-order importance, often underestimated, is even more critical. It serves as the backbone of the food processing industry, rural economies, ecology, and food security.

- Agriculture serves as the primary source of raw materials for various industries such as the agro-industrial sector encompassing food processing. The food processing industry contributes approximately 13 percent to the total manufacturing production value and employs 6.5 percent of the manufacturing labor force. Moreover, it engages 1.4 percent of the country's overall labor force, primarily comprising small- and medium-sized enterprises closely integrated with local production.

Rural Economy: Agriculture serves as the primary driver of economic linkages in rural regions, assuming a fundamental role in poverty reduction.

⁷ Bangladesh Startup Ecosystem Funding Dashboard. (n.d.). LightCastle Partners. Retrieved September 30, 2023, from <https://www.lightcastlebd.com/bangladesh-startup-ecosystem-dashboard/>

Future-Proofing the Nation Against Major Disasters: Agriculture is the ultimate robust industry. A thriving agriculture sector can serve as a significant safeguard against global-scale uncertainties, including the possibility of natural disasters, political crises, or major great-power conflicts.

The Agriculture Opportunity

Agriculture is one of the most fascinating markets in Bangladesh, brimming with opportunities to build substantial enterprises with generational impacts. We look into the market sizes within different verticals of the agriculture sector in Bangladesh.

Agricultural products market: In 2019-20, Bangladesh's agricultural output was about 70 million metric tons, led by rice, potatoes, and sugar (80%), and fruits, vegetables, and spices (17%). The agricultural product market size is estimated at \$47.54 billion⁸.

The agro-food industry is approximately 1.7% of GDP, employing 250,000 people, and accounting for approximately 3.5% of exports. In FY 2018-19, exports generated \$1.41 billion, primarily in frozen fish, shrimp, tea, spices, and fruits. Major markets include the EU, US, Middle East, and Gulf. The domestic packaged food sector was \$5.2 billion in 2018, expected to grow to \$7.3 billion by 2023, driven by edible oils, dairy, and snacks at a 6% annual growth rate. Furthermore, processed fruits and vegetables, seafood, and meat are expected to experience robust growth at rates of 8%, 13%, and 13% per year, respectively⁹.

Total Market Size for Agricultural Products: 2016-2021 (in \$million)¹⁰

	2016	2017	2018	2019	2020	2021
Total Local Production	\$30,424	\$33,374	\$35,882	\$38,095	\$37,568	\$38,801
Total Exports	\$1,488	\$1,625	\$1,418	\$1,600	\$1,343	\$1,586
Total Imports	\$5,991	\$9,470	\$5,952	\$8,000	\$8,442	\$10,334
Imports from the U.S.	\$496	\$889	\$1,087	\$1,300	\$966	\$1,031

⁸ Bangladesh - Agriculture Sectors. (2022, July 20). International Trade Administration. Retrieved September 30, 2023, from <https://www.trade.gov/country-commercial-guides/bangladesh-agriculture-sectors>

⁹ Agro Processing. (n.d.). BIDA. Retrieved September 30, 2023, from <https://bida.gov.bd/agro-processing>

¹⁰ Bangladesh - Agriculture Sectors. (2022, July 20). International Trade Administration. Retrieved September 30, 2023, from <https://www.trade.gov/country-commercial-guides/bangladesh-agriculture-sectors>

Total Market Size	\$34,927	\$41,219	\$40,417	\$44,495	\$44,667	\$47,549
Exchange Rates	79	81	82	84	85	85

total market size = (total local production + imports) - exports)

Agriculture input markets:

The Bangladesh seed market is expected to grow from \$245 million in 2023 to \$305 million by 2028 at a 4.48% CAGR. The country consumes around 6.9 million tonnes of chemical fertilizers, mainly importing urea, triple superphosphate, diammonium phosphate, and MOP.¹¹ In 2021, farmers used insecticides (4,636 tonnes granular, 2,240 tonnes powder, 6,345 tonnes liquid) and fungicides (18,000 tonnes) for crop protection.¹²

(In '000' metric ton)

