The role of tech-enabled formal financing in agriculture in India

June 2020

ThinkAg

MSC
MicroSave Consulting

MSC and ThinkAg researched the AgTech landscape in India with a focus on innovations in financing small and marginal farmers

A. Key objectives of the study

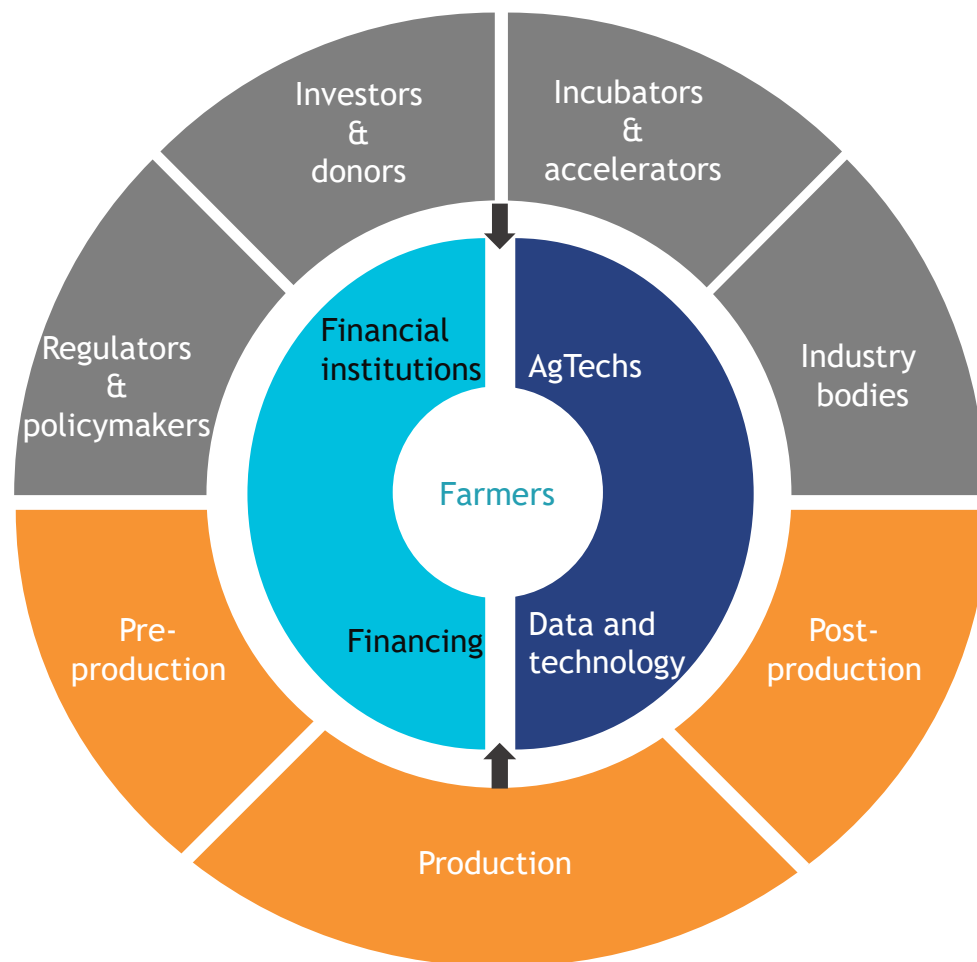Understand the landscape of farmer financing and AgTech in India

Study new engagement models around technology in the AgTech space

Understand the role of lenders that have adopted AgTech solutions to provide finance to farmers

B. Stakeholders in the ecosystem around farmer financing

Investors & donors

Incubators & accelerators

Regulators & policymakers

Industry bodies

Financial institutions

AgTechs

Farmers

Pre-production

Financing

Data and technology

Post-production

Production

C. Structure of the presentation

Chapter 1
Financing the farmers: The current scenario and gaps

Chapter 2
AgTechs in India: Landscape and challenges

Chapter 3
The intersection of AgTechs and incumbents: Gaps and requirements

Chapter 4
Ways to improve the ecosystem for AgTechs in India

Chapter 5
Way forward

Refer to Annex 1 for research sample

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1. Financing the farmers:
The current scenario and gaps
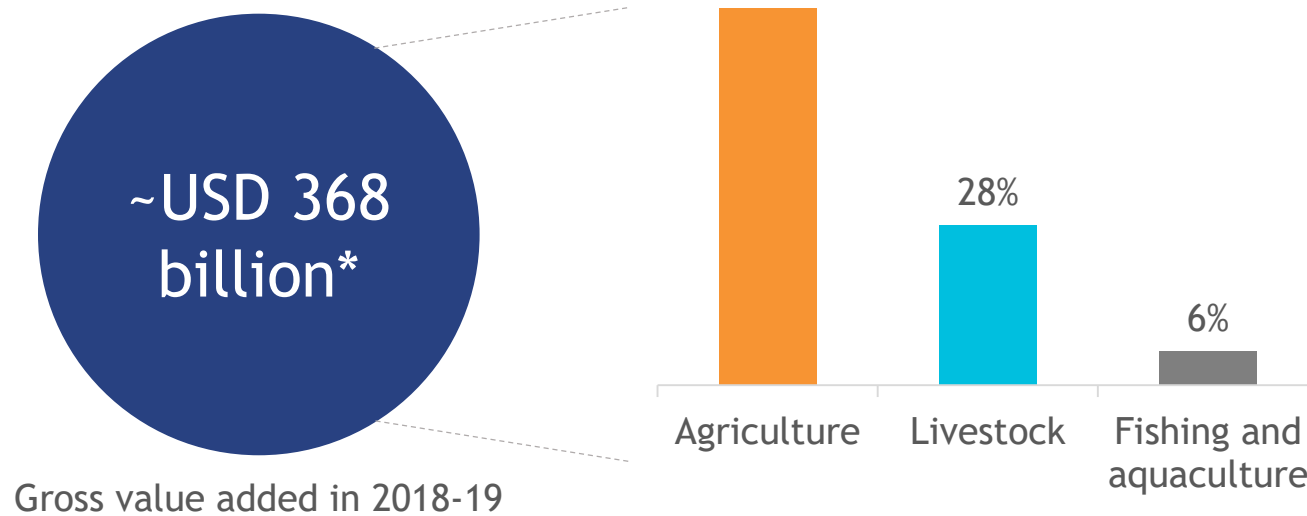
The agri and allied sector, which contributes USD 368 billion to the economy, is up for tech-based disruption

Gross value added by the agriculture and allied sector[1]

