

The ecosystem path to elevating agriculture finance



Abstract

Global food demand is increasing rapidly and will continue to do so fueled by growing population. With the world population expected to touch **9.7 billion by 2050¹**, **food production needs to increase on an exponential scale**. Global agriculture faces physical constraints such as highly stressed natural resources, increased urbanization, climate change, and water scarcity among others, necessitating a significant surge in the annual investment needed to increase food production to required levels. By leveraging new technology advancements ranging from robotics and drones to predictive algorithms, modern agriculture can be transformed to address major issues like a rising global population, farm labor shortage, and dwindling natural resources. This translates into a unique opportunity for financial institutions to offer affordable credit to farmers, ranchers, and rural communities to take advantage of technology innovations to enhance production and move toward sustainable agriculture - one of the targets set by the **United Nations as part of its Sustainable Development Goals (SDGs)**. This white paper discusses opportunities available to financial institutions to support **sustainable economic growth** through affordable agriculture finance along with market-based safety nets. It also examines how financial institutions can facilitate the flow of long-term investment finance to the agricultural community.

Feeding an expanding world population: Technology to the rescue

In the 21st century, agriculture faces multiple challenges: it must produce more to feed a growing population amid constraints such as scarcity of natural resources, climate change, economic uncertainties, and the need to quickly adopt more efficient and sustainable production methods. Transforming the agriculture sector can create jobs, raise incomes, reduce malnutrition, and drive the growth of the middle and working classes in turn kickstarting the economy. The solution lies in embracing digital technology driven farming solutions such as precision agriculture on a large scale and using internet of things (IoT) and big data analytics solutions, which can help farmers increase the quantity and quality of their produce in the face of rising population and climate change.

[1] United Nations, Growing at a slower pace, world population is expected to reach 9.7 billion in 2050 and could peak at nearly 11 billion around 2100, June 2019, Accessed October 2021, <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>

The future of agriculture technology

Embracing technology innovations in modern agriculture is more necessary than ever before. Agriculture organizations are increasingly recognizing the need for automation, robotics, and artificial intelligence (AI) backed innovation in areas such as livestock, greenhouse practices, and precision agriculture. **Annual agriculture technology investment** has continuously increased over the past few years reaching a record USD 22.3 billion in 2020.² The rapid pace of investment and broad adoption of digital technologies are tremendously helping farmers to reduce costs, boost yields, and put more money in their pockets.

Cloud computing technology deserves a special mention as it has the potential to become a tremendous asset to the agriculture industry. Cloud-based technology solutions can help optimize farming efficiency as they offer storage, speed, and greater compute power to aggregate the plethora of information from sensors and monitoring tools that collect soil data, crop data, weather data and field images during the growing season. With cloud solutions, farmers can now proactively solve problems within the same growing season and thus increase efficiency and productivity.

In recent years, agricultural companies have been creating cloud powered solutions to:



Pull satellite images, biomass metrics and geolocated, agronomic data through machine-learning (ML) algorithms to give farmers valuable insights.



Enable timely, in-season agronomic insights, real-time post-harvest analysis and simplified recordkeeping to drive data-driven decision-making.



Manage the collection, processing, and analysis of seed-growing data, including temperature, humidity levels, and prevailing soil conditions to provide access to real-time information on mobile devices.

Role of financial institutions in enhancing agricultural productivity

Farmers' decisions to invest and produce are closely influenced by access to financial instruments. Improving access to finance can increase farmers' investment choices and arm them with more effective tools to manage risks. While financial institutions are supporting agricultural needs and propping up rural economies, historically, challenges such as the systemic risk agricultural activities are typically exposed to and the lack of financial infrastructure in rural areas have increased the risk exposure. Over the past two decades, new approaches aimed at mitigating these challenges have emerged. One area that has great potential is the use of technology to facilitate financial transactions related with agriculture.

[2] Finistere, Finistere Ventures 2020 Agrifood Tech Investment Review, April 2021, Accessed October 2021, <https://finistere.com/news/finistere-ventures-2020-agrifood-tech-investment-review/>

New opportunities in agri financing

According to the American Bankers Association's 2020 Farm Bank Performance Report, the banking industry accounts for a major share of all farm loans in the US – USD 174 billion as of December 2020.³ With the meteoric rise in the **global smart agriculture** market size, financial institutions must develop ongoing relationships with farmers, meet needs beyond routine requirements, as well as offer customized solutions to mitigate seasonal and market risks throughout the cycle, regardless of size and scale.