FY	Name of Fertiliser										Total
	Urea	TSP	DAP	SSP	NPKS	MOP	AS	Gypsum	Zinc	Others	
2013-14	2462.00	685.00	543.00	0	27.00	577.00	3.00	126.00	42.00	0.40	4465.40
2014-15	2638.00	722.00	597.00	0	27.00	640.00	6.22	122.00	39.00	0.00	4791.22
2015-16	2291.00	730.00	658.00	0	39.59	727.00	9.96	229.42	53.43	0.00	4738.40
2016-17	2366.00	740.00	609.00	0	40.00	781.00	10.00	323.30	57.47	0.00	4926.77
2017-18	2427.46	706.62	689.90	0	50.00	789.47	10.00	250.00	80.00	90.00	5093.45
2018-19	2594.00	781.00	763.00	0	50.00	724.00	10.00	285.00	95.00	120.00	5422.00
2019-20	2505.00	660.00	953.00	0	42.00	715.00	6.00	360.00	115.00	101.00	5457.00
2020-21*	2450.00	500.00	1300.00	0	40.00	750.00	4.00	550.00	141.00	130.00	5865.00

Source: FFM, Ministry of Agriculture. * provisional figure.

Use of Fertilizers in Bangladesh | [Source](#)

The agricultural machinery market in the country reached \$1.2 billion in 2019. The market is growing, influenced by factors such as a rapid decrease in agricultural labor availability and increased crop production opportunities.¹³

The annual demand for animal feed in Bangladesh is about 6.3-6.4 million tonnes, surpassing production in 2020. In 2019, the annual market demand for feed was estimated at approximately 4.7 million metric tonnes. The feed sector's market size in Bangladesh was estimated at \$2.5 billion in 2019.

¹¹ A fertilizer crisis in the making! | Prothom Alo. (n.d.). Prothom Alo English. Retrieved September 30, 2023, from <https://en.prothomalo.com/bangladesh/a-fertilizer-crisis-in-the-making>

¹² Parvez, S. (n.d.). Dollar crisis hurts pesticide imports, may hit crop output. The Daily Star. Retrieved September 30, 2023, from <https://www.thedailystar.net/news/bangladesh/agriculture/news/dollar-crisis-hurts-pesticide-imports-may-hit-crop-output-3247156>

¹³ Seraj, S. (2020, July 10). Agricultural machinery: Where is Bangladesh heading? The Daily Star. Retrieved September 30, 2023, from <https://www.thedailystar.net/country/news/agricultural-machinery-where-bangladesh-heading-1927969>

The challenges of agriculture

Bangladesh's agriculture sector faces a variety of structural challenges that hinder its ability to reach its full potential. These challenges include low productivity, post-harvest losses, insufficient access to high-quality agricultural inputs such as fertilizers and seeds, a fragmented output supply chain, limited access to finance, and information, and scant technology adoption and innovation, among others.

We take a closer look at the major challenges confronting Bangladesh's agriculture sector. These challenges also underscore the scale of potential opportunities available for ambitious entrepreneurs to develop solutions. While many agritech startups do focus on addressing some of these challenges, the current agritech landscape is just scratching the surface.

Fragmented agribusiness ecosystem: Bangladesh's agricultural ecosystem is significantly fragmented due to the presence of multiple intermediaries and middlemen throughout the value chain. This fragmentation leads to reduced farmer income, higher consumer costs, price volatility, and increased wastage.

- **Output market linkages:** Farmers often depend on multiple layers of middlemen to sell their products. Across various agricultural products, there typically exist 5-7 layers of middlemen between farmers and consumers. Farmers typically receive just 30% of the final selling price. According to an Asian Development Bank (ADB) report, in Bangladesh, this share is even lower: 27% for red amaranth, 44% for pineapples, 45% for tomatoes, and 46% for cucumbers¹⁴. Several factors contribute to this, including limited access to wholesale markets, reliance on local collection centers, information asymmetry, intermediary aggregators, inadequate storage, wastage, weak bargaining power, and a lack of price forecasting and crop insurance utilization.
- **Inputs market linkages:** High-quality agricultural inputs are often expensive and not widely available. Farmers often choose lower-quality agricultural inputs due to accessible credit and lower prices. Limited awareness of high-quality inputs and overuse of fertilizers, water, and pesticides lead to increased costs, lower efficiency, and soil degradation. Inadequate data on input supply and demand causes price volatility. Growing input costs, especially fertilizers, outpace crop price increases, further reducing

¹⁴ Islam, J. (2020, August 11). Middlemen eat into farmers' profits. The Business Standard. Retrieved October 1, 2023, from <https://tbsnews.net/economy/agriculture/middlemen-eat-farmers-pie-117898>

farmer income. This problem is exacerbated by the unavailability of key inputs during peak seasons.