~USD 368 billion*

Gross value added in 2018-19

66% — Agriculture
28% — Livestock
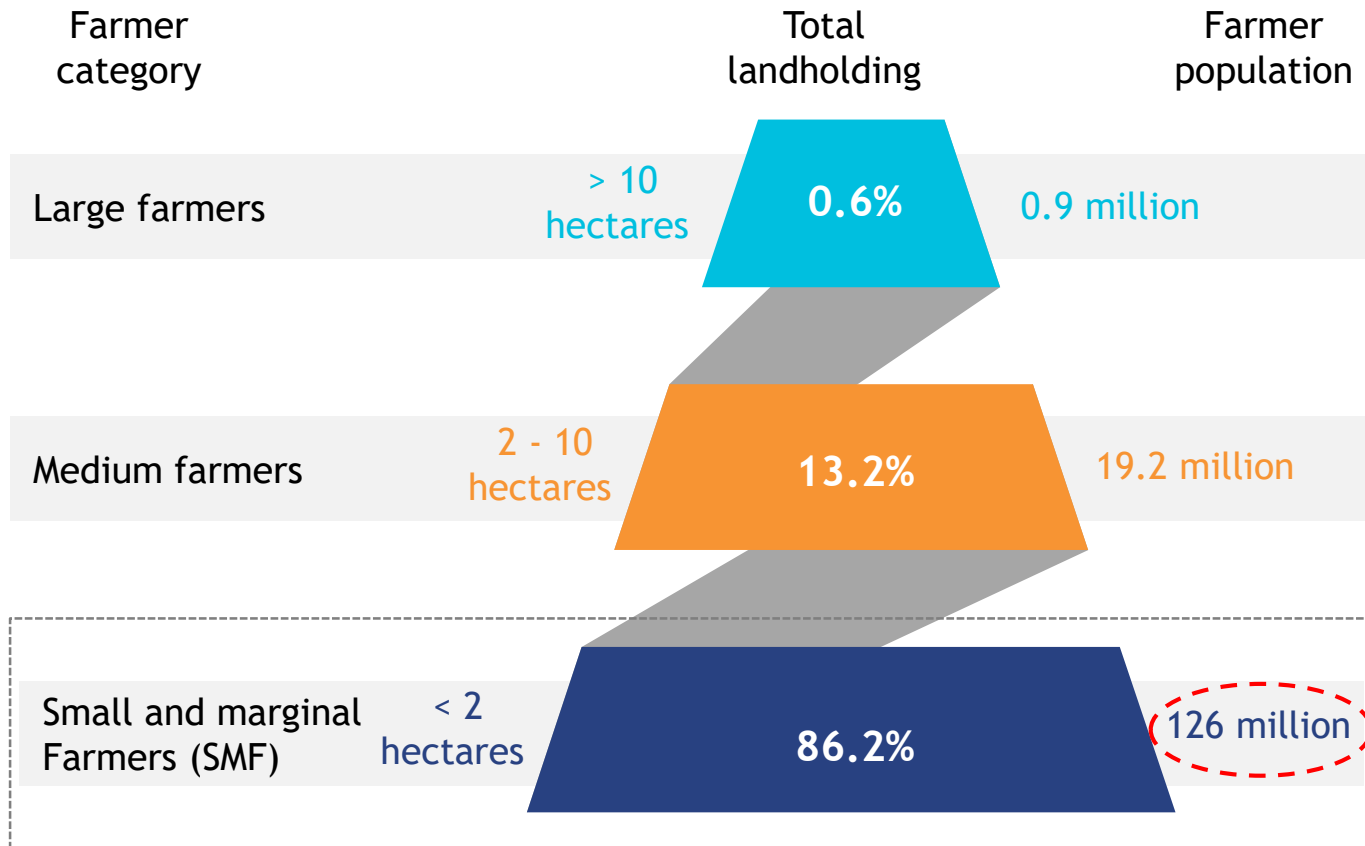6% — Fishing and aquaculture

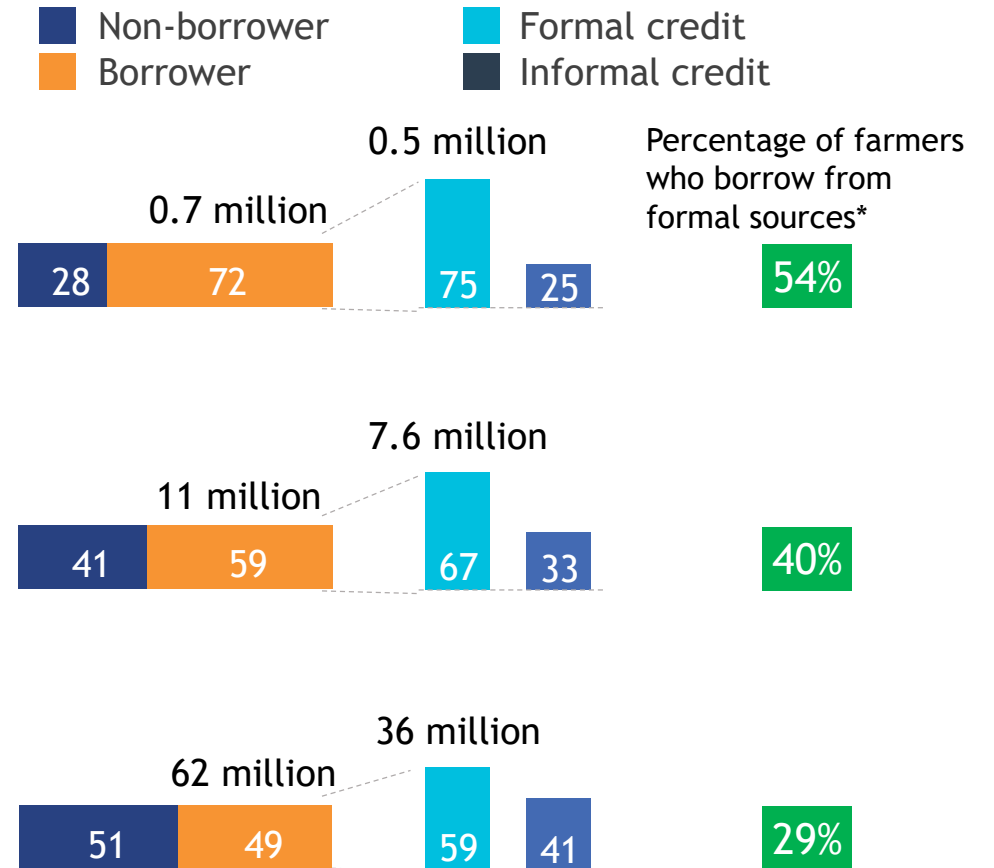## Key facts related to the sector[2]

- **55%** of the population depends on the agriculture and allied sectors

- **~16%** is the contribution to the economy by the agriculture and allied sectors

- **~3%** is the growth rate of the agriculture and allied sectors as against 2017-18

- **USD ~38 billion** is the value of the total agricultural exports in 2018-19

- **USD ~21 billion** allocated in the interim budget (2019-20)

Source: 1 – National Statistics Office, Ministry of Statistics and Programme Implementation, 2018-19
2 – Union Budget, 2019-20

* Provisional estimates of gross value added at a basic price by economic activity at current prices

