



Strengthening Financial Resilience in Agriculture
Knowledge Exchange Series Part 2

Disaster Risk Financing Solutions for Climate-resilient Livelihoods in the Agricultural Sector

**Session 4: Lessons Learned from Fintech and Agritech for
Agricultural Insurance and Finance**

**Disaster Risk Financing
& Insurance Program**

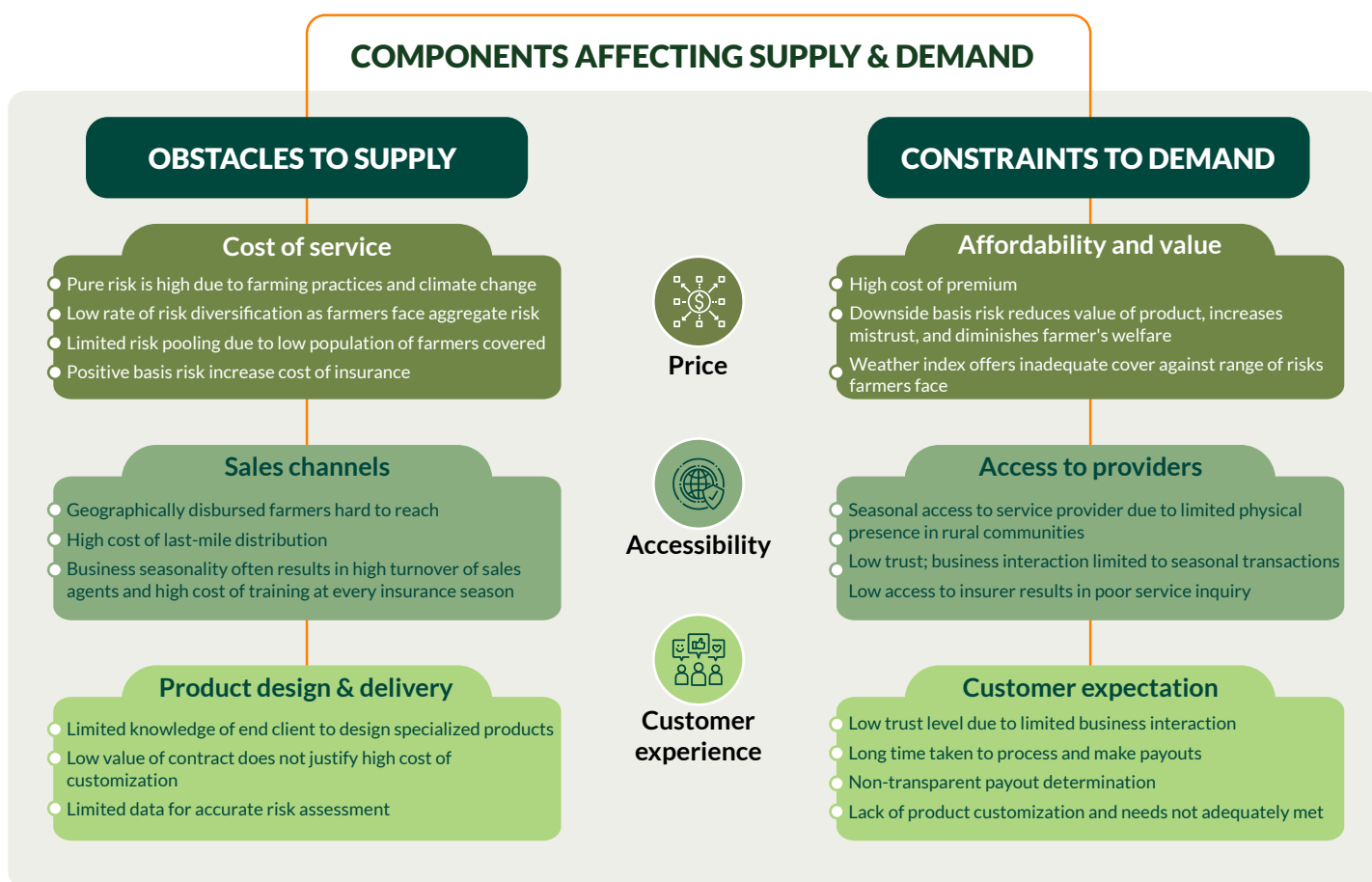
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Challenges to scaling up agricultural and microinsurance

Despite more than a decade of experience and high levels of premium subsidies, only a few micro-level index-based agricultural insurance schemes targeted at small-scale farmers have achieved scale and sustainability globally.

Studies on index-based climate and disaster insurance across African and Asian developing countries find persisting constraints to demand and obstacles to supply¹. In terms of supply, challenges with accurate risk assessment, robust product and index design, high cost of last mile distribution, ability of customer in using services, and claims processing remain. On the demand side, high premium costs, basis risk, inadequate coverage of risk and needs, limited trust, and untimely payouts continue to prove problematic. Levels of trust have yet to increase due to low familiarity with index-based insurance. In most cases, farmers’ interaction with insurers is limited to one transaction during the insurance sales season and one transaction at claims payout, if any. See Figure 1.

Figure 1: Obstacles to supply and constraints to demand for micro-level agricultural index insurance



Sources: authors

¹ADB, 2019. Disaster Insurance in developing Asia: An analysis of market-based schemes; and Bharat Inclusion Initiative. 2021. Scoping meso-level insurance in agriculture in India and DAI, 2018. RESEARCH STUDY INTO THE MESO-DISASTER RISK INSURANCE MARKET WITHIN SUB SAHARAN AFRICA

Beyond the limited level of financial protection, the smallholder agriculture sector remains largely depressed due to numerous challenges such as high labor intensity; lack of access to data; lack of access to markets; limited access to formal finance due to lack of collateral to secure financing and lack of data to appropriately assess their credit risk; and extreme weather events due to climate change, which affects productivity. Meanwhile, the COVID-19 pandemic, which accelerated the adoption of digital technologies and innovative solutions across all sectors, sparked the development of new agriculture technology (agritech models) and enhanced fintech businesses. The pandemic also resulted in Governments prioritizing investments in internet connectivity and consumers adopting digital payments and e-commerce across both developed and emerging markets.