Access to finance: In Bangladesh, 80% of farmers are smallholders who lack formal financing options, relying on high-interest loans from various sources¹⁵. Almost 70% of farmers typically don't have access to formal financing in Bangladesh. Financial institutions such as Banks and NBFIs deem farmers ineligible for loans. Limited digitization and financial management on the part of farmers also make it challenging for financial services providers to offer credit to smallholder farmers.

Productivity challenge: Bangladesh's agriculture sector faces the urgent task of increasing productivity amid population growth. This requires mechanization, modern techniques, like drought-resistant seeds and precision farming, and the development of new technologies, such as salt/submergence-tolerant seeds. Land scarcity, with a high population density of 1,239.7 people per square kilometer, and climate change vulnerability add to the challenges.

Technology adoption: The adoption of technological innovation in the agricultural sector of Bangladesh is poor compared to other developing nations. Lack of digital literacy, low technology adoption, and limited data access across the agricultural value chain hinder farmers' visibility into crop yield, soil productivity, price information, etc.

Smallholder farmers: The small and marginal farmers need to be supported in maintaining their relevance, earning meaningful living, and continued growth.

Labor shortage and limited mechanization: As more people migrate toward non-farm jobs, the proportion of the prime working-age population engaged in agriculture has diminished. This shift has resulted in a labor shortage for farmers, particularly during peak harvest and sowing seasons. Moreover, small and marginal farmers face difficulties in adopting mechanization solutions due to capital shortage, coupled with limited access to affordable financing options.

¹⁵ iFarmer is Creating a New Model For Empowering Farmers. (2021, October 24). Future Startup. Retrieved October 2, 2023, from <https://futurestartup.com/2021/10/24/ifarmer-is-creating-a-new-model-for-empowering-farmers/>

Agritech plays across the value chain

As we have seen above, there are key pain points that exist along the agriculture value chain. The opportunities for agri-tech players are huge across the value chain. In all estimates, agritech players in Bangladesh are still scratching the surface and just getting started.

We take a look across the agriculture value chain to identify opportunities for agritech players through the lens of challenges the agriculture sector is facing in Bangladesh.

Value chain	Instantiation
Market linkages for agricultural inputs	<p>Agricultural inputs include seeds, fertilizers, pesticides, machinery, and feed.</p> <ul style="list-style-type: none"> ● Developing platforms—digital marketplaces and physical infrastructure—that offer farmers convenient access to high-quality agricultural inputs. ● Advisory to farmers to choose and use the right inputs ● Provide farmers credit facilities to access high-quality inputs
Farming, cultivation, and harvesting	<p>Focuses on enhancing productivity and farm management through automation, precision technology, new farming and farm management innovation, and advisory services.</p> <ul style="list-style-type: none"> ● Farming as a service ● Farm equipment rental ● Precision agriculture and farm management ● Utilization of geospatial and weather data, IoT, sensors, robotics, etc., to enhance productivity ● Agriculture advisory and information services
Output market linkages	<p>Output market linkages include supply chain solutions and access to markets for farmers.</p> <ul style="list-style-type: none"> ● Digital platforms and physical infrastructure for managing post-harvest supply chains and connecting farm output with customers
Financial services	<p>Lending and insurance solutions targeting the agriculture value chain</p> <ul style="list-style-type: none"> ● Providing credit and insurance solutions tailored to farmers and the broader agriculture value chain such as credit facilities for input procurement, equipment, etc., and crop and livestock insurance ● Facilitating connections between farmers, retail investors, and established financial services companies.