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Only 30% of all farmers borrow from formal sources, while ~50% of small and marginal farmers are unable to borrow from any source

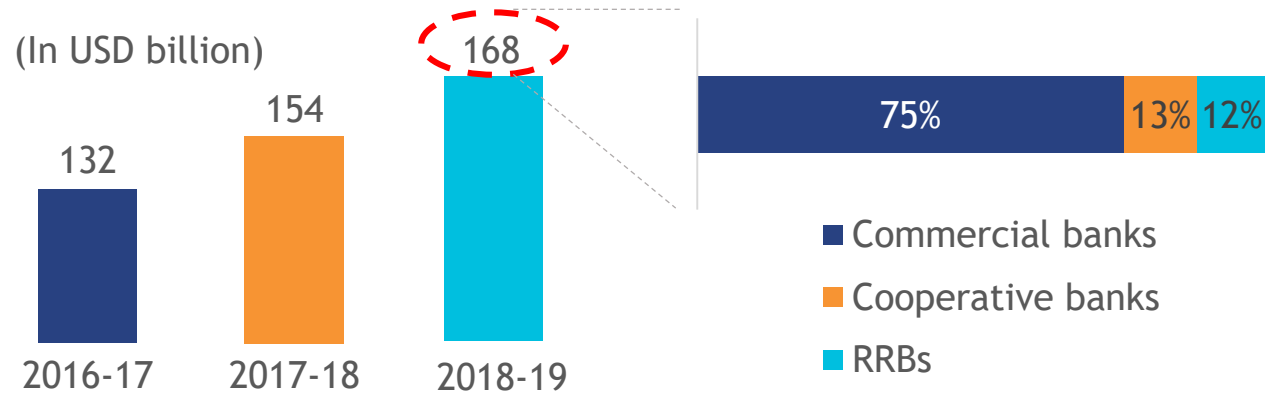## Breakup of types of farmers w.r.t landholding[1]

Farmer category		Total landholding	Farmer population
Large farmers	> 10 hectares	0.6%	0.9 million
Medium farmers	2 - 10 hectares	13.2%	19.2 million
Small and marginal Farmers (SMF)	< 2 hectares	86.2%	126 million

Percentage of farmer households[2]

- ■ Non-borrower
- ■ Borrower
- ■ Formal credit
- ■ Informal credit

Percentage of farmers who borrow from formal sources*

Large farmers
0.7 million: 28 | 72
0.5 million: 75 | 25
54%

Medium farmers
11 million: 41 | 59
7.6 million: 67 | 33
40%

Small and marginal farmers
62 million: 51 | 49
36 million: 59 | 41
29%

* Formal sources include commercial banks, RRBs, SHG-bank linked, SHG-NBFC or MFI, and cooperative societies
Informal sources include relatives and friends, moneylenders, landlord, and input suppliers

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Banks provided agriculture credit worth USD 168 billion in FY18-19; however, 50% of the credit was offered to medium and large farmers

Total agriculture credit disbursement by banks[1,2]

(In USD billion)

2016-17	2017-18	2018-19
132	154	168

75%	13%	12%

- ■ Commercial banks
- ■ Cooperative banks
- ■ RRBs

Deployment of bank credit across sectors in FY 2018-19[3]

Parameters	Agri and allied activities	Industry or MSMLEs#	
	All banks	PSBs	PVBs + FBs
Credit deployed (in billion USD)	168	208	207
Percentage of gross bank credit	13		32
NPA (in %)	7-9	16	5

Key facts related to lending to SMF in 2018-19[1,2]

- ⯈ **Most banks** resorted to priority sector lending certificates (PSLCs) to achieve the PSL targets under agriculture

- ↳ The volume of overall PSLC trading (USD 44 billion) increased by **78 %** in FY 2019 compared to FY 2018

- ⯈ **USD 15 billion** is the volume of PSLC-SMFs in 2019, a growth of **62%** compared to FY 2018

- ↳ Private and foreign banks emerge as major **buyers**; while PSBs, RRBs, and SFBs are the major **sellers**

- ↳ Only **~40%** loans are long-term*

MSMLEs stands for micro, small medium and large enterprises
* Short-term crop loans are used for pre-harvest activities, such as weeding, harvesting, sorting, and transporting.
   Long-term loans are taken to invest in agricultural machinery and equipment, or for irrigation.

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Banks are reluctant to offer credit to small and marginal farmers due to poor access, limited information, and unpredictable policy environment

High cost of servicing and risks involved
- Difficult-to-reach remote areas
- High acquisition and servicing cost for small and marginal farmers (SMFs)
- Perceived high risk of default

Difficult to verify reliable information
- Difficult and uneconomical to gather and verify farm-level and farmer-level data
- Limited visibility on financial information like cash flows and credit history
- Limited expertise to verify or estimate or do both on the income from alternate sources

Risks related to policy and environment
- Farm loan waiver by state governments* affects the culture of credit among farmers
- Perception of higher NPA under PSL, particularly agriculture

In the financial year 2017-2018 and to date, 10 state governments have announced farm loan waivers that amount to USD 26.5 billion

Source: Stakeholder interviews, MSC, and ThinkAg analysis

2. AgTechs in India:
 Landscape and challenges

The AgTech landscape is growing steadily since the past few years with high quality start-ups and increasing investor interest

Most AgTechs have emerged in the past five years and are still at a nascent stage

3116 — Registered start-ups in food and agriculture in India

2 — India's rank globally based on the number of AgTechs

25-30% — Growth in number of start-ups year-on-year

Approx USD 500 million investment since 2014

Investments in AgTechs till 2019 (million USD)

| 300 |
| 250 |
| 200 |
| 150 |
| 100 |
50

2014 2015 2016 2017 2018 2019
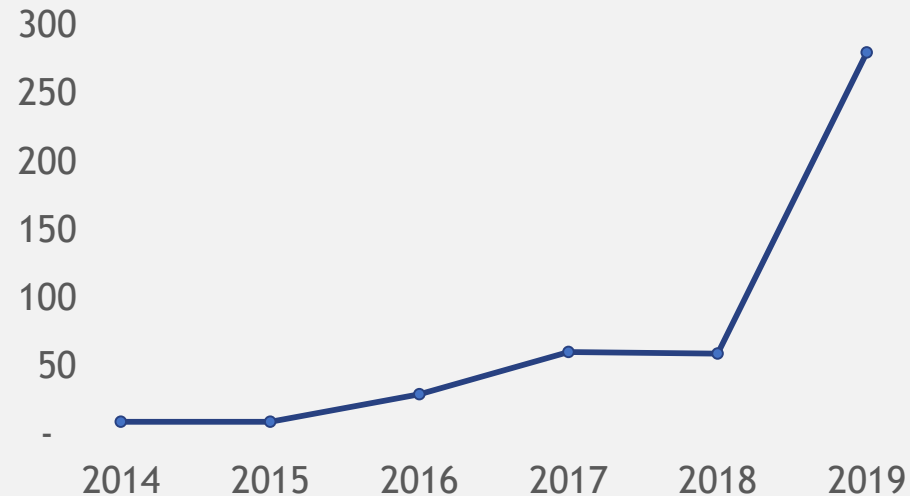
90+ Active institutional investors