Landscape of agritech and fintech

The combination of factors above and rapid technological advances are driving the expansion of fintech and agritechs – digital companies and businesses that aim to increase productivity, profitability, and access to services and markets in the agricultural sector. These businesses are addressing a wide range of needs that smallholder farmers face, which include:



Production information and advisory services: provide credible, actionable information in real-time to increase efficiencies in labor, input utilization, precision farming, planning, and management, ultimately increasing productivity and incomes.



Market linkages: provide tools to help farmers link to markets, including digital platforms to sell farm produce, logistic services, and processing in some cases.



Agricultural analytics: enable data-driven decision-making by farmers, their service providers, and policymakers by leveraging data infrastructure, drone technology, remote sensing and mapping technologies, precision agriculture tools, and computing power.



Financial inclusion and financial protection: provide credit and savings products, insurance, and other innovative financial services that enable farmers to invest in their farms by acting as a digital financial service provider or linking farmers to conventional financial service providers.

Table 1 provides a summary of some of the most well-known and fastest-growing entities and the needs that they meet.

The most successful agritech and fintechs are building an ecosystem of services, taking a holistic approach to meet a range of needs, aggregating demand and supply, and digitizing processes and transactions. These ecosystems generate essential data on farmers’ behavior, which is used to develop and refine proprietary credit rating models and facilitate lending to small-scale farmers that traditional lenders underserve.

The most successful agritech and fintechs solutions incorporate the following features:

- i** Building robust ecosystems – enabling farmers to forward linkages with off-takers or market and backward linkages with suppliers of inputs;
- ii** Taking a holistic approach – providing high-quality inputs and customer-centric financing approaches, including flexible repayment terms, credit-linked insurance, and asset protection insurance;
- iii** Employing aggregation – aggregation of both demand and supply of inputs to lower the cost of inputs per unit due to economies of scale;
- iv** Digitizing registration, business processes, and transactions – reducing operational costs and eliminating market inefficiencies through automation.

The leading markets globally on agriculture ecosystems include Israel, Netherlands, China, India, and Indonesia, primarily driven by enabling regulations under which fintechs and agritechs:



Register as a non-banking financial institution




Have a less complicated regulatory framework




Have lower capital requirements




Table 1: Examples of agritechs and fintechs in Africa, Asia, and Europe

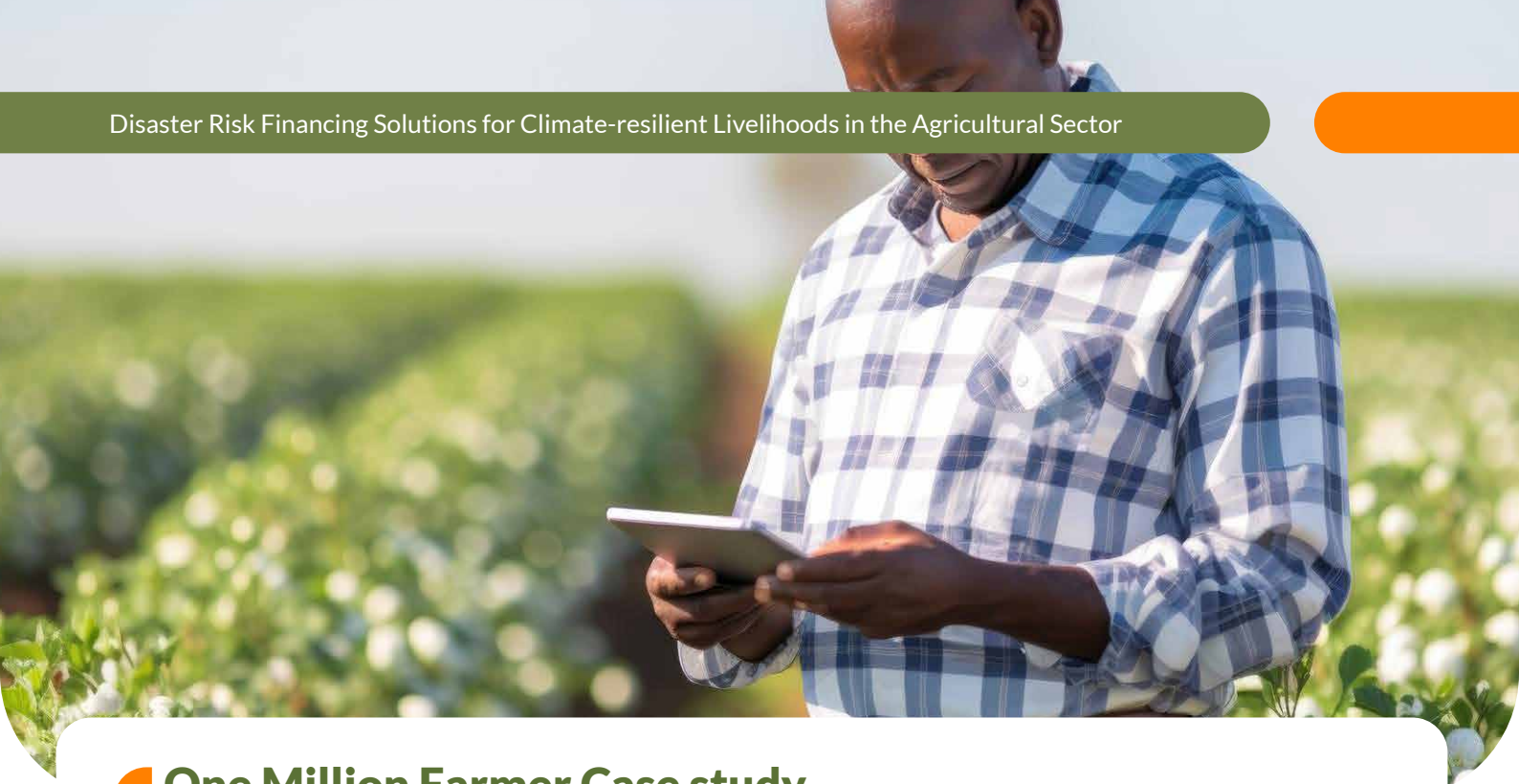
	Needs met	Results and impact
Production Information & Advisory, Market Linkage, Financial Inclusion	Digifarm Kenya (Safaricom service) <ul style="list-style-type: none"> • Providing discounted inputs to farmers with financing option • Accessing insurance bundle on yield impacting natural calamities for loan products • Providing learning materials on livestock and crops both in digital and SMS formats • Providing market access to farmers to sell their products 	<ul style="list-style-type: none"> • 160,000 engaged farmers • 62,000 access to credit and insurance • 410 m. KSh (\$2.77 m.) in value of transactions • 15% growth in farmers' yield • 6% reduction in production cost by lower cost of inputs
	Juhudi Kilimo (2009) <ul style="list-style-type: none"> • Providing agri-finance, insurance, market access, and trainings • Providing business management, technical and financial literacy training to rural smallholder farmers and micro entrepreneurs 	<ul style="list-style-type: none"> • Over 500,000 direct and indirect beneficiaries • 68% of loan been granted to women • 84% rural outreach in Kenya • \$2.4 bn loan book
	MooFarm (2019) <ul style="list-style-type: none"> • Providing market transparency and guarantee to facilitate digital sales of cattle • Connecting farmers with Expert Veterinarian via audio/video calls and chat, with a transparent pricing mechanism • Providing market access with online payment or cash on delivery • Digital livestock management, recording and maintaining cattle lifeline, revenue vs. expenses, etc. • Providing trainings on dairy farming • Providing credit and insurance solutions 	<ul style="list-style-type: none"> • Over 160,000 farmers under cover • Over 19,879 villages covered • Over 70,000 cattle on the app
	Omnivore (2011) <ul style="list-style-type: none"> • As an impact investor, investing in themes that enabling entrepreneurship within Agritech ecosystem • Lowering costs through providing access to lower cost inputs, market transparency, and lower interest rate by various portfolio companies • Enhancing revenue streams through better pricing, improving farm yields, and reducing wastage 	<ul style="list-style-type: none"> • 12.1 m. smallholder farmers reached • \$8.2 bn worth of products sold • \$0.82 bn loans enabled to farmers • \$1.4 bn insurance coverage enabled • \$1.3 bn value creation (including cost and revenue) • 33 bn liters of water saved • 2.1 m. hectares under sustainable cultivation
	Shamba Pride (2016) <ul style="list-style-type: none"> • Providing input access to farmers through Mobile App, USSD, and Web platform • Providing a market linkage for farmers to supply their goods • Granting short-term capital to farmers and agrodealers • Embedding financial and inventory management tools in the app • Crop and livestock advisory services both digital and USSD • Trucking marketplace to increase efficiency and reduce costs 	<ul style="list-style-type: none"> • 60,000 registered farmers and 2000 agri-retailers • 160 digishops • 50 suppliers