Information and advisory	<ul style="list-style-type: none"> Information and advisory platforms for agronomic, pricing, market info, and farmer education
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Technologies leveraged by agritech players: Agritech companies in Bangladesh are employing a diverse array of technologies. Here are some of the commonly used technology stacks:

Technology stack	Vertical	Prove solved	Examples of players
Data analytics and machine learning	Precision agriculture and Financial services	<p>Improved productivity by providing insights on weather and soil/livestock health, etc.</p> <p>Data and insights for efficient resource utilization, including water and labor and better farming techniques.</p> <p>Predictive credit rating models to assess farmers' creditworthiness.</p>	Adorsho PraniSheba, iFarmer, WeGro
Data and platforms for price discovery, transparency, and demand and supply prediction	Inputs market linkage Supply chain tech and output market linkage	<p>Better returns for Farmers and waste reduction through higher supply chain visibility and transparency</p> <p>Online platforms for price discovery, and demand gauging for inputs and outputs</p>	Fashol, Agrishift
IoT, AI, ML, Robotics	Precision agriculture	<p>Understanding soil quality</p> <p>Monitor cattle health and growth and match that with</p>	Adarsha PraniSheba, iPage, InsureCow

		insurance and finance	
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Dominant drivers of current agritech trends in Bangladesh

The most influential factors driving current agritech trends in Bangladesh are supply chain and market inefficiencies and evolving consumer behavior towards consuming healthier food— in fact, a marriage between these two. However, this trend will change in the upcoming years as agritech companies consolidate and new players focus on addressing more substantial challenges such as productivity.

- **Market linkage players in inputs**, combining technology with physical infrastructure, ensure price certainty, advisory support, and input quality for farmers. Many adopt a "phygital" model by partnering with retailers and input companies to address accessibility challenges.
- **Output market linkage players are important for several reasons.** With a growing middle-class population, expected to reach 30 million by 2030, the demand for high-quality agricultural products has gone up significantly over the last decade, amplifying the importance of farm-to-retail/table output market linkage agritech players. These companies tackle inefficiencies in agricultural product output supply, forming the largest segment within agritech. These players, both B2B and B2C, reduce wastage and price volatility in the supply chain by directly connecting farmers with customers and improving visibility and traceability throughout the agricultural product supply chain. These players are also increasingly using the “phygital” model.
- **Productivity through data-driven precision agriculture:** Productivity in agriculture relies heavily on understanding factors such as soil quality, weather patterns, crop health, and soil health. Data-driven precision agriculture has the potential to meet these needs and can also drive efficiencies in resource utilization. A small number of precision agritech players have emerged, leveraging IoT and novel technologies to monitor everything from soil conditions to livestock health, they provide valuable insights, and advisory services to farmers.

Dominant business models in agritech

Business models significantly vary. Some players such as iFarmer have evolved into platform play by connecting different ends of their business making their business model complex. However, the common business models can be divided into three:

- **Margin-based models:** Players make money from margins. Market linkage players, both farm inputs and and outputs, operate through this model where the agritech player earns margin by creating marketplace linkages at the input or output side, and by offering fulfillment services. These players often use an aggregation model where they aggregate demand from customers and hope to use that market power to bargain for a greater margin from the suppliers. On the input end of the business, players also earn from advisory or use advisory as a potential competitive moat to attract and keep farmers with them.
- **Subscription-based models:** Players offer a mix of software, hardware, and services to help farmers improve crop yields, track the quality of produce, or trace the produce across the value chain. Agritech players in precision agriculture and farm management segment solutions usually use this model where they use a monthly or annual subscription model.
- **Transaction/commission-based models:** Players charge per transaction in the form of commission/fees/interest. Players in the financial services segment predominantly use this model.

The State of Bangladesh's Agri-tech Landscape

Overview

Bangladesh's agriculture sector faces a long list of challenges hindering its full potential. This is where the emerging agritech ecosystem enters the spotlight. Though in its early stages, agritech companies hold promise in addressing key agricultural challenges by democratizing farmer access to information and technology, overcoming financing obstacles, enabling market access, and providing precision technology to boost yields.

Agritech startups operate in a market estimated at \$47.54 billion, for agricultural products alone. The opportunity dramatically expands when you include agri-inputs, technologies to improve productivity, food processing, and finance. This opportunity has garnered attention, interest, and capital. Investments in Bangladeshi agri-tech startups steadily grew in recent years, with most of the agritech funding between 2016 and 2023 going to startups focused on disintermediating the agriculture supply chain i.e., reducing intermediaries by providing direct market linkages to farmers at the input and output stages and agriculture financing solutions.

Total funding for food and agriculture startups in recent years reached approximately \$14 million. While modest compared to India or Indonesia, it's significant within Bangladesh's startup ecosystem, where raising capital remains a significant challenge for founders.