~250 Angel investors

<10 AgTech-focused investors

~70% deals are focused on seed-stage and early-stage AgTechs

Stage-wise investor deals (2016-2019)

19
48
33
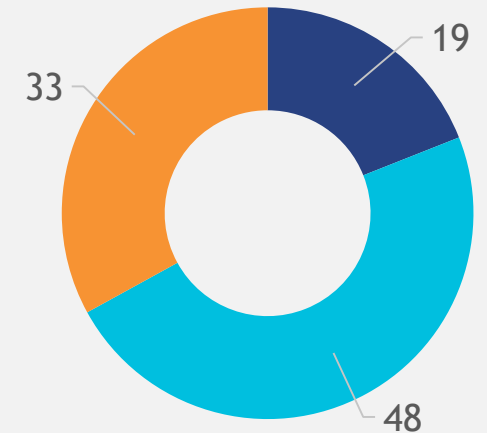
■ Grant/Angel
■ Seed
■ Series A and beyond

Source: Tracxn, MSC, and ThinkAg analysis

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In the entire agri value chain, we see an opportunity to fund farmers across all the categories of AgTech solutions

Farm management and data analytics
- Remote sensing, smartphones, drones, sensors & IoT
- Predictive modelling, crop monitoring and traceability

Cropin, NubeSol, agricx Desh ki mandi, Fasal, SatSure, INTELLO LABS

Agri – input marketplaces
- Direct to farm
- Data and advisory driven
- Channel agnostic
- Last mile delivery

AgroStar, Gramophone, BigHaat.com, DeHaat Seeds To Market, Unnati

Agri – output marketplaces
- Demand aggregation
- Kirana stores, modern trade, horeca
- Procurement via Farmers/FPOs
- Staples & fresh produce

WAYCOOL, Kamatan, ninjacart, crofarm, S4S technologi science for society

Agri Financing / FinTech
- Value chain financing
- Fintech
  - Farmer onboarding
  - Credit scoring
  - Input linked credit

Samunnati VALUE CHAIN FINANCE, arya Simplifying Agribusiness, Jai Kisan, farMart for farmers from farmers, BIJAK

Livestock management
- Livestock—cattle, poultry, and fisheries
- Data driven supply chain and financing

PASHUCHIKITSA A GREAT INNOVATION, AQUA CONNECT, stellapps Smart Systems, Stellar Applications., Eruvaka

Mechanization / Novel farming
- Hardware
- Farming as a service
- Vertical farming/hydroponics

SICKLE INNOVATIONS Design|Farming|Technology, TOOLSVILLA, FutureFarms LET'S TAKE CONTROL, CLOVER

Source: MSC and ThinkAg analysis

ThinkAg | MSC

However, we continue to see challenges around funding, partnerships, and access to data for scaling agri-financing solutions

Limited funding for early-stage AgTechs
- High risk perception among investors – policy, long gestation period, climate risk
- Lack of leverage – need for credit guarantee structures

Collaborations with industry players and banks
- Contrasting viewpoints about the offerings and potential of AgTechs
- Mismatch of expectations between corporate partners and startups
- Banks have own legacy systems

Limited availability of agri-data and access to it
- Difficult to access reliable agri-data owned by the government
- AgTechs have to spend significant resources to gather farm and farmer-related data
- Only a few states have digitized land records; however AgTechs have no access

Challenges at the farmer level
- High cost to acquire small and marginal farmers
- Limited adoption of smartphone penetration—although it is now growing
- Digital payments are not commonplace

Source: Stakeholder interviews, MSC and ThinkAg analysis

ThinkAg   MSC

3. The intersection of AgTechs and incumbents: Gaps and requirements

AgTechs have a role to play in farmer financing—from origination to assessment, monitoring, and recovery (1/3)

Origination	Underwriting/Credit assessment	Servicing and monitoring	Collection

Category	Data required by FIs	Offerings of AgTechs	Source of data	AgTechs that offer such data
Personal profile	Demographic details	Field staff to onboard farmers	Physical on-field	Haqdarshak, SocialCops
Income and cropping profile	- Details of current and previous income: Farm and non-farm income - Crop name - Seasonal or annual - Irrigated or Unirrigated - Proposed crop for the next financial year - Arrangements for cultivation, inputs procurement, marketing, storage, and transportation of the produce	- Data based on proximity to the nearest *mandi* - Historical data on the type of crops and their quality - Weather forecasting - Tracking irrigation facilities - Assessment of soil quality - Price prediction tools - Agri-inputs purchased online, personal profiles - Historical data on outputs sold	Physical on-field Satellite imagery Weather stations Smart sensor Input data Output data	FarmGuide, Jai Kisan, FarMart, Pay-agri SatSure, CropIn Skymet Farmsys AgroStar, BigHaat, Gramophone, Dehaat, Bigbasket, NinjaCart, WayCool Foods, AgriBazaar
Credit history profile	- Deposit and loan account - PMJDY overdraft - Amount of loans sanctioned and outstanding	Sourcing information from the credit bureau	Credit bureau	N/A

Source: Stakeholder interviews, MSC and ThinkAg analysis

AgTechs have a role to play in farmer financing—from origination to assessment, monitoring, and recovery (2/3)

Origination	Underwriting/Credit assessment	Servicing and monitoring	Collection

Category	Data required by FIs	Offerings of AgTechs	Source of data	AgTechs that offer such data

Particulars of agri land holdings and crops	• Nature of land
	  • Owned as opposed to leased
	  • Irrigation facilities
	  • Percentage of land irrigated
	  • Market rate per acre
	  • Number of owners, among other factors
	• Access to the *mandi*
	• Distance from the farm to home
	• Type of crop sown, yield estimates, past performance, availability of input
		• Develop solutions to digitize land records with beneficial ownership	Physical on-field	FarmGuide, FarMart, Jai Kisan

Movable assets or properties	• Types of assets like irrigation pump sets, tiller, tractor, transport vehicle, etc. • Livestock	• Tap into existing networks to source information	Physical on-field	FarmGuide, FarMart, Jai Kisan

Source: Stakeholder interviews, MSC and ThinkAg analysis

AgTechs have a role to play in farmer financing—from origination to assessment, monitoring, and recovery (3/3)

Origination	Underwriting/Credit assessment	Servicing and monitoring	Collection

Category	Data required by FIs	Offerings of AgTechs	Source of data	AgTechs that offer such data
Output profile	• Sowing and harvest estimates • Current and historical cropping frequency	• Crop monitoring to predict NPAs • Yield estimation • Visibility of usage of credit • Demand forecasting	Satellite imagery Input data	Cropin, SatSure, AgroStar, BigHaat, Gramophone