		Needs met	Results and impact
Market Linkage, Financial Inclusion	Apollo Agriculture (2016)	<ul style="list-style-type: none"> A digitized and automated business process in providing access to inputs Real-time credit and financing for purchases bundled with insurance to protect farmers in the event of a loss 	<ul style="list-style-type: none"> 200 k farmers financed in 2023, 120k increase from 2022 Total lending of \$26.5 million in 2023 Partnered with +1000 agrodealers 7,000 agents across 21 counties to ensure maximum proximity to farmers
	Cellulant Corporation (2003)	<ul style="list-style-type: none"> Registering players – farmers, agrodealers, and other actors, online with access to e-wallets, e-vouchers, etc. Engaging financial partners in the online platform to lend and finance working capital and equipment Multinational & multicurrency payment solution 	<ul style="list-style-type: none"> More than 250 payment methods Payment platform is available in more than 35 markets across seven African countries Powered payment transactions for more than 220 million consumers
	CROWDE (2017)	<ul style="list-style-type: none"> Providing market access both to sell and purchase products Accepting harvest or products as loan repayment Using flexible guarantees/ collateral such as ongoing bills against a company, purchased product 	<ul style="list-style-type: none"> Rp 964,633 billion (\$61.5 bn) of granted loans from 2017 20,522 borrowers Rp 253.7 billion of non-cash assistance in fertilizer, seeds, and equipment, as well as training, to tens of thousands of farmers since 2017
	Hello Tractor (2014)	<ul style="list-style-type: none"> A tractor sharing application that connects tractor owners and smallholder farmers in need of tractors Expanded to a PAYG tractor financing product 	<ul style="list-style-type: none"> Over 3,000 tractors 1,220 booking agents Over 500,000 smallholder farmers reached
	Tanihub Group (2015)	<ul style="list-style-type: none"> Enhancing supply chain transparency and efficiency within market access, logistics, and financing Providing B2B market access Providing logistics and processing (washing, sorting, packing) services, delivering harvested goods to buyers Providing financing with pay off option by selling goods 	<ul style="list-style-type: none"> Over 45,000 farmers and 350,000 buyers IDR 520.9M (\$33,000) disbursed loans 7,096 lenders and 295 borrowers
Production Information & Advisory, Agricultural Analytics	Astral Aerial Agriculture (2016)	Drone services in agricultural mapping and spraying, disaster response and control, infrastructural inspection, crop health inspection, agricultural drone training, environmental conservation etc.	<ul style="list-style-type: none"> Mapped over 2,700 farmers in Kiambu county using drones 90% cost reduction using aerial seeding drones in ecological restoration, in comparison to traditional methods
	DigiFarm Norway	<ul style="list-style-type: none"> Delineated field boundaries and seeded acres to enhance in-season analysis and season-planning Providing satellite information and indices to farmers helping farmers make informed decisions about their crop management practices Providing comparison and historical data with similar soil composition 	<ul style="list-style-type: none"> 12-15% higher accuracy in field boundary 12 years of performance report across Norwegian agricultural fields Performance measures from over 13,000 farms
	Ujuzi Kilimo (2016)	<ul style="list-style-type: none"> Measuring soil nutrition and reports results via SMS Cloud-based farm management dashboard, conducting analytics, predictions, and recommendations on fertilizer/crop management Providing tailored recommendations on planting via text message to farmers by using sensors to measure and analyze soil qualities Processing data points to create a field specific soil and agronomic data pool 	<ul style="list-style-type: none"> Over 10,000 customers 45% productivity increase in 2015's pilot program