While many agritech companies are in their early stages, some have experienced meaningful growth. A few have transitioned from vertical players to platform play. These moves are natural as companies raise investment and pressure to achieve scale growth, prompting horizontal and vertical expansions. For instance, iFarmer has already entered into platform play where it owns the end-to-end relationship with the farmer. In the output market, some players own the entire farm-to-table value chain.

Dhaka's agritech scene also embraces the 'phygital' model, combining physical and digital approaches. Many agritech firms now have a substantial physical presence with field personnel and collection/distribution centers for farmer interaction along with their tech operations.

Business models in agritech continue to evolve, with revenue models varying from margin-based to subscription to transaction-based, depending on the specific agritech segment being addressed.

Traditional players have also started paying attention to the space in the unique Bangladeshi fashion. In 2018, ACI launched 'Fosholi', an Android application, which provides access to high-quality agricultural inputs, services, information, and solutions in one platform.

Bangladesh's digital ecosystem has been witnessing healthy tailwinds with growing smartphone and internet penetration. Digital commerce has seen meaningful growth. The confluence of these factors presents an opportunity for innovation in the agricultural ecosystem.

As we noted above, challenges across the agriculture value chain are substantial, creating ample room for tech-first companies to thrive. Tenacious founders and eager investors have already started paying attention to the vertical. With the right blend of technology, entrepreneurship, and investment, the sector has the potential to transform the nation's agriculture.

Notable agritech players in Bangladesh

iFarmer is a Dhaka-based agri-tech platform that connects farmers with capital, knowledge, inputs, and markets. Founded in 2018, the company started by addressing the challenge of access to capital. The company claims it currently has about 99,000 farmers in its network, facilitating more than BDT 2.24 billion million funding support for farmers. While iFarmer started with finance and inputs, the company now helps farmers to sell their products directly bypassing middlemen. The company has also been working on advisory and precision farming products.

Bhalo Social Enterprise is an omnichannel marketplace offering smallholder farmers access to high-quality agriculture inputs. Founded in 2019, Bhalo offers curated high-quality farm inputs such as seeds, fertilizers, chemicals, etc., and advisory and credit facilities to farmers which increase their production and income. The company does this by connecting smallholder farmers

to high-quality farm input suppliers and financial institutions, using technology and a network of exclusive sales agents, logistics hubs, and retail outlets.

Fashol.com is a wholesale agriculture products marketplace for retailers. The company collects agricultural products such as fruits and vegetables from different parts of the country, brings them to its distribution center, sorts them using an in-house sorting method, and then delivers them to partner retailers directly at their doorsteps.

Nagarkrishi is an online marketplace offering a comprehensive range of products and services for urban farming.

AgroShift sources agriculture directly from farmers and sells to micro-retailers and customers. Micro retailers can order digitally and Agroshift collects produce from farmers through an established process.

WeGro connects individual and institutional financiers with farmers and their agricultural projects.

InsureCow offers “a 360° technology-powered cattle insurance and wellbeing monitoring platform.”

As we mentioned earlier, the largest number of agritech startups operate in the output market linkage space. **Khaas Food, Chaldal, Premium Fruits, NeoFarmers, GhorerBazar, GreenGrocery**, and a number of omnichannel players are building supply chain solutions for farm-to-table solutions. These companies work directly with farmers to collect agricultural products and deliver them directly to customers through ecommerce and physical retail stops. Some of these companies are also involved in contract farming.

We have also seen some work in precision agriculture, farm advisory solutions, and livestock monitoring solutions through IoT-integrated hardware and software for sensing, and monitoring.

iPage is one of the players in this space that provides farmers “with easy access to all required agricultural information on time for a better productivity and enhanced profitability.”

Adorsho PraniSheba Limited is another player that “assists marginal cattle farmers in with IoT-based cattle identification, wellbeing monitoring, insurance, access to finance, crowdfunding, online veterinary services and forward market linkage support.”

Understanding the current landscape and opportunity

Bangladesh's agritech sector is still in its infancy. As noted above, the cumulative investment in the vertical is no more than \$14 million over the last several years. The number of companies is not that high either. However, the sector offers a huge opportunity.

Startups like iFarmer have raised significant investments. Companies like WeGro have received backing from investors like Accelerating Asia. Output market linkage startups such as Agroshift and Fashol have raised investment from local and international investors. Several bootstrapped players have significantly scaled their operations such as Khaas Food, and NeoFarmers operating on the output market/retail end of the value chain. We are seeing global marquee investors taking interest in the sector.