Origination	Underwriting/Credit assessment	Servicing and monitoring	Collection

Category	Data required by FIs	Offerings of AgTechs	Source of data	AgTechs that offer such data
Actual collection	• Visibility of crop harvest and prices	• Market linkages for farmers • Partnerships with warehouse owners and support to grade and sort the output	Physical App-based Mobile imagery Spectrometry	NinjaCart, WayCool, Jumbotail, Kamatan, Crofarm, KrishiHub, AgroWave Agricx, Intello Labs

However, meaningful partnerships between financial institutions and AgTechs need some more time to scale due to a variety of reasons

No full-stack solution
- Most AgTechs offer standalone, partial solutions to banks
- Banks find it difficult to collaborate with multiple AgTechs
- Banks are likely to prefer AgTechs that offer full-stack solutions

Challenges with non-risk-sharing model
- Banks hesitate to collaborate with AgTechs, which do not share any liability
- Banks require guarantee from AgTechs to mitigate or minimize their risk

Limited understanding of AgTech solutions
- Most banks have a limited understanding of the solutions and potential of AgTechs
- Banks believe that most AgTechs provide little beyond some additional—or satellite—data points

Limited trust on data captured by AgTechs
- Banks trust their local staff for any information related to farmers and their crops
- Banks believe that AgTechs fail to add value in assessing the creditworthiness of SMFs
- Banks require AgTechs to have data points for around 4-5 years before conducting a pilot

4. Ways to improve the ecosystem for AgTechs in India

A single unified digital agri-database "AgriStack" for India can enable financing for small and marginal farmers

Present constraint	Focus area	Key recommendation	Expected outcome
Lack of a public platform that provides access to agri-data	Creation of AgriStack	Build AgriStack—a secure digital platform that enables access to farmers by providing information related to farm, farmer, and crop	A public platform to drive innovations across the value chain
Only a few states have digitized land records completely	Data digitization	Create digital GPS-tagged land boundaries that guarantee land titles, digital records in a demat form, and open APIs for AgTechs	A single window to verify and gather the required details economically
AgTechs find it challenging to partner with government	Ease of business	Create a single window to address various concerns that AgTechs face, and create a provision for short-term working capital to partner AgTechs	B2G partnerships with access to data of a large number of SMFs

Source: Stakeholder interviews, MSC and ThinkAg analysis

Development financial institutions should help build agri-market infrastructure and offer capital to institutions that lend to SMFs

Present constraint	Focus area	Key recommendation	Expected outcome
The storage gap for agricultural produce is at 35 million tons and post-harvest losses is at ~USD 13 billion	Asset infrastructure development	Promote public-private partnerships to augment necessary storage and warehousing infrastructure and focus on post harvest financing	Asset infrastructure to improve and post harvest financing to become more acccesible
Multiple challenges limit the growth and sustainability of FPOs	Support to FPOs	Provide technical handholding, capacity building, financing, and market linkage support to FPOs to run sustainably	Effective FPO channel ready for partnerships with various players
The high cost of capital to NBFCs results in a high rate of interest for SMFs	Source funds	Explore the creation of separate fund like RIDF or seek alternative sources of funding from global development and financial institutions like ADB, IFC, and GIZ. to institutions that lend to SMFs	Serious lenders can borrow capital at a low cost

Source: Stakeholder interviews, MSC and ThinkAg analysis

5. Way forward

Rabo group can play a key role to transform the AgTech landscape in India

Build the platform and provide catalytic support

- Design and develop a platform for multiple AgTechs to work together and provide various services to banks, from origination to collection
- Provide catalytic support to early stage and late stage AgTechs

Facilitate innovative financing models

- Support various financial models through credit guarantees and FLDGs, and by offering Rabo's expertise to selected start-ups (please see Appendix)

Develop pilots and case studies

- Create knowledge collaterals for policy reforms on farmer financing

Source: Stakeholder interviews, MSC and ThinkAg analysis
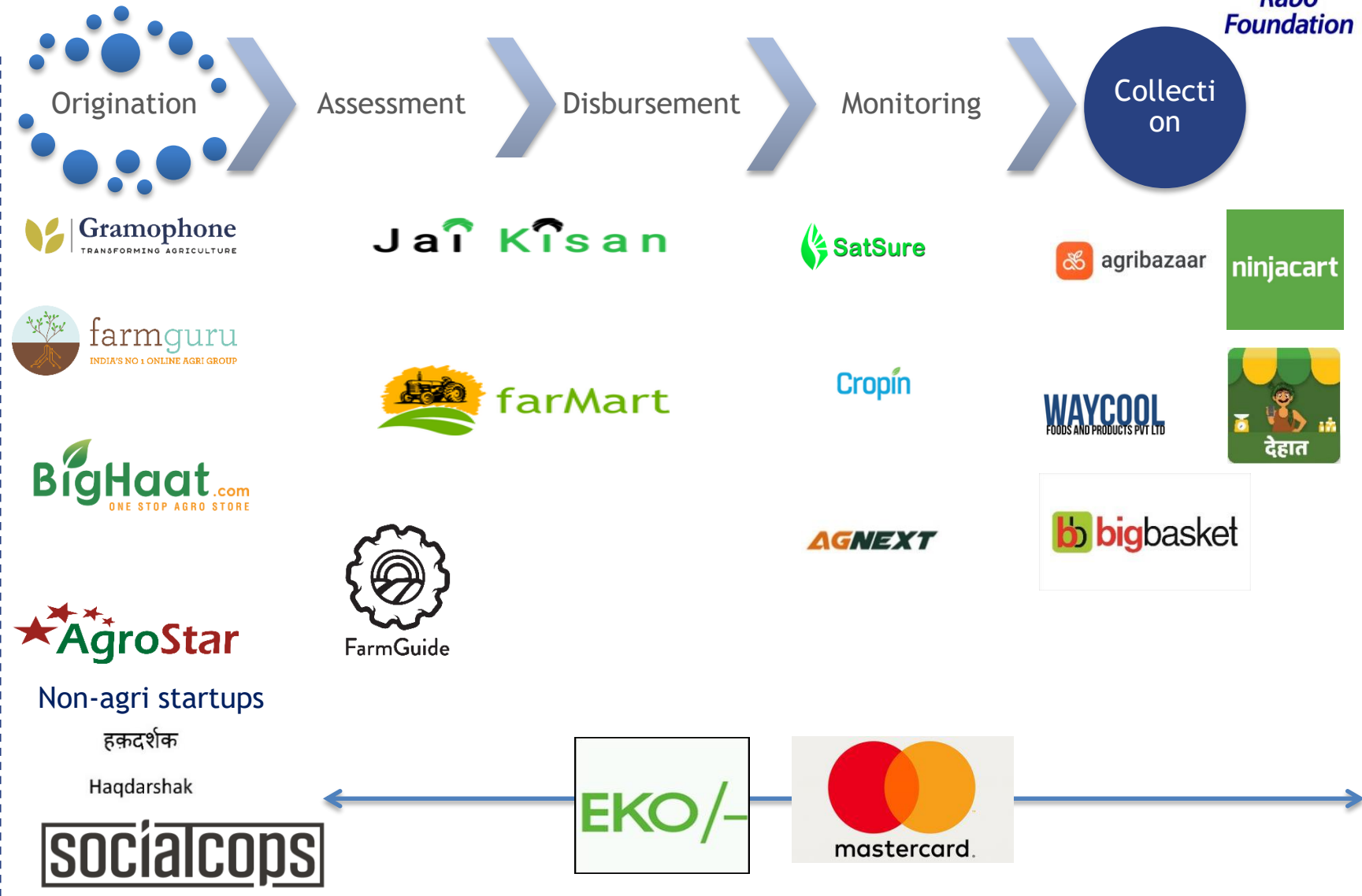
Appendix : Partnership models to be supported