		Needs met	Results and impact
Production Info & Adv., Financial Inclusion	Sunculture (2013)	<ul style="list-style-type: none"> Using off-grid solar technology to provide our customers with reliable access to water, irrigation, lighting, and mobile charging Pay-As-You-Grow option for financing 	<ul style="list-style-type: none"> From two to five times increase in yields with irrigation systems Up to 10 times increase in income 80% water usage reduction
	Production Info & Adv., Market Linkage	JIVA (2020)	<ul style="list-style-type: none"> Provides no-cost advances for agricultural inputs AI-powered advice engine delivers relevant, feasible advice to farmers to produce better-quality crops and increase yield Arrange pickup, cross-check prices, and cost breakdowns Operating a hybrid model, to preserve key face-to-face interactions while automating inefficient/unfair processes Partnering with rural entrepreneurs to enhance trust
Financial Inclusion	ACRE Africa (2009)	<ul style="list-style-type: none"> Subsidized premium: 50% of the premium paid by agribusiness partners During a climate crisis, compensation for yield loss is triggered immediately via a mobile money transfer service 	<ul style="list-style-type: none"> Over 1,700,000 farmers in Kenya, Tanzania and Rwanda insured, by 2018 Over \$180 m. insured against a variety of weather risks
	AmTech	Enables agricredit through SACCOs and farmers organization, provides training and linkages to dairy markets	More than 50 clients with 657,000 members
	OKO (2020)	<ul style="list-style-type: none"> Providing index-based insurance with a USSD platform access and mobile money payment option, eliminating the need for smartphones Creating a voice note chatbot so people who cannot read or write can still listen to information, respond by choosing an option 	<ul style="list-style-type: none"> Over 18,500 insured farmers in Mali as of July 2022 Over 900 farmers insured in Uganda
	Lendable (2014)	<ul style="list-style-type: none"> Growing fintech companies in emerging and frontier markets by providing capital and consultation Providing the capital, expertise and insights that businesses need to scale and deliver transformational impacts in local communities Working with fintechs that support unbanked and underbanked people and businesses 	<ul style="list-style-type: none"> Over 3.3. m. borrowers reached Over 102.8 m. loans analyzed Over 126,000 SMEs financed Over 826,000 female borrowers reached, and 25% of the end borrowers are women \$5.2 billion in loan payments

		Needs met	Results and impact
Production Information & Advisory	Arifu (2015)	Providing information and training content that can be accessed freely on SMS, WhatsApp, Telegram and Facebook Messenger, and connect customers to relevant organizations in case	Digitized the agribusiness's traditional in-person training: <ul style="list-style-type: none"> • Helped 5,000 farmers improve 21 categories of behavior related to good agricultural practice • Increased farmer yield by 55% • Increased income by \$187/acre
	CropX (2015)	<ul style="list-style-type: none"> • Import real-time data from soil sensors, satellites, farm machinery, and other sources to help farmers monitor health of fields/crops • Providing precise irrigation control with the use of real-time data from soil sensors to avoid crop stress 	<ul style="list-style-type: none"> • Up to 20% fertilizer savings • Up to 15% yield increase • Up to 50% water savings • Up to 20% fungicide savings
	Kuza	Provides farmers in remote areas production information and advisory services using village agents	<ul style="list-style-type: none"> • 94% of farmers reported increased crop production • Incubated 5,000 youth Agripreneurs who now support 750,000 smallholder farmers
	Netafim (1965)	<ul style="list-style-type: none"> • Combine precision irrigation, agronomic expertise and relentless innovation to help farmers grow more of any crop, in any climate • Digital farming solution, monitoring soil, crop's growth stage and generate daily irrigation strategies personalized to the crops • Precise irrigation with three business models; to outsource capital and operations, outsource operation and maintenance, and just annual maintenance 	Case study on corn with precise drip irrigation <ul style="list-style-type: none"> • 45% -23% more yield per hectare • 53% -39% less carbon emissions • 24% -17% less fertilizer need Rice crop dripped irrigation results: <ul style="list-style-type: none"> • 70% less water usage • Up to 150% more yield • 90% Arsenic uptake reduction
Market Linkage	Farmster (2017)	Enabling market access without requiring internet access, connecting farmers and buyers through an AI-powered SMS Chatbot and a Mobile App	Over 36,000 users
	M-Shamba	Provides farmers production information on regenerative agriculture and food safety incl through USSD and SMS	<ul style="list-style-type: none"> • 68,546 farmers reached • 400,040 acres of land covered • KSh12 m. value of traded commodities

Source: Authors



One Million Farmer Case study

The World Bank and the GoK initiated the One Million Farmer Initiative in 2019 to reach 1,000,000 farmers across 45 counties through a digital agritech platform, building up from two agriculture projects valued at US\$450m.

The platform aims to provide knowledge, policy support, data analytics, enable farmers linkages across the public and private sector, stimulate financing and investment, provide coaching and mentoring, and undertake evaluation and learning.