Companies addressing access to finance challenges of farmers have so far received the most funding. Some of these companies such as iFarmer, while started as a financing business, have expanded to become what many people call full-stack end-to-end agri-tech players. We have a good number of players in the output market linkage space. There are companies looking to address the productivity challenge through precision technology, the use of IoT, and similar technological solutions.

Compared to the opportunity the sector offers, the activities are still insignificant. But gauging the interest indicates that we'll be seeing more activities in the coming days as the global funding downturn and economic uncertainties ease.

Our research helped us to gain a meaningful understanding of the sector and the potential challenges the sector is facing. We have triangulated our learning with other emerging tech sectors in Bangladesh such as ecommerce, software, on-demand delivery, and healthcare in an effort to develop a meaningful understanding of the vertical.

Based on our research we have divided the agritech startups into 4 key sub-sectors. In each sub-sector, we will briefly look at the opportunities and challenges, major players, and dominant business models.

- Input market linkages
- Farming, cultivation, and harvesting
- Supply chain tech and output market linkage
- Financial services

Input linkages market: Solving price volatility, quality challenges, and sub-optimal input selection

Agri-input markets include seeds, fertilizers, pesticides and chemicals, animal feed, and agri machinery. Although Bangladesh has a large agri-input retail network across the country, farmers continue to struggle to access quality inputs at the right time. Accessibility is a challenge where farmers don't have access to high-quality inputs and the fragmented nature of the input supply chain increases prices. The other challenges include farmers' lack enough knowledge about the quality of the input and best usage practices.

Key agri-tech insights

- **Streamlining the supply chain:** Agritech players in this space address supply chain challenges by building input marketplaces, working directly with retailers and manufacturers, and selling directly to farmers through their network of distribution channels. Agritech players usually run a 'phygital' model, combining a digital marketplace for inputs with a network of retail outlets. This allows these companies to gather data about demand and supply and create better predictive models.
- **Advisory:** Agritech players in this space also provide advisory to farmers, helping them to choose the right input.
- The key challenge is to offer meaningful value to farmers through offering credit or other means so that they stick around.

Prominent agritech players: iFarmer

Players in this space are experimenting with several models. For instance, there is the Bhalo and iFarmer model which is often called the managed marketplace model where the agri-tech player works with the manufacturers to aggregate products and supplies to retailers/franchises, and then farmers buy from these retail stores. The agri-tech player then can turn these shops into a platform to offer advisory services and also to buy output from farmers.

Supply chain and output linkages market: Addresses inefficiencies in the supply chain and ensures fair prices for farmers

The post-harvest agriculture supply chain is riddled with inefficiencies, middlemen, and information asymmetry that eats into the income of farmers and increases prices for customers. Players in this space disintermediate middlemen to offer better prices for farmers and cheaper costs of procurement to retailers and customers. This segment has the largest number of players in the agritech space. There are companies building B2B supply chains such as Fashol, Agroshift, and iFarmer, and there are companies that have been running digital and retail B2B and B2C models such as Khaas Food, GreenGrocery, NeoFarmer, DeshiFarmer, Premium Fruits,

and a host of others. This vertical has also seen a good number of funding activities. Agroshift raised over \$1.8 million in funding. Facial raised \$1.0 million in pre-seed this year. GreenGrocery also raised several hundred thousand dollars in funding.

Key agritech insights:

- Agritech companies use digital platforms to take orders and manage the supply chain and use collection centers or farmgate to buy outputs. The model allows greater supply chain visibility, price transparency, demand estimation, and lower wastage.
- We believe there are significant opportunities in both farm-to-table and farm-to-B2B space.
- The key challenge to scalability is maintaining consistent quality of produce at scale.

Prominent agritech players: Fashol, Agroshift, Khaas Food, Neofarmer, Chaldal, iFarmer, GreenGrocery, Ghorerbazar, DeshiFarmer, etc.