An end-to-end agri-stack platform to improve existing farm-lending processes
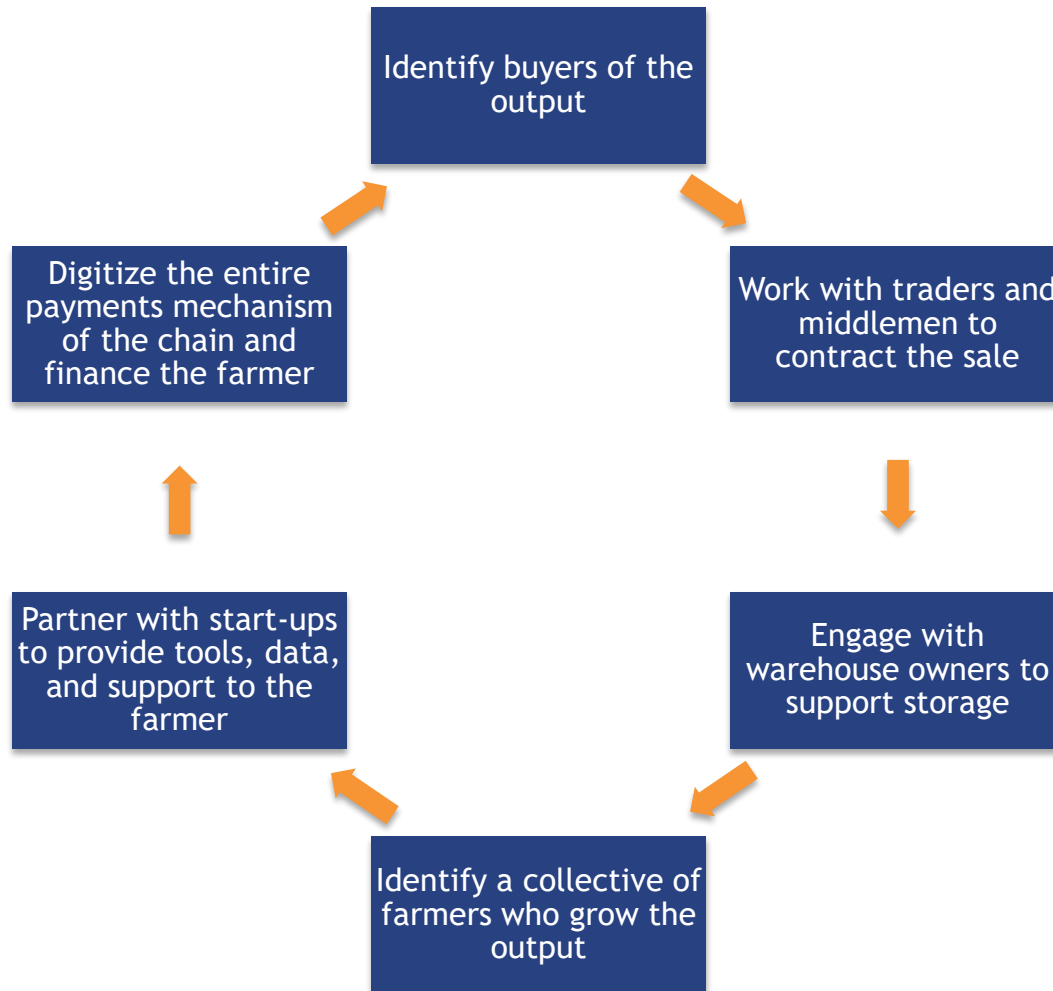
One-stop access for banks

Features of this model:

1. Innovator group
Create a group of innovators that offer a variety of solutions to work together with banks in a particular district

2. FI group
Create a group of leading banks and financial institutions that can work together to discuss processes and solutions with AgTechs

3. Pilot development
Choose one district in which the bank or FI currently offers lending and deep dive into existing processes where AgTechs can plug in their solutions

4. Build data and history
Digitize the entire process and enable digital payments to create year-on-year records to facilitate ease of lending going forward

Origination → Assessment → Disbursement → Monitoring → Collection

Gramophone — TRANSFORMING AGRICULTURE

farmguru — INDIA'S NO 1 ONLINE AGRI GROUP

BigHaat.com — ONE STOP AGRO STORE

AgroStar

Non-agri startups

हक़दर्शक

Haqdarshak

socialcops

Jai Kisan

farMart

FarmGuide

SatSure

Cropin

AGNEXT

EKO/-

mastercard

Rabo Foundation

agribazaar

ninjacart

WAYCOOL FOODS AND PRODUCTS PVT LTD

देहात

bigbasket

Source: MSC and ThinkAg analysis

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New tech-focused partnership models are emerging to enable access to finance (closed loop platforms-1)

```
Identify buyers of the
output
        ↓
Work with traders and
middlemen to
contract the sale
        ↓
Engage with
warehouse owners to
support storage
        ↓
Identify a collective of
farmers who grow the
output
        ↑
Partner with start-ups
to provide tools, data,
and support to the
farmer
        ↑
Digitize the entire
payments mechanism
of the chain and
finance the farmer
        ↑
(loop back to Identify buyers of the output)
```

Features of this model:

1. Focus on cash flows that accrue to the farmer
Partnering with institutional buyers and large distributors ensures visibility of cash flows and thereby of recovery

2. Digitization
This would allow data analytics on transactions over time, leading to better credit score and finance products

3. End-to-end support to the farmer
The farmers receive handholding support from input players and startups to ensure quality and standardization of the end output

4. Creation of micro-entrepreneurs
Entrepreneurs at the village level to facilitate coordination among farmers, service providers, and end-buyers.