1,000,000

Small Holder Farmer Initiative:Kenya

National Agricultural and Rural Inclusive Growth Project

Number of farmers **400,000**
Investment: **USD 200 million**
Farmers' producer organization **8,400**
Number of value chains **12 commodities**



Kenya Climate Smart Agriculture Project

Number of farmers **600,000**
Investment: **USD 250 million**
Farmers' producer organization **9,600**
Number of value chains **11 commodities and 4 livestock commodities**



45 counties

Kenya has the highest agritech intensity in Africa. Approximately 30% of African agritech start-ups operate in Kenya


An assessment of the impact of 4 agritechs and fintechs supported by the World Bank through an agricultural technology innovation challenge in 2019 shows a significant impact in terms of:


- 1 Enabling new financial products:** farmers can access products and services that they did not previously have access to. 70% of farmers did not previously have access to a similar product, neither do they have access to a good alternative product.
- 2 Improvements in farming production:** about 86% of farmers experienced improvements in their way of farming, mainly due to inputs and improved planting methods.
- 3 Improvements in farm earnings:** about 84% of farmers experienced improvement in productivity on the same hectareage; hence incomes have increased, resulting in more family needs being met and higher quality of life.
- 4 Improvements in quality of life:** about 90% of farmers experienced improvement in quality of life mostly driven by increase in income to meet more family needs.
- 5 Improved farm income led to improvements in savings:** about 76% of households increase savings.
- 6 Reduction in negative coping strategies,** e.g., borrowing for household consumption decreased by 51%.
- 7 Enabling recovery from climate shocks:** in recovery about 71% of farmers were able to recover from climate shocks due to the services of agritechs and fintechs.
- 8 Deepening of impact on productivity and welfare over time,** Outcomes are higher for farmers who have been accessing services through these agritechs and fintechs.
- 9 Inclusivity gap:** Agritechs and fintechs effectively serve the not-so-poor segment of farmers. About 36% of farmers are living under US\$3.20 per day. Much less than the national (47%) and rural average (65%).





What problems is the latest technology helping to solve?

Overall, agritech and fintech are leveraging technology and primarily addressing demand-side constraints related to customer experience and accessibility. So far, there is limited evidence on the impact of these solutions to reduce premium costs, reduce basis risk, and increase the level of protection. On the supply side, there is emerging evidence of the following:

- 

Reduction in costs of product design through collection and production of data at lower costs
- 

Improvements in risk assessment through the production of more accurate data at a more granular level
- 

Increasing timeliness of claim payment while simultaneously reducing the cost of claims processing through digitization
- 

Improvements in trust through the provision of ancillary services and more transparent communication, and elimination of middlemen through automation

Leveraging sensing technology and drones

Sensing and drone technologies, as well as smart-phone photography for remote crop damage estimation and measurement, are already being used to collect more precise farm-level data; however, the promise that these will enable lower insurance costs compared to indemnity insurance, which has high field verification costs or area yield index insurance with its relatively lower costing crop-cutting experiments, is yet to materialize.

Sensing technology and drone technologies offer a wide choice of data to enhance agricultural insurance:

- Historical data sets for countries where data is challenging
- Near-real-time actual data (weather data, vegetation indexes)
- Accurate risk assessment
- Additional data for risk analysis and premium rate setting
- Quicker and precise loss calculation



Sensing technologies also allow insurers to introduce front-end solutions to enhance distribution and improve client communication including updates on coverage, alerts, claim notification, and claim communication.

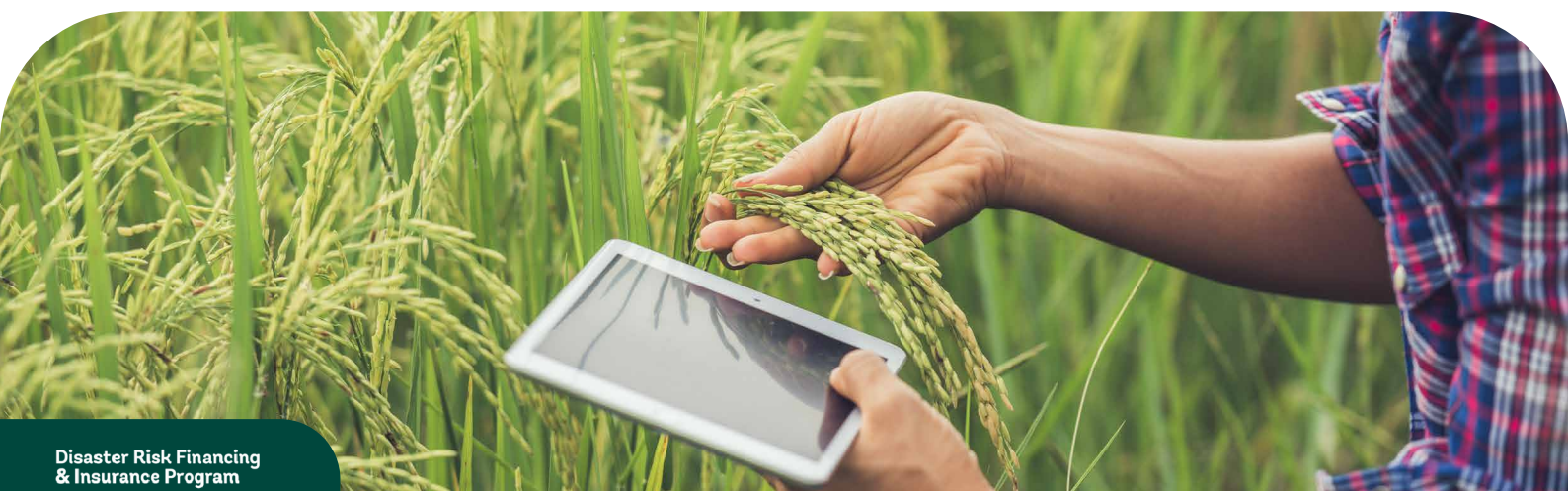
However, there are challenges to adoption of these technologies, namely:

- High cost of technology– development, subscription, on-demand services, costs of equipment, qualified operators, software, administration;
- Functionality – technologies with low accuracy are not useful to the insurance industry, which requires at least 90% accuracy for viable solutions;
- Data availability and interpretation – satellite data is not always usable due to technical issues like cloud cover, and changes in technology may require merging different data sets together;
- Limited technical capacity of insurance companies;
- Narrow scope of risk covered compared to farmers exposures – for example in Vietnam AYII technology has about 85% accuracy in estimating rice area yields, but faced major resistance by local farmers because it does not address localized losses.

