Agriculture Insurance

Understanding India's Risk Transfer Framework & Technology Solutions

Federation of Afro-Asian Insurers & Reinsurers (FAIR)

December 2025

Agenda

- AICIL - Overview
- Basic Principles of Agricultural Insurance
- Crop Insurance in India
- Technology in Crop Insurance
- AICIL – Growing Footprints

About Us

Agriculture Insurance Company of India Ltd.

Commencement **2003**	**40M+** Farmers insured	Crossed $1.3b GWP — Largest Crop Insurer in India	20 Million Ha. Gross Insured Area	**2020** BSB: Remote Sensing based crop Insurance
250+ Districts covered	**7M+** Benefitted Farmers	Pan India Coverage	**$10b** Sum Insured	 **2022** Allied License

Indian Agriculture - Some Facts

Support 42.3% of population and contributes 18.2% to GDP

Average Growth Rate 4.18% per year

Total Farm Holdings 146 Mn,

Insured: 40 Mn (27%)

S/M Holdings 126 Mn (86%)

Gross Cropped Area: 219 Mn Ha

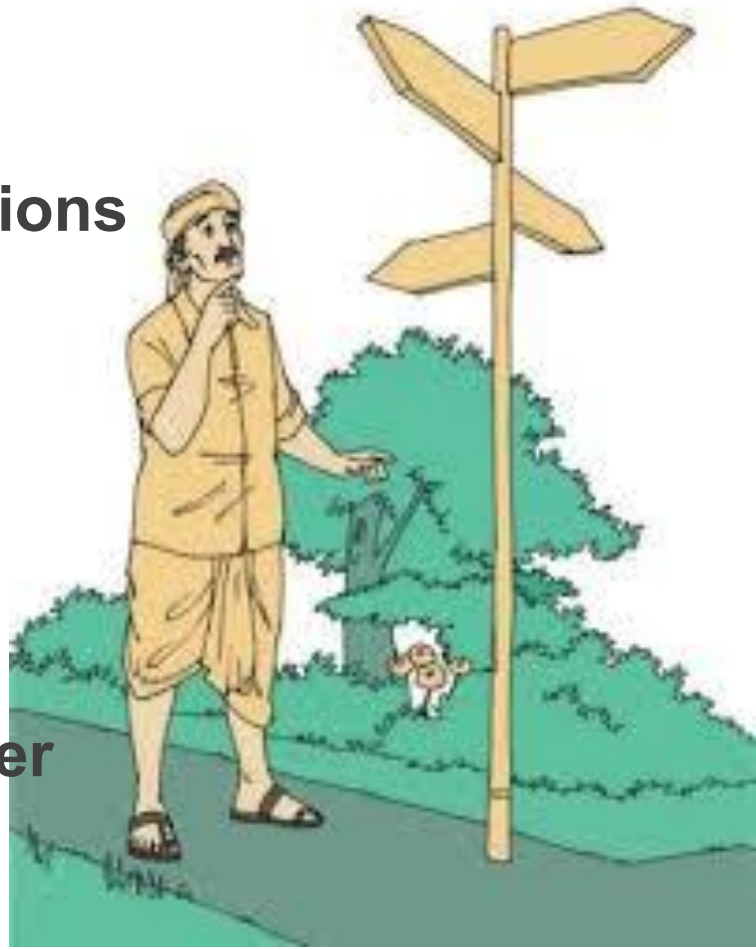
Insured Area: 62 Mn Ha (28%)

Cattle Population: 193 Mn,

Cattle Insured: 2 Mn (1%)

Why Crop Insurance?