Transforming into an agri-focused financial institution

In a rapidly changing landscape, banks can turn to innovations backed by the most advanced technologies to grow their business, cut costs, and transform the customer experience (see Figure 1). The convergence of big data, AI, cloud computing, and IoT increases banks' ability to innovate with confidence, improve efficiency and risk management, expand customer base, and meet the financial needs of rural America.

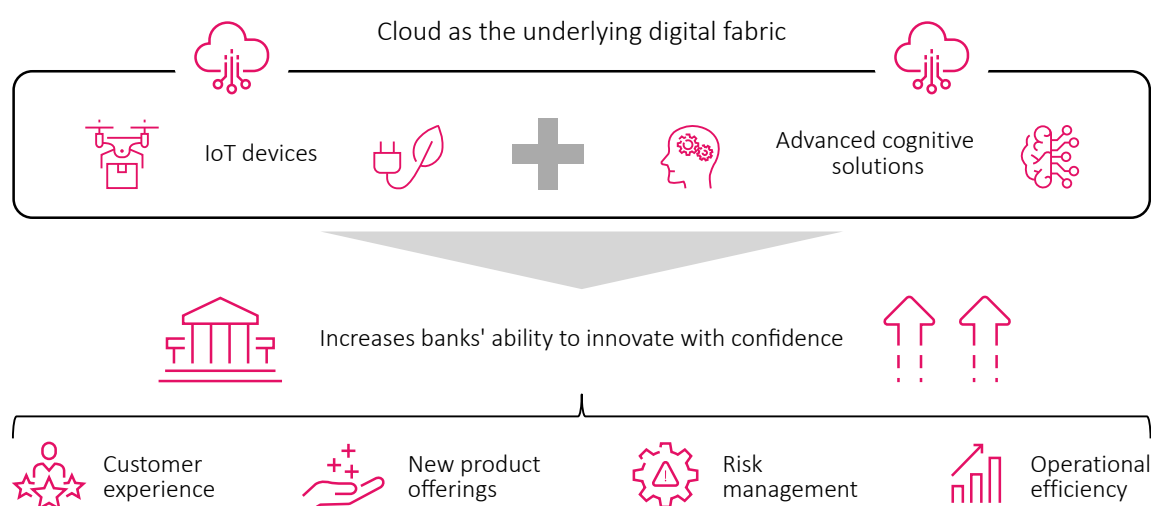


Figure 1: Technology innovations to enable seamless agri-finance

To become an agri-focused financial institution, banks must orchestrate **purpose-driven ecosystems** (see Figure 2) to enable the various agricultural players in the value chain to seamlessly collaborate and create new value-added products and services considering evolving consumer preferences and regulatory requirements. Creating such digital ecosystems will help banks drive production innovations and deliver a transformative customer experience to farmers besides unlocking exponential value for all the stakeholders through co-innovation networks.

[3] American Bankers Association, ABA Report: Farm Bank Lending Remains Strong at \$98.6 Billion in 2020, June 2021, Accessed October 2021, <https://www.aba.com/about-us/press-room/press-releases/farm-bank-lending-remains-strong-in-2020>