Providers expect that as technologies are refined, the data generated could help with product customization, improve the accuracy of risk assessments, and allow for more active monitoring and support farmers' risk management throughout the farming season.

Notwithstanding, there is already emerging evidence of impact:

- Risk assessment using optical imagery and drones creates efficiencies: 30% of time saved on risk assessment;
- Enabling multiple parameters can be used for crop insurance purposes to increase accuracy and likelihood of basis risk;
- Risk assessment using remote sensing (NDVI index) in Australia is improving accuracy in claims assessment, which is passed on to insured through lower premium costs;
- In Guyana, a better understanding of risk has enabled insurers to start underwriting agriculture insurance.



Leveraging blockchain technology

Blockchain² technology, through “Smart contracts,” has improved insurance service offerings by making customized products more accessible and cheaper while making the inquiry and payment processes faster. “Smart contracts” are simply programs stored on a blockchain that run when predetermined conditions are met. They are typically used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary’s involvement or time loss. They can also automate a workflow, triggering the next action when conditions are met (IBM). Smart contracts for the insurance industry are policies that are automatically executed when certain conditions are met. Unlike physical contracts, smart contracts can track insurance claims and hold both parties accountable, which helps limit the impact of insurers being inaccessible to farmers for claims inquiries and increases trust.

How is leveraging the latest technologies impacting the supply and demand for micro-level index based agricultural insurance?



Price

The larger the number of farmers covered, the greater the spread of risk, leading to a lower pure risk premium. The pure risk premium can further be reduced by diversification, covering more uncorrelated risks. A way to cover more uncorrelated risks and more people is customization. This necessarily results in specialized products, which have historically been niche market offerings delivered at high cost to end users. However, “Smart contracts” have reduced customization costs by decreasing operational costs, streamlining and simplifying payouts, automating claim inquiries, and, most importantly, providing access to decentralized insurance³ to make specialized product development faster and cheaper.

ACRE Africa, an agritech service provider that has been enabling index-based insurance since 2009, conducted a study in 2020 that reported the top reasons for farmers’ dissatisfaction included lack of communication around claim status, not receiving payouts despite facing weather shocks, and lack of company follow-up after registering for the service. ACRE Africa piloted Smart Contracts with over 12,500 smallholder farmers in Kenya in 2021 and found evidence of:



Reduced operational costs: Smart contract automation reduced the product cost by 80%



Improved product value: cost savings passed on to farmers through a 27% increase in the sum insured

²A public digital ledger of transactions maintained by a network of computers, or database that maintains a continuously growing list of ordered records, called blocks. The blocks in a blockchain confirm the exact time and sequence of transactions and are linked securely together to prevent any block from being altered or a block being inserted between two existing blocks.

³A parametric insurance written and managed by a smart contract using blockchain technology. It essentially reduces or removes human involvement in claims payment. The contract describes the independent sources of information that confirm the parameters for a payout as well as the payout amount. If conditions are met the smart contract automatically sends a payout to a predetermined account.



Greater transparency: 58% of participating farmers reported improvements in onboarding, communication, and access to information about their insurance policy. About 44% of farmers used the SMS tool to check the status of their insurance policy, 70% of users being women.



Greater trust: Transparency increased trust among customers more than half (53%) of participating farmers reported increased trust in insurance.



Faster payouts: 40% of claims processed within 24 hours after the policies were triggered, a 64% reduction in average payout time in the initial pilot, and 100% of claims processed within 24 hours in a second pilot phase.



Improved resilience: 40% of farmers reported improved quality of life due to reduced stress, increased ability to purchase agricultural inputs, and greater knowledge of improved farming practices. About 34% of farmers specifically reported reduced stress⁴.

Moving toward "Smart contracts," the need for intermediaries in the post-purchase process has been eliminated as clients can update policies and monitor claims at their own convenience through ACRE's farmer-facing USSD platform. In an extreme weather event, the policies are automatically triggered, facilitating fair, transparent, and timely payouts. By removing a third-party verifier, this model reduces the number of intermediaries and minimizes overhead costs.

Decentralized insurance is enabling customization at a low cost and at scale:

Etherisc⁵, a Munich-based insurtech has built a platform for decentralized insurance, this is a free, open-source, open-access platform that uses blockchain technology to deliver agriculture insurance to open-up product design process, which enables competitive pricing and new kinds of insurance contracts at a global scale. Unlike traditional insurers, it uses blockchain-based smart contracts to help reduce rent-seeking and conflicts of interest without all the expensive overhead costs and middlemen. The key to this model is a library of open-source smart contracts, which people can use and modify as they like for policy issuance and claims processing. Using the Etherisc protocol, a data scientist can add a feature to an existing auto policy to make it cheaper and more accurate. Similarly, local developers can reuse an existing windstorm policy or cyber insurance contract and modify it, making it more relevant to their needs and community. This makes it possible to insure against the risks, which were previously considered niche and not economical (etherisc blog).



One study found that the use of this technology will reduce the costs required to issue a policy by a massive 41%, bringing down premium costs for the farmers⁶.

⁴This is an important outcome given that studies from around the world have documented significantly higher rates of depression, anxiety, and suicide among farmers than the general population.