5. Warehouse financing
Partnership with local entrepreneurs to develop a warehouse that will allow farmers to store produce and receive finance based on the quality of their output

New tech-focused partnership models are emerging to enable access to finance (closed loop platforms-2)

Identify credit-worthy smallholder farmers using credit underwriting model

→

Partner with financial intermediaries to extend lines of credit to the farmers

↓

The farmer places the order with the select group of retailers and the financier settles the transaction is settled directly

←

Engage with select retailers of input and machinery with whom the farmers can engage with to use the credit

↓

Digitize the entire payment mechanism of the chain and finance

→

Engage with buyers of output or warehouse players to whom the farmers can sell/store and repayment can be made to the financier directly

Features of this model:

1. Credit underwriting model
This model analyzes multiple alternate data points to include income, social and output data points to determine the creditworthiness of the farmer.

2. No cash disbursement to the farmer
The credit that the farmer receives is essentially cashless, as the financier settles the payments due to the retailers directly and receives the payment from the buyer or warehouse owner. This ensures utilization of credit for the said purpose.

3. Market linkage
Working with the buyer leads to a higher earning potential for farmers as middlemen are eliminated

4. Advantage to the financial institution
A reliable and vetted base of farmers and information on credit utilization makes it a profitable loan for the financier.

5. Focus on smallholder farmers
The model focuses on SMF who find it difficult to qualify for the traditional due diligence process of banks, which require documentation and collateralization

Source: MSC and ThinkAg analysis

ThinkAg MSC

New tech-focused partnership models are emerging to enable access to finance (input suppliers that extend credit to the individual farmers)

Identify credit-worthy smallholder farmers based on buying data and other metrics

→

Provide high-quality inputs with personalized advisory

→

Provide credit linked to the crop harvested

Features of this model:

1. Historical data and analytics
Data points collected from previous purchases—both online and call data along with additional parameters and tests

2. Personalized advisory
Troubleshooting agronomy via an agronomist at call center minimizes risks of crop defects as well as weather risks

3. Monitoring and support
Consistent monitoring of the crop via the call center and field team mitigates issues with repayment at an earlier stage, thereby minimizing the credit risk

Source: MSC and ThinkAg analysis

AgTechs can learn from FinTechs (which focus on urban markets) and adopt solutions for the rural environment

Category	Origination	Underwriting	Servicing and monitoring	Equivalent in agriculture
Digital consumer lending OptaCredit, EarlySalary, SlicePay, LoanTap, ZestMoney	PAN, bank statements, credit card statements, salary slip, address proof, and physical KYC	Credit-scoring based on spending pattern and earning information based on documents or evidence	Post-dated bank checks or e-mandate taken at the time of disbursement	Online input sellers, such as AgroStar, Gramophone, BigHaat as well as JaiKisan and FarMart collect spending data as well as demographic data to develop similar credit scores.
SME financing Capital Float, Indifi, ZipLoan, Power2SME	PAN card, Aadhaar card, address proof business registration proof, bank statement, latest income tax returns	Algorithm to instantly approve the loan based on submitted information	Loan contract (digital) is signed at the time of disbursement	Samaaru digitizes transactions by working with players across the chain from farm to market and intends to lend based on the constructed P&L.
P2P lending Faircent.com, Anytime Loan.in, OpenTap	Proof of Identity and Address, DOB Proof, mobile bill, Bank statements, Salary slip, ITR, NACH Mandate	Automated system to provide an indication about the borrower's capability to efficiently repay the loan	Post-dated bank checks or e-mandate taken at the time of disbursement	Commission agents and money lenders currently occupy the space.
Loan marketplace BankBazaar, Deal4Loans	Basic personal details No proofs needed	Only listing of various personal finance products and match-making between borrower to the lender.		Existing players, such as AgroStar and iMandi have plans to provide a variety of finance products.
Invoice discounting Kredx,M1xchange, Indifi	KYC and CIBIL of Directors Bank statements, Sales data for one year, board resolution and sanction letters	An automated system carried out a number of checks, followed by physical checks	Post-dated bank checks or e-mandate taken at the time of disbursement	Warehouse receipt financing by banks and existing players play a similar role.

Source: MSC and ThinkAg analysis

Annexures

AgTechs

Agri

Cropin · agricx Desh ki mandi · FarmGuide · SatSure · BigHaat.com ONE STOP AGRO STORE

farMart for farmers from farmers · agribazaar · DeHaat · Gramophone TRANSFORMING AGRICULTURE · samaaru Farmers First

AGRIBUDDY · ecoZen solutions · Y-COOK!

Allied

PASHUCHIKITSA A GREAT INOVATION · LiVESTOC IMPROVE YOUR STOCK · stellapps Smart Systems, Stellar Applications. · ZF ZOOFRESH FOODS

Incubators and accelerators

villgro possible. · YES SCALE

Investors and donors

Investors

ankur capital · ACUMEN · omnivore · Aspada

Donors

Rabobank · Rabo Foundation · Michael & Susan Dell FOUNDATION · BILL & MELINDA GATES foundation

Industry bodies

NASSCOM® · mastercard

ThinkAg · MSC

Financial institutions

Commercial banks and small finance banks

AXIS BANK

YES BANK

SBI

UJJIVAN
UJJIVAN SMALL FINANCE BANK
Better Banking. Better Living.

Non-banking financial companies (NBFCs)

ANANYA
Going Beyond Finance

NAFA
One Step towards Prosperity

Samunnati
VALUE CHAIN FINANCE

DVARA
Trust

Input suppliers

syngenta

Agri-corporates

Godrej agrovet
brighter farming

Key attributes

Geographic focus
Ghana and Kenya

Year founded
2016

Technology used
Satellite data, artificial intelligence

Focus area in value chain
Marketplace

Key offerings
Payments, credit, farmer and data management, insurance

Number of farmers served
9,000

Revenue model
- Fee-based
- Commissions
- Loan or credit interest

Summary

- **Addressable challenge:** Lack of financial and information services for smallholder farmers in Africa
- Tulaa is a digital lending platform that links input suppliers, farmers, and commodity off-takers. It provides financing to farmers for agri-input purchases and coordinates delivery through the existing retail network or paid field agents.