- ✔ Primary risk management tool
- ✔ Protects against losses caused by crop failure
- ✔ Strengthens Co-operatives and agri finance institutions
- ✔ Accelerates adoption of new agricultural practices
- ✔ Minimizes rural indebtedness due to crop failure
- ✔ Reduces govt expenditure on relief measures
- ✔ Keeps continuing farmer's income and buying power
- ✔ Ensures the prosperity of the country
- ✔ Maintains the dignity of farmers



VS

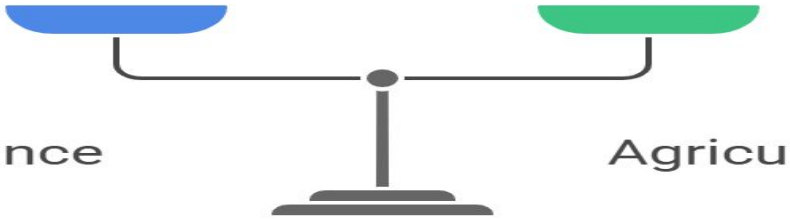
General Insurance

Covers broad risks, predictable

Agricultural Insurance

Protects against farming risks, uncertain

Broad Coverage Scope	Specific Agricultural Focus
Wide Target Group	Farmers and Agribusinesses
Diverse Product Range	Crop Insurance Schemes
Predictable Risk Nature	Uncertain Weather Risks

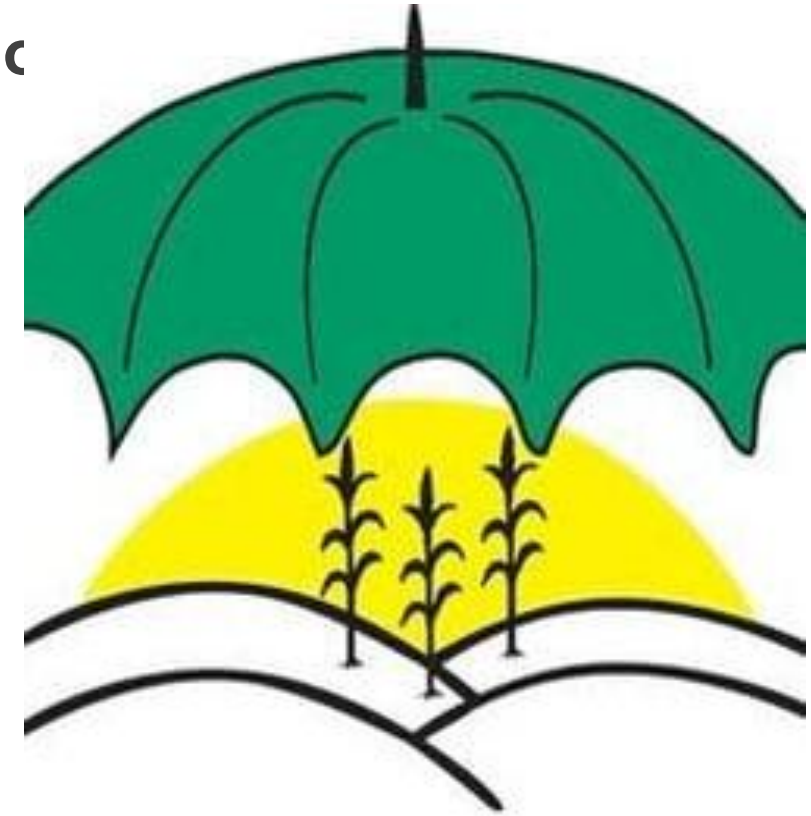


General Insurance

Agricultural Insurance

Crop Insurance - Challenges

- ✔ Lack of Reliable historical data of Yield and crop lo
- ✔ Wide variety of agricultural practices
- ✔ Paying capacity of farmers
- ✔ Loss assessment – individual vs area approach
- ✔ Unique identification not possible
- ✔ Lack of trained manpower for loss assessment
- ✔ Difficulty to attribute and measure the loss due to insured peril



Crop Insurance Systems

1. **Traditional:**
   - (i) Named Peril,
   - (ii) Multi-Peril
2. **Index:**
   - (i) Yield Index (ii) Weather Index
   - (iii) Crop Health Index
   - (iv) Multiple Trigger
3. **Hybrid (Index Plus):**
   - Weather + Named peril
4. **Income: Revenue Based**

Crop Insurance Scheme - Framework

Critical Elements	Key Elements	Other Requirements
• Perils covered • Invidual/ Area approach • Voluntary/ Compulsory	• Farmers/ Crops covered • Sum Insured/ Premium • Loss assessment methodology • Financing	• Historical data • Channel partners • Trained manpower • Monitoring

