

Crop Insurance: Improving Business Value Using Technology Interventions

Abstract

Agriculture contributes ~16% to India's GDP. To mitigate risks associated with agriculture, the government has nurtured an ecosystem to provide credit and insurance to farmers. Indian insurers are key participants in the agriculture ecosystem. For general insurers, crop insurance is the third largest line of business. Insurance penetration stands at ~22% of the total number of farmers covered and ~30% of the gross cropped area. This creates a huge opportunity for insurers to grow. A key enabler will undoubtedly be the rapid deployment of technology solutions to bring efficiency in insurance operations.

This paper introduces the crop insurance ecosystem in India, followed by trends and challenges faced by stakeholders. It dives deep into the technology interventions that the insurers can deploy to bring efficiency and accuracy to various processes, such as yield estimation, risk underwriting, and claims settlement. The reformed processes can lead to increased farmer enrolment in line with the government vision.

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Introduction

The agriculture sector is one of the largest livelihood providers in India. However, farmers here are often exposed to several threats with many being beyond human control, such as price fluctuation, weather variability, varying crop yields and pest attacks. The government provides crop insurance to farmers and landowners to mitigate these risks and ensure farmers are covered in the event of a disaster and stabilize their income.

Crop insurance was first introduced in 1972 based on Individual Farm, followed by PCIS based on a homogeneous area-based yield index. Several crop insurance schemes were introduced from time to time, such as CCIS, NAIS, MNAIS, and WBCIS. Historically, the crop insurance industry has faced several problems such as high premium, delay in CCE, non-payment of claims, and lack of transparency.



Exhibit1: Crop insurance timeline

The Indian Government launched PMFBY¹ in February 2016. The PMFBY replaced all prevailing yield-based insurance schemes in India and extended coverage for localized risks, post-harvest losses, etc. The scheme was different from its predecessors in terms of methodology and adoption and aimed to increase crop insurance penetration through increased farmer awareness, technology adoption, and low premium rates.

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Today, crop insurance is the third largest segment in the non-life insurance sector after motor and health.

Crop insurance typically covers the following risks:

- Standing crop: Covers losses due to natural calamity, weather conditions, widespread pest attacks, and diseases.
- Prevented sowing/planting/germination risk: Covers losses due to adverse seasonal and weather conditions.
- Post-harvest losses: Covers losses for crops that need to be dried and spread in the field after harvest.
- Localized calamity: Covers losses to insured crops in notified areas due to localized risks such as hailstorms, landslides, etc.
- Wild animals: Covers loss or damage to crops due to attack by wild animals.¹

Trends

Around 15% of the gross cropped area was insured in 2006-2007, gradually increasing over the last decade to 30% in 2019-2020.



Exhibit 2: Crop Insurance Penetration in India



The share of private insurers has increased over the last five years, with over 46% of the net premium in 2019-2020.

There are 17 empaneled private and public sector insurers in India for crop insurance. In 2019, only 13 participated in the bidding process



Exhibit 3: Share of Insurance Organizations

The total number of farmers insured under PMFBY has decreased over the last two years in the Kharif and Rabi seasons, but Kharif season saw a nominal increase under WBCIS.



Exhibit 4: Loanee & Non-Loanee farmers





Incurred claims for FY2019-2020 exceeded the net premium by more than 15% for all insurers combined.

Exhibit 5: Premium – Claim growth over the 5-year period²

Crop Insurance Ecosystem

The crop insurance ecosystem in India is a diverse system of participants that together serve the farmers.



[2] IRDAI website, Public Disclosure and Annual Reports of General Insurance Companies



The **government** is the nodal authority responsible for formulating regulations for crop insurance. It invests and sets up the necessary infrastructure.

The **insurer** underwrites the risk and is the primary holder for insurance contracts.

The **reinsurer** diversifies the risk coverage for insurers. Typically, only 25% of risk (as a percentage of sum insured) is absorbed by domestic insurers. The rest is passed on to reinsurers.