Partners

Type of partners: Value chain actors, financial institutions, and insurance providers on both the Input-side and output-side

musoni — MFI lender

Mavuno — Fertilizer supplier

syngenta — Wealth index insurance

OCP — Input supplier

Data captured

- KYC data
- Farmer crop data
- Plot location data

Business model

- Farmers purchase inputs from the nearest retailer. The lender pays the input supplier directly through the Tulaa platform. The off-taker repays the loan repayment in lieu of paying the farmer directly. The farmer receives the remaining payment over a mobile money account
- The Tulaa platform with farmer account dashboard is offered to agri-enterprises and corporate clients for a fee

Key value proposition

- **Input suppliers:** Aggregated demand, increased sales, reduced counterfeit products, and customer loyalty
- **Commodity off-takers:** Aggregated produce, increased quantity and quality of output, reduced cash handling
- **Lenders:** Expanded customer reach, lower KYC costs and reduced loan diversion, lower risk, and access to data for credit risk assessment
- Farmers: Access to credit, inputs, technical support, and direct link to buyers

Source: Digital financial services for agriculture, IFC

Key attributes

Geographic focus
Kenya

Year founded
2016

Technology used
Satellite imagery, machine learning, and remote sensing

Focus area in value chain
Agri-FinTech

Key offering
Agri-related information and credit

Type of farmers
Maize farmers

Revenue model
- Loan or credit interest

Summary

- Addressable challenge: Lack of access to credit and agronomic information for unorganized value chains (maize farmers)
- Apollo is a digital lending platform that provides farmers access to credit based on alternative credit scoring models as well as agri-information and advisory services
- The loan product also comes with weather index insurance to cover the cost of a package of input

Partners

Type of partners: Input-side value chain actors like agri-input dealers, financial institutions, insurance providers

Data captured

- Basic farmer data: housing, animal or livestock ownership, and access to roads
- Crop data: yield, crop cycles, crop types, soil data

Business model

- Apollo Agriculture collects information from enrolled farmers through a phone survey and captures the GPS boundaries of farms and other information through satellite imagery
- Applies agronomic machine learning to generate information services and credit-worthiness scoring
- Farmers repay the loans through mobile money over the course of the season with full repayments after harvest
- At the time of writing, Apollo Agriculture was seeking partnerships with banks or MFIs for lending

Key value proposition

- Low cost of customer acquisition through radio, refer-a-friend initiatives, and roadshows; reduced cost of customer registration through the low-cost SMS channels
- Apollo Agriculture can customize products based on the specific location of each farmer

Source: Digital Financial Services for Agriculture, IFC

Key attributes

Geographic focus
Global (25 countries, including 12 in Sub-Saharan Africa)

Year founded
2012

Focus area in value chain
Farm management and data analytics

Key offering
Information, market access services, credit

Number of farmers served
250,000

Revenue model
- Software as a service: One-off set up fee and annual licensing fees

Summary

- **Addressable challenge:** Need to formalize transactions and interactions between agribusinesses and smallholder farmers
- Farmforce is a cloud-based data sourcing and management solution that off-takers and cooperatives can use to capture and store farm information and create farmer profiles

Partners

Type of partners: Farmers associations and financial institutions

Off-takers & exporters

Kellogg's
McCormick
Cargill

Lending

In Southeast Asia, agribusinesses in the black pepper value chain and IFC have been piloting the use of data for credit

Business model

- Field staff for agribusinesses, cooperatives, or aggregators collect farmer and crop data on the farmforce mobile app.
- Field staff enters data on the loan to be disbursed and loan repayment amount on the platform
- Farmforce's integrated harvest module is connected to a mobile payment system that allows clients to pay farmers via farmforce
- The client (agribusiness) owns the data, hence the partnership is directly between the agribusiness and the financial institution

Data captured

- To create credit scorecards
- Crop data: crop information, crop cycles, planting and fertilizer application, previous harvests
- Farm data: individual GPS field information, land size, picture of the farm

Key value proposition

- Lenders and off-takers: data collected can drive strategic decisions, such as choosing input packages, project yields, facilitate value chain funding, and boost farmer production. Also, farmforce reduces the cost of data collection.
- The application can be used in multiple languages (currently 13)

Source: Digital financial services for agriculture, IFC

Key attributes

Geographic focus
Indonesia

Year founded
2015

Technology used
Blockchain, AI, machine learning

Focus area in value chain
Marketplace

Key offering
Data exchange for food, agri and financial sector, hence microcredit

No. of farmers served
19,500

Revenue model
- Earnings from data providers and data buyers

Summary

HARA

- **Addressable challenge:** lack of platforms for effective and standardized data sharing for credit-scoring
- HARA is a blockchain-based startup that has developed a suite of data acquisition apps that ensure decentralized storage and security of agricultural data. It works to make the value chain sustainable by connecting smallholder farmers with financial institutions, off-takers, and input producers through data

Partners

Type of partners[1]

Data buyers
BNI   btpn bank
ASURANSI PAROLAMAS   Hexa Agro

Value-added service
DATTA BOT   Singularity Net

Data providers
aruna   PRISMA
Promoting Rural Income through Support for Markets in Agriculture

Data qualifiers
HARA

Business model

- Data providers enter the raw data on the HARA system for which they receive tokens
- VAS access the raw data and reenter the processed data on the system, monetizing the exchange
- Data qualifiers receive tokens to verify the quality of data
- Data buyers purchase the enriched and qualified data from the HARA system

Data captured

- Farm data: land size, types and quantity of farm input used
- Crop data: transactional data on crop sales, previous harvest data,

Key value proposition

- Data buyers: access to near- real time and valuable data. reduced cost of customer acquisition
- Farmers: access to credit, discounts on fertilizers and seeds through local HARA partners, gauge price for their crops
- Token-based incentive system for both farmers and field agents who collect the data from farmers

[1]Data buyers: banks, insurance & agri-input companies
VAS: organization that convert raw data to processed data
Data providers: farmers, IoT, satellite companies
Data qualifiers: HARA field agents

Rabo Foundation

ThinkAg   MSC

Annex 3: JAM infrastructure

340 million
Jan Dhan accounts

Access to formal financial system through Jan Dhan bank accounts

- 99% of Indian HHs now have a bank account
- Over 53 per cent of the Jan Dhan account holders are women, 59 per cent accounts are in rural and semi-urban areas

1.2+ billion
Aadhaar enrollments

Access to government subsidies through *Aadhaar*

- 0.425 billion subsidy transactions through *Aadhaar*
- USD 24.43 billion subsidy transferred through *Aadhaar* till now

300+ million
Smartphones

Access to information

- 500 million unique smartphone users by 2020 (~300 M[1])
- 750 million internet users by 2020 (~450 M[1])
- Reduced cost of internet data from USD 3.5 per GB to USD 0.2 per GB

- DFS providers can combine access to digital finance with access to information on market linkage and agriculture practices in near-real time
- They can develop tailored solutions for farmers and boost their business growth and profitability.

Annex 4: National Agriculture Market (eNAM)

Key facts about eNAM

- **eNAM** is a virtual platform that connects existing *mandis* through an online trading portal and increases the reach of farmers to buyers nationally

- **585** *mandis* integrated across **16** states and **2** union territories

- **12.7 mn** registered farmers and **0.11 mn** registered traders

- **USD 6.94 billion** of trade value

- **385** farmer producer companies (FPCs) connected

Current challenges for farmers

- Currently, APMCs limit the scope of trading in agri-commodities

- Multiple licenses required to trade in different markets within the state

- Multiple transaction costs involved

- Presence of multiple intermediaries

Role of AgTechs to help improve access to finance for SMF through eNAM

- eNAM was launched to remove the middle-men and **offer better prices** to farmers

- However, most *mandis* continue to **face issues** with providing quality produce to buyers

- AgTechs can provide **quality grading and assaying solutions** to improve quality assurance and fetch better prices for the farmers