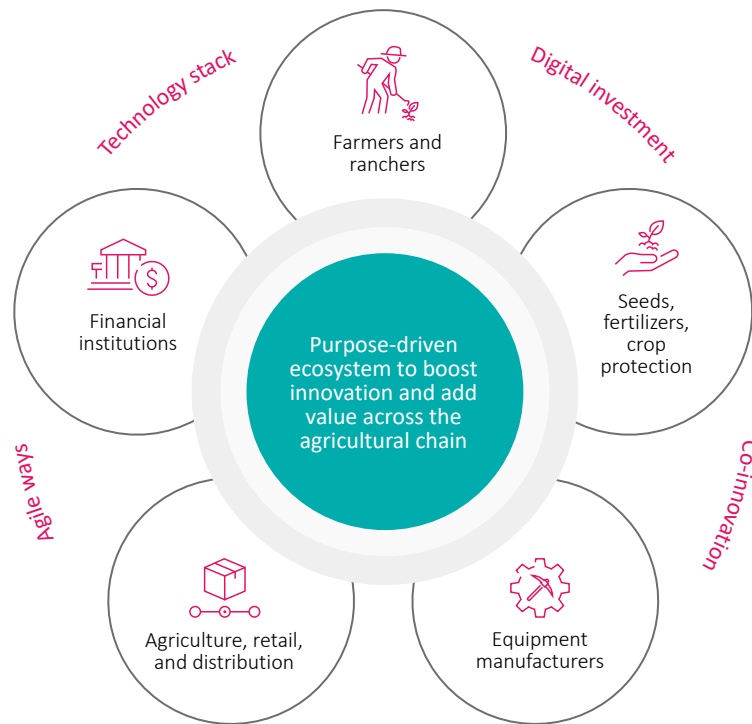


Figure 2: Purpose-driven agri ecosystem

Foundations of an effective agri ecosystem

To build a healthy, thriving, and effective ecosystem, financial institutions must initiate some important measures.

Strengthen the digital platform

Financial institutions must select ecosystem partners based on their strengths, business strategies, focus within the value chain, and revenue generation model. However, integrating the various ecosystem players on to a single digital platform is essential to success. To accomplish this, financial institutions must embrace technological advancements like cloud and microservices and build scalable and integrated digital platforms to elevate the customer experience through the provision of banking and non-banking services. Key components of such a platform include:



Advisory chatbots: AI-powered chatbots (virtual agents) to assist farmers with advice and recommendations on specific problems.



Collaboration platform: Digital collaboration platforms for agricultural clients to connect with each other and a central knowledge base comprising information, research, and direct contact with dedicated agriculture experts to access the latest farming techniques and exchanges ideas.



Innovation network: Co-innovation networks that pair farmers with emerging, sustainable companies to address farmers' challenges.

Establish a data ecosystem

A data ecosystem that incorporates new, unconventional, and external sources of data beyond conventional information generated internally has the potential to deliver significant value. Financial institutions must put in place a continuous process for identifying, engaging with, and evaluating new external data sources and integrating them to build databanks with consistent, benchmark data on the agriculture sector **to inform risk management strategies**. By leveraging digital cloud technologies and the data ecosystem, financial institutions can promptly identify risks by capturing, monitoring, and studying crop information and use predictive algorithms to analyze and validate the information furnished by farmers.

Leverage actionable insights

With diverse and compound data sets, financial institutions must adopt the recent technological evolutions in big data analytics to process data in near real-time and harvest valuable insights tied to key business goals and strategic initiatives. Tapping into AI and ML techniques can help financial institutions unlock value from actionable insights through efficiency gains, upsell and cross sell opportunities, and innovative offerings such as:

- **Value chain finance** including multi-party arrangements between financial institutions, agribusiness companies, and farmers
- Agricultural insurance schemes like **index-based crop insurance**

The bottom line

As gatekeepers of capital, financial institutions, play a vital role in shaping the trajectory of local and global communities. Given the rising focus on the social consciousness of financial institutions, banks are embracing sustainability through concentrated measures and committing to lead the way in reaching the **UN's Sustainable Development Goals (SDGs) including those related with sustainable agriculture**. Consequently, banks that tailor financial products to the needs of farmers and agri businesses by leveraging digital technologies stand to gain ground and surge ahead of the competition.

About the authors

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Rajnish V Palande is vice president and business head of the Google Cloud unit in TCS' Banking, Financial Services, and Insurance (BFSI) business unit. Focused on increasing agility and enabling holistic modernization of financial services organizations through leveraging cloud capabilities, Rajnish has been instrumental in driving growth and transformation and enhancing customer and employee experience as well as operational excellence with a customer-first approach for various large financial services institutions. With over two decades of experience in IT and the BFSI industry, Rajnish is an expert in strategy, leadership, business consulting, transformation, planning, and executive relationships. He holds bachelor's degrees in Science as well as Computer Engineering from Mumbai University, Mumbai, India.

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Awards and accolades



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