Farming, cultivation, and harvesting management

Productivity is increasingly a major challenge for Bangladesh's agriculture. Climate change and similar challenges have further exacerbated this challenge. This space requires a greater number of high-impact players. Several players are operating in space across a number of segments:

- **Precision agriculture:** Precision agriculture companies use technology to collect data such as soil samples, weather, etc. using IoT sensors, drones, satellite imagery, etc., organize and analyze data through digital applications, and offer insights and advisory to the farmer to improve crop selection, yields and health. The data can also be used to provide credit and finance.
- The key challenge to scaling these services is establishing the need and building an affordable model for farmers to use these technologies.

Prominent agritech startups: Adorsho PraniSheba, iPage, iFarmer,

Financial services: Addresses the lack of access to financial solutions

Almost 70% of the farmers don't have access to formal finance in Bangladesh. There are companies like iFarmer, Wegro, InsureCow, and Adorshop PraniSheba that have been looking to solve this challenge.

- Traditional financial service providers usually don't lend to farmers. Agritech players who operate in this space connect farmers with retail and institutional investors through digital platforms.
- Agritech companies often build creditworthiness profiles of farmers to assess risk.

Prominent agritech startups: iFarmer, WeGro, InsureCow

Aquaculture: The supply chain for fish and meat remains largely unorganized. There are several startups looking to organize the fish and meat market in Bangladesh. Protein Market, Fishmart, BengalFish, and SeaFishBD are some of the notable players in the space.

Agritech Investment Landscape

Investment activity in Bangladesh’s agritech sector is largely dominated by agriculture financing, input linkage, supply chain tech, and output market linkage segments. iFarmer, AgroShift, Fashol, and WeGro all have raised investment in the last two years.

Major investors who have invested in Bangladesh’s agritech startups in recent years:

Startup Bangladesh Limited
Millville Opportunities Management
South Asia Tech Partners
IDLC Finance
DEKKO ISHO
Zayn Capital
Falcon Network
Accelerating Asia
Sketchnote Partners

Anchorless Bangladesh
Ratio Ventures
Sabr Capital
Shorooq Partners
UNCDF
Bill and Melinda Gates Foundation

Table: Top funded Agritech start-ups as of September 2023

Startup	Disclosed funding	Investors
iFarmer Has built an ecosystem of services that deal with access to finance, market, input, and advisory for farmers.	\$3.5Mn	IDLC Ventures, Millville Opportunities Fund, Startup Bangladesh, Accelerating Asia, Falcon Network
Agroshift Sources agriculture produces directly from farmers and sells to micro-retailers and customers.	\$1.8Mn	Shorooq Partners, Anchorless Bangladesh, Julian Shapiro, Ratio Ventures, Sketchnote Partners, Sabr Capital.
Fashol Connects farmers with retailers and B2B customers.	\$1Mn	DIVC, SOSV, South Asia Tech Partners, Ambareen Reza Zubair Siddiky
WeGro Connects individual and institutional financiers with farmers and their agricultural projects.	\$100k	Biniyog Briddhi, Accelerating Asia
GreenGrocery Green Grocery is an online grocery seller aspiring to be a leader in the Organic food industry in Bangladesh.	\$100k	M Asif Rahman, Nazmul Hasan Rupok, Jahangir Alam, Pran Krishna Paul, Ashif Anam Siddique and Md. Shahjahan.

Key segments that have attracted investor funding include:

- Supply chain tech and output market linkage
- Financial services
- Inputs market linkages
- Precision agriculture

Bangladesh's agritech market has a significant runway for growth given the nascency of digital solutions coupled with the huge opportunity in the agriculture sector.

Observations about Bangladesh's agritech sector

We need more activities and startups: Although the overall agritech ecosystem in Bangladesh is less than ten years old, we need greater actions in the space. There should be more diverse startups and more local investment in the sector.

Funding remains a challenge: Total investment raised by Bangladeshi food and agriculture startups is estimated at \$14 million, which is quite insignificant compared to the potential of the sector and compared to investment in Bangladesh's neighbor India and peer Indonesia. Insufficient access to investment is one of the reasons behind the slow growth of the sector. The other side of the coin is that the lack of enough promising startups in the agritech sector limits potential investment opportunities.

Local agriculture conglomerates should invest in agri-tech companies instead of doing it in-house: While Bangladesh's corporate culture has a tendency where companies tend to do everything in-house and resist collaboration, it often leads to suboptimal outcomes. Instead, local conglomerates will do well if they collaborate with agritech startups.