Crop Insurance in India

1972

First Ever Crop Insurance for H4 Cotton
Implemented by GIC

1985

Comprehensive Crop Insurance Scheme (Yield Area Based) implemented by GIC

1999

National Agricultural Insurance Scheme (Area Yield Based)
GIC/AIC (2003 onwards)

2007

Weather Based Crop Insurance Scheme (Parametric) AIC

2016

Pradhan Mantri Fasal Bima Yojana (Yield & Parametric)
Implemented by all empaneled companies

Objectives of PMFBY

Financial Support to Farmers	Stabilize Farm Income	Encourage Modern Agricultural	Flow of Credit
Provide insurance cover to farmers in the event of crop losses due to non-preventable risks.	Ensure continuity in farming operations, especially after severe crop losses	Promote the use of innovative and modern agricultural techniques to increase productivity.	Ensure the flow of agricultural credit to farmers, encouraging them to adopt progressive farming practices.

PMFBY Key Features

Low Farmer Premium

Uniform across the nation

Kharif Crops – 2% of Sum Insured

Rabi Crops – 1.5% of Sum Insured

Commercial / Horticulture Crops – 5% of the Sum Insured

Comprehensive Risk Coverage

Comprehensive risk coverage against all non-preventable natural risks from pre-sowing to post-harvest stage

RWBCIS

Weather-index-based risk coverage offered for Horticultural, Commercial Crops/Areas based on term-sheets

National Crop Insurance Portal (NCIP)

End-to-end auto Administration of the Scheme from Enrollment to Claim Settlement & Grievances

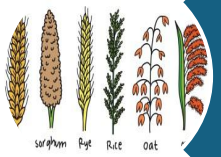
Leveraging technology

CCE Agri App, YESTECH models, WINDS, KRPH, and other Remote Sensing Technology in yield estimation

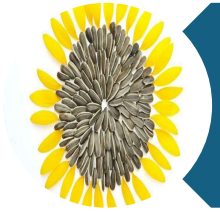
Scheme Flexibility

PMFBY offers flexibility to State to select the covers and ARTM models to suit their requirements

Coverage of Crops



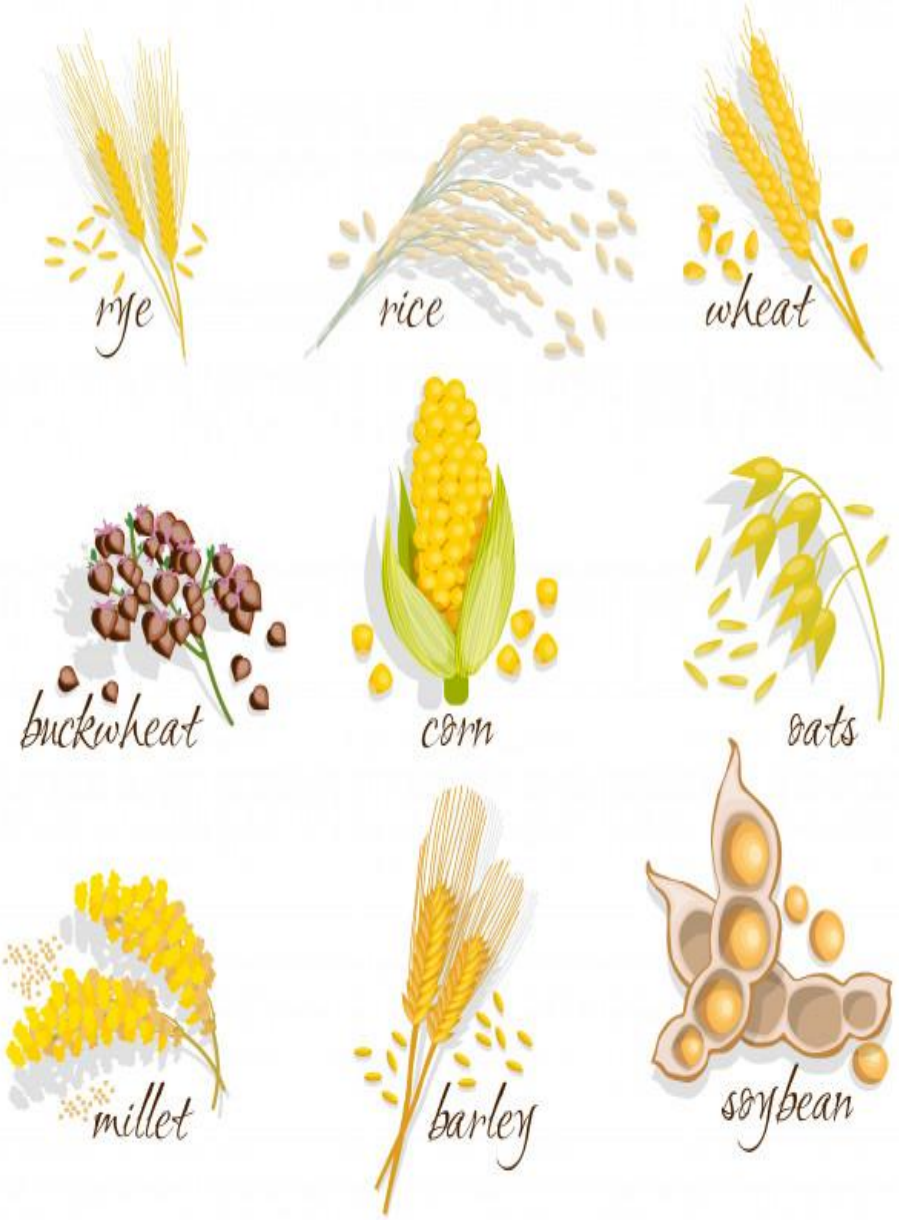
Food crops
(Cereals ,Millets and Pulses)



Oilseeds

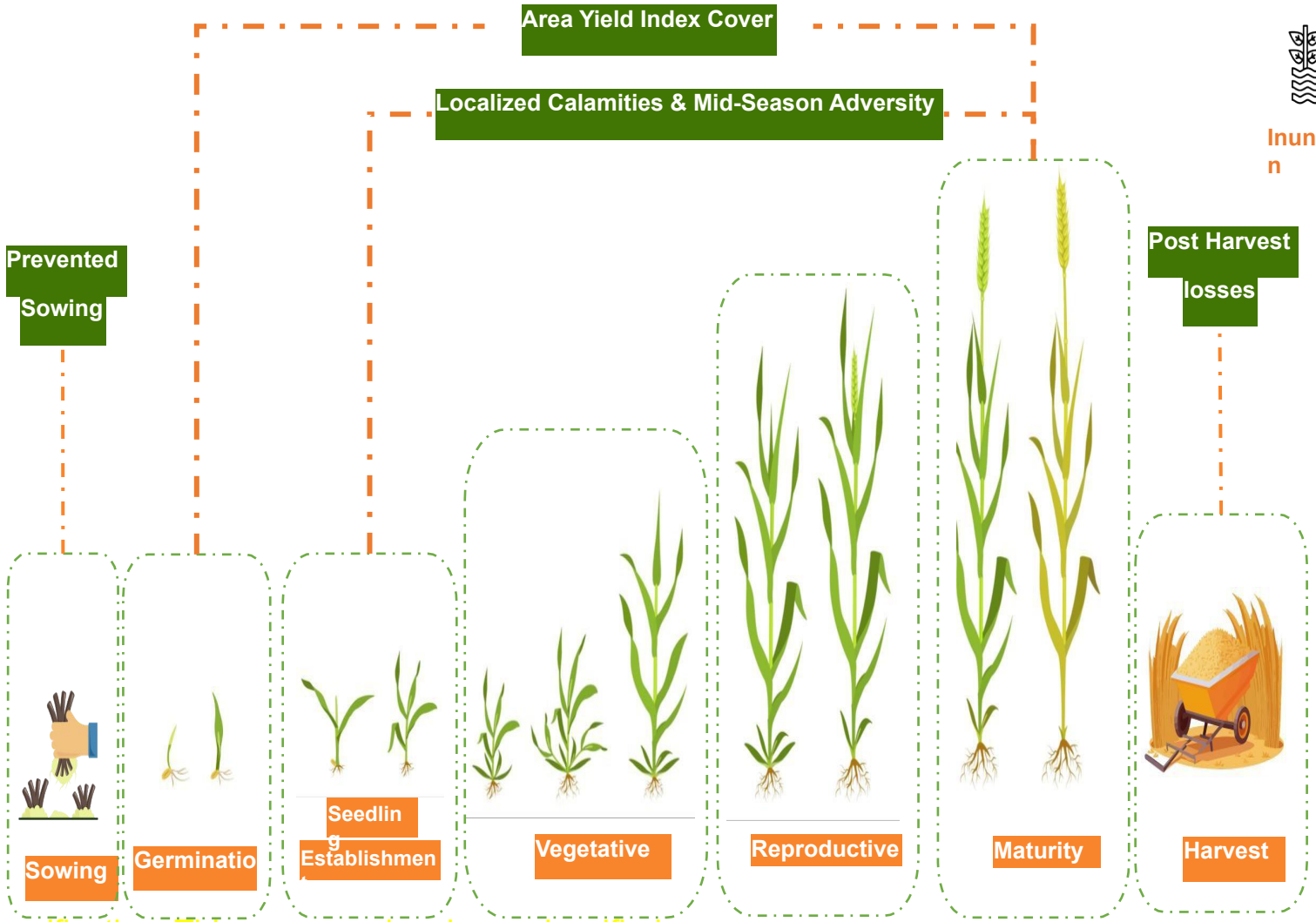
Annual Commercial / Annua
Horticultural crops.

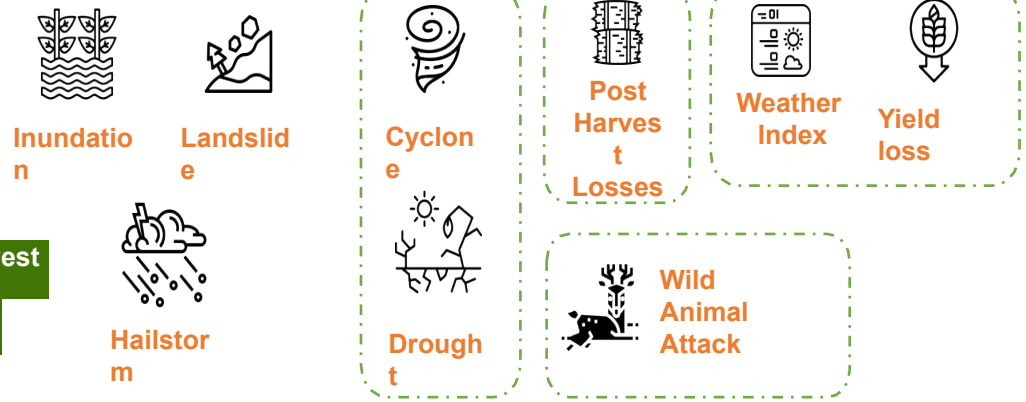
Perennial horticultural crops
standard methodology for yie
estimation



PMFBY Product Structure

A Comprehensive Insurance Product covering all Stages from Sowing to Harvesting



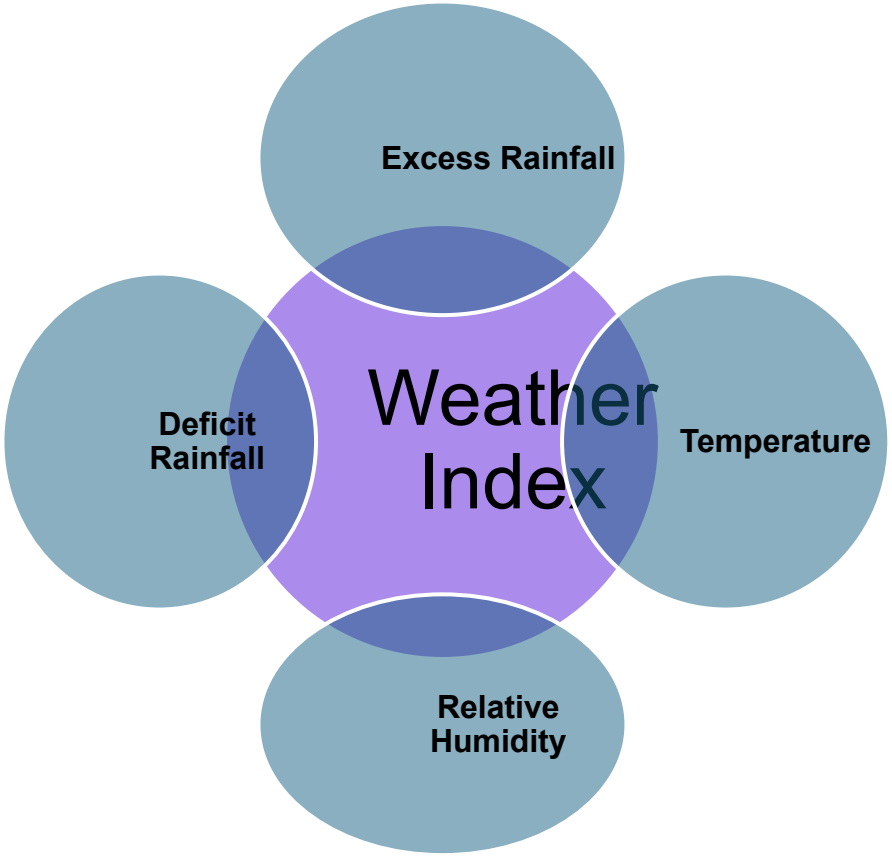


100+ Crops notified under PMFBY Scheme

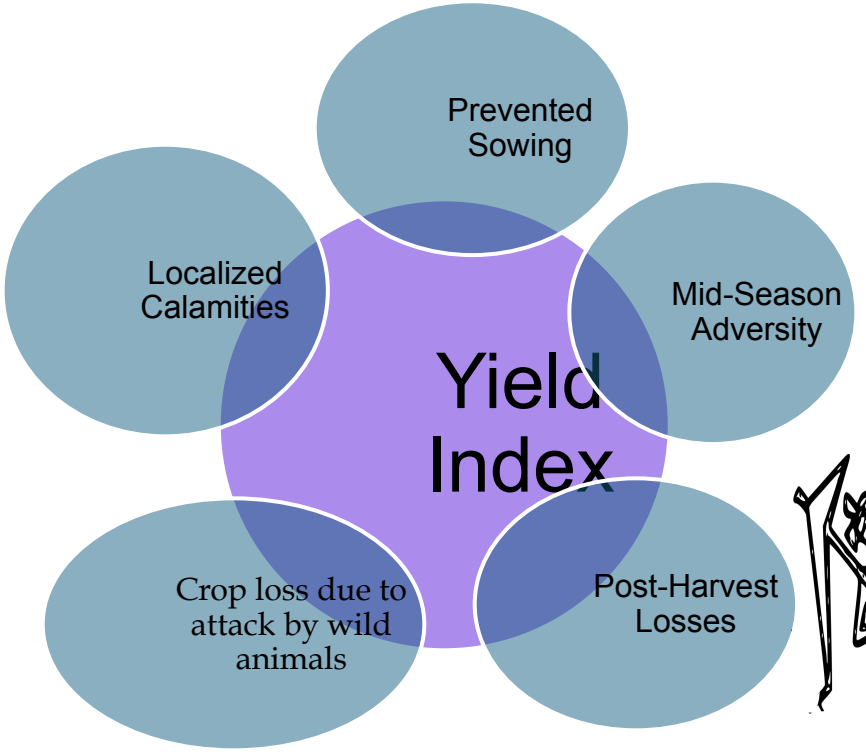
24 States/UTs in nationwide participation