⁵<https://etherisc.com/>

⁶<https://www.cryptoaltruism.org/blog/etherisc-using-blockchain-technology-to-deliver-crop-insurance>



Accessibility

After integrating its weather-index insurance product into an Ethereum-based smart contract platform with Etherisc, ACRE Africa enhanced its sales distribution and accessibility by recruiting and training approximately 300 Village-Based Agents (VBAs) on the mechanics and benefits of the updated product.

Although there is a need for human interaction, especially at the early stages, to prepare farmers for the transition, the need for intermediaries in the post-purchase process has become eliminated as clients can update policies and monitor claims at their convenience. In addition, monitoring the indices automatically triggers the policies, eliminating a third-party verifier and potential delays or lack of geographical access.

Providers are also leveraging mobile phone technology to address accessibility challenges. Smartphones become a 24/7 communication channel between the insurer and the farmer. Farmers can update their policies, submit inquiries, and monitor their claims. Insurers can respond to inquiries and settle claims timeously through mobile money payments.



Customer Experience

The "Smart contract" has allowed service providers to provide tailored products cheaper and faster. At the same time, the automatic triggering of processes and payouts has enabled faster response and payout procedures, enhancing customer experience and trust.

For instance, further tailoring the product, ACRE Africa incorporated a mid-season payout, which automatically disburses the payouts to selected eligible farmers at the end of the two crop stages. Changes will create a better customer experience and increase farmers' trust in the insurance product. Other iterations of smart contracts for insurance also endeavor to create more customized products to meet client needs better.

Yet, even if smart contracts live up to their promise, there are still significant challenges around uptake. As mentioned alongside the other advances, the need for the human touch in distributing insurance remains, which will continue to drive operational costs- particularly variable costs - even as smart contracts lower some administrative costs.

Box 1: The case of Apollo Agriculture

Apollo Agriculture is a FinTech that is helping smallholder farmers make more money by providing high quality inputs on flexible credit terms (non-financial lending – farmer is required to make a 10% deposit through mobile money) and insurance to protect the farmer’s livelihood in the event of a loss. Over 330,000 farmers have benefitted from Apollo’s end to end digital solution.

The package of services includes meso-level area yield index insurance which pays out to Apollo for credit settlement after which the balance is paid to the farmer, and credit life insurance against death and permanent disability.

Digitization and automation are the heart of Apollo’s innovation. Leveraging technology to digitize and automate business processes (both credit and insurance services) has enabled Apollo to drive down cost and turnaround times including customer acquisition.



Digitization has in turn enabled production of data development of a proprietary credit rating model using ML techniques that input farmer behavior and satellite data to enable lending. In 2023, total lending reached US\$26.5m corresponding to 200,000 borrowers up from about US\$11.3 million borrowed to 80,000 farmers in 2022.



Addressing gender gaps. Over 50% Apollo’s clients are women. Apollo Agriculture proprietary data and credit models allow for lending to women farmers who lack formal financial credit histories.







The cherry on top has been developing a last mile distribution channel that consists of local agrodealers and shops– have 1,000 agrodealers and 7,000 agents across 21 counties.

Several challenges to achieving scale remain





- Lack of integration with Gov (national and county level) programs and competition with subsidized inputs from GoK eg. Fertilizer at KES2000 vs. market price of KES6000
- Limited working capital to meet the increasing demand for financing by farmers
- Significant exposure to foreign currency risk due to Apollo receiving USD denominated capital but lending in KES
- Lack of an appropriate regulatory environment

Source: interview of Apollo management by World Bank staff

Four key takeaways on the impact of fintech and agritech

- 1  Technological advances are necessary to enable the scale-up of microlevel agricultural insurance but are not enough. Digital literacy remains a challenge for smallholder farmers to adopt these new technologies.
- 2  Technology adoption is highly dependent on economic, regulatory, and social factors. Adoption of the latest technologies is slow mainly because insurers don't know what they can get for free while the cost of proprietary tech solutions is still relatively high. Further, in emerging economies with poor infrastructure and internet connectivity, it is difficult to deploy IoT devices at scale.
- 3  There is emerging evidence that fintech and agritech solutions are helping provide integrated financial and non-financial services to improve farmers' welfare, particularly financial resilience. Gradually, these solutions may help to design and develop products at a price that covers the cost of insurance and is affordable to farmers, governments, and development partners.
- 4  Notably, there is an increasing trend of micro-level index agriculture insurance products being designed to pay out lower amounts more frequently.⁷ Although this may meet farmers' need for liquidity, it may not necessarily meet farmers' need for protection in the event of a catastrophe or serious shocks that require larger amounts of funds for farmers to recover. This suggests a gap in the market for contingency credit or shock-responsive savings products that are more cost-effective for recurrent but moderate shocks (high-frequency, low-severity events).

Four ways in which policymakers could help address the remaining challenges

- 1  Policymakers could support the growth of agritech and fintech by creating an enabling regulatory environment that supports their unique non-financial lending models. For instance, open exchange of borrowing information through credit reference bureaus to strengthen the financial health of the ecosystem. The financing needs of non-financing lending to essential sectors like agriculture, unlike core consumer where credit is incidental to the overall solution, are unique and regulation should allow for greater flexibility while maintaining accountability.
- 2  Index insurance cannot replace other types of insurance. Regulators should continue to support indemnity insurance, particularly for commercial farmers, while enabling index and hybrid insurance under an enhanced regulatory framework to understand rapid changes and reflect lessons learned.
- 3  Regulators could incentivize training and education of agricultural and financial technology centers and teams (drones, remote sensing, apps, and software administration) within the insurance industry or agricultural administration programs.
- 4  Policies to deepen the financial market could help reduce the cost of hedging for smaller companies, particularly important in the early stages of the agritech and fintech industries during which they rely on international USD denominated FDI or wholesale financing.

⁷See webinar 2 of KX series part 1.

Sources

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Work Sheet 4:

Lessons Learned from Fintech and Agritech for Agricultural Insurance and Finance

Test your knowledge and record your insights through this easy, DIY worksheet!