Emergence of end-to-end agritech players: Even though the opportunity size in the agritech space is large, thin margins across segments make it challenging for players operating in single verticals. A number of agritech players are already looking at end-to-end platform play and the number is only going to increase in the coming years.

Entry of retail grocery players and e-commerce players into the sector: Large retail players are faced with the challenge of thin margins, especially in the case of fresh produce and grocery. Moreover, customers today want high-quality agricultural products. As a result, retailers like Chaldal and Shwapno are investing in directly working with farmers. Case in point, Chaldal, the leader in online grocery, has strong agriculture operations through its CDVN initiative. Shwapno, one of the largest organized retail players in the country also has initiatives for working directly with farmers.

Consolidation: There are a lot of companies with similar business models and target customers. Consolidation among replicable business model players will happen in the coming days.

Long-term orientation: Bangladesh agritech players will be wise to approach venture building from a long-term sustainable perspective instead of choosing venture back aggressive expansion. First of all, growing at all costs days are gone given the global funding winter. Secondly, the investment landscape for Bangladeshi startups remains challenging. So finding a business model that can lead to profitability should be a key priority for agritech players in Bangladesh.

Depth over breadth: A lot of companies currently looking to amass market power through aggregation. However, companies will be wise to look for greater integrated play to serve customers better than spreading themselves too thin in pursuit of aggregation play.

Conclusion

Increased investment activity in the last few years has helped accelerate the growth of agritech in Bangladesh. However, for the Bangladesh agritech to reach its potential, stakeholders across the agriculture ecosystem need to come forward and play an active role.

Agritech ecosystem: Innovation happens in clusters. Any successful industry, be it garments in Bangladesh or tech in Silicon Valley, is a result of coming together of relevant stakeholders and building an ecosystem. Similarly, agritech growth will need an ecosystem at the intersection of multiple stakeholders including startups, technology providers, private companies, food process companies, agricultural players, research institutions, and the government.

R&D, academia, and industry collaboration: A significant percentage of agritech startups are operating around business model innovation whereas agriculture in Bangladesh faces even greater challenges. We need innovation for productivity, to combat the impact of climate change and automation. This will require greater collaboration between academia and the industry.

Agritech startups: The sector needs more startups in diverse verticals within agritech. The current agritech market is highly homogeneous in nature. Similarly, startups need to demonstrate the skill to scale and build profitable businesses to receive attention from investors.

Government: Smart agriculture is a major focus for the government in the coming years. The government can support the growth of underdeveloped segments such as precision agriculture, automation, and access to government research facilities to use the data and commercialize potential innovations.

Cross-country learning and collaboration: One of the ways to close the innovation and technology gaps in agritech will be to learn from markets where agritech has already made meaningful progress.

Agriculture is the ultimate schlep blindness: Consequential enterprises are built at the intersection of two things: solving critically important problems in a difficult field. When you are doing something important, it gives you meaning. Humans need meaning to stay driven. And if you are doing something important it is likely to be difficult. More importantly, difficult and boring problems are often overlooked providing unique opportunities to build consequential things. Agriculture, in this context, is a perfect intersection of these two things.

Agriculture suffers from the ultimate schlep blindness in Bangladesh. The sector is important — we have discussed its critical importance to Bangladesh. It offers incredible opportunities. It remains and will remain relevant for ages. It is the ultimate anti-fragile sector. If you are someone who values long-term thinking, agriculture is the ultimate long-term thinking — it'll likely be around to the end of the world. Despite the huge potential, the sector lacks activities and initiatives. One of the reasons we believe behind these low activities is that agriculture is difficult and hard active. The sector is also viewed as mundane. That's what Paul Graham, Founder and former President of Y Combinator calls Schlep blindness, which simply means we tend to avoid tedious and boring tasks. And that's precisely why entrepreneurs should get down to learn about the sector and go and build their next venture there.

The second point to note is that although investor interest in agritech has been growing, this interest is proportional to the overall attention Bangladesh startup ecosystem receives, which means, the current agritech landscape in Bangladesh is small and is just getting started. As a result, while similar ventures in other markets, such as Indonesia, have successfully raised substantial capital, Bangladeshi startups still struggle to gain attention. Better access to funding for agritech startups could have led to more promising outcomes in the sector. We believe that investors and local conglomerates would be wise to pay more attention to this overlooked sector in Bangladesh.

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