The **Distributors** include banks and intermediaries like microfinance institutions, CSC/PACS, brokers. Public sector banks are the primary distribution channel as the insurance is bundled along with agricultural credit. The distributors also serve to spread awareness about crop insurance. Agri-tech is an emerging channel primarily involved in supplying farm inputs to farmers

The **technology platform** includes data and technology providers. They can emerge as a critical backbone for the agriculture ecosystem and introduce digital innovations in crop insurance.

Current Challenges

The following are the challenges faced by stakeholders in the crop insurance ecosystem:



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- Ensuring Data Correctness in Prevented Sowing/Planting/Germination Claims: For claims related to sowing, the state government notifies the impacted insurance units. To verify the claim, the government and insurers must complete the assessment within a fixed timeframe. The manual verification process is prone to errors. For cases where claims are made without sowing crops, verification at an individual plot level becomes important.
- Delay in Transfer of CCE Data Due to Manual Process: For claim assessment, the government obtains yield results based on CCEs conducted in the presence of insurers. After harvest, 3 to 3.5 million CCEs are conducted across India within 20 to 40 days. The CCE process, which is manual, causes biases in outcomes, affecting the accuracy of claim settlement.
- Lack of Digital Data: For issues related to area discrepancies, physical verification is performed at the farm level. This process is error-prone and time-consuming. Digitization of land records can automatically link insurance to the insured area. So far, as a part of the Digital India Land Records Modernization Program, 56% of cadastral maps are digitized, and spatial data is verified for 52.88% villages.³
- Delay in Localized Claims Settlement: Claims assessment for localized perils is conducted at the individual plot level by the assessor, block-level agriculture officer, and affected farmer(s). The process is manual and time-consuming, leading to a delay in the claim settlement process.



Technology Enablers and Use cases



The key technology enablers to overcome the abovementioned challenges are:

1. Data and Analytics

The availability of data analytics use cases for Indian crop insurers can play a transformative role across the crop insurance value chain. Here are a few scenarios:

Effective CCEs

The following data, along with ML models, can be used to digitize the insurance process:

- Satellite imagery
- Vegetation indices
- Real-time data from weather and rain gauge stations
- Soil and crop data
- Time series video of crop growth
- Census code mapping

Discrepancies in area sown and insured

The digital land records are geo-coded latitude/longitude village shapefiles. These can be used to identify the location of CCEs, map plot boundaries, and identify mismatches in area/crops sown.

Multiple insurance coverage for one plot

The digital land records can be used to identify any case of excess or double insurance against the insurance application when integrated with distributor and insurer systems.

Faster claims processing

The real-time integration of insurer data with weather and satellite data providers will enable insurers to automate claim intimation. With digital banking, the claim amount can be directly transferred to farmers.

Underwriting

The satellite data can be used to monitor crop health. With current and relative vegetation analysis, insurers can assess the risk profile of the region/plot and use the data for arriving at an accurate premium.

2. Drones

Drones can be deployed to assess crop damage and thus speed up claim settlement. The time-series data captured can be used to improve the underwriting process. The captured images can also be superimposed on digital maps of states to help identify farms and crops sown.

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3. Blockchain

All participants in the crop insurance ecosystem are nodes on the blockchain. The insurer and farmer enter the contract. The data providers act as trusted third parties. In case of an event, actions will be triggered and claims settled immediately on the blockchain.

4. Mobile Applications

Claim intimation

This involves using mobile applications for loss intimation and can include pictures of crop damage and location-specific details.

Conducting Digital CCEs

Here, mobile applications can capture the locations where CCEs are conducted along with date/time and photographs.

5. Internet of Things (IoT)

The use of sensors to monitor weather conditions, soil health, and crop health can generate data points that can be used to perform analytics for real-time control.

6. Distribution Using Digital Channels

Digital channels allow agro-dealers to provide packetized insurance cover with their products. After buying the product, a farmer can use bar-coded scratch cards or SMS to avail insurance cover.

Conclusion

The technology interventions discussed in the paper can play a transformative role in the crop insurance value chain as they help deliver outcomes faster and in a more accurate manner.

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