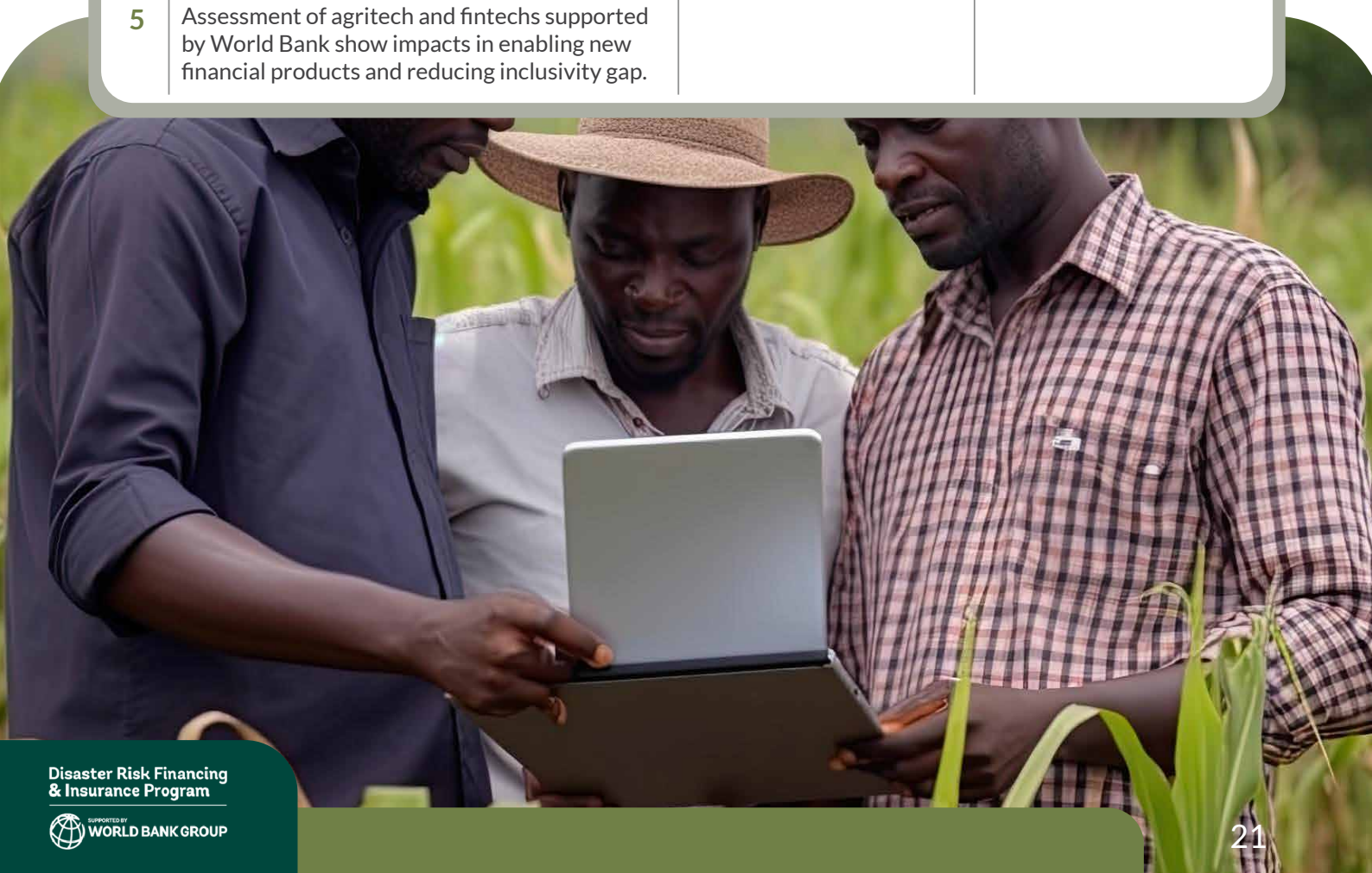
Drawing on your understanding of the content in this fact sheet, attempt the following activities.

Activity 1: A list of statements about components affecting demand and supply of Index-based insurance are given below. Identify which of the statements relate to constraints to demand and which statements relate to obstacles to supply.

#	Statement	Obstacles to Supply	Constraints to Demand
1	Pure risk is high due to farming practices and climate change affecting cost of insurance.		
2	Downside basis risk reduces value of the product, increases mistrust and diminished farmer welfare.		
3	There is a lack of product customization and farmer needs are not adequately met.		
4	Low value of contract does not justify high cost of customization.		
5	Risk pooling is limited due to low population of farmers covered.		
6	Business seasonality often results in high turnover of sales agents and high cost of training every insurance season.		
7	Cost of premium is high leading to issues of affordability and value.		

A list of statements is given below. Identify which of the statements correctly identifies the key takeaways of fintech and agritech for agricultural insurance and Finance.

#	Statement on key takeaways	Correct	Incorrect
1	Technology advances are not necessary to enable the scale-up of microlevel agricultural insurance and current level of advances are adequate for achieving digital literacy amongst smallholder farmers.		
2	Technology adoption is highly dependent on economic, regulatory, and social factors. Further, in emerging economies with poor infrastructure and internet connectivity it is difficult to deploy IoT devices at scale.		
3	There is emerging evidence that fintech and agritech solutions are helping provide integrated financial and non-financial services to improve farmers welfare, particularly financially resilience.		
4	Policies to deepen the financial market will have a negative impact on reducing the cost of hedging for smaller companies, particularly important in the early stages of the agritech and fintech industries during which they rely on international USD denominated FDI or wholesale financing.		
5	Assessment of agritech and fintechs supported by World Bank show impacts in enabling new financial products and reducing inclusivity gap.		



Activity 3: Reflections

These are my top two take-aways from this fact sheet.

Here are two concepts or ideas that I would like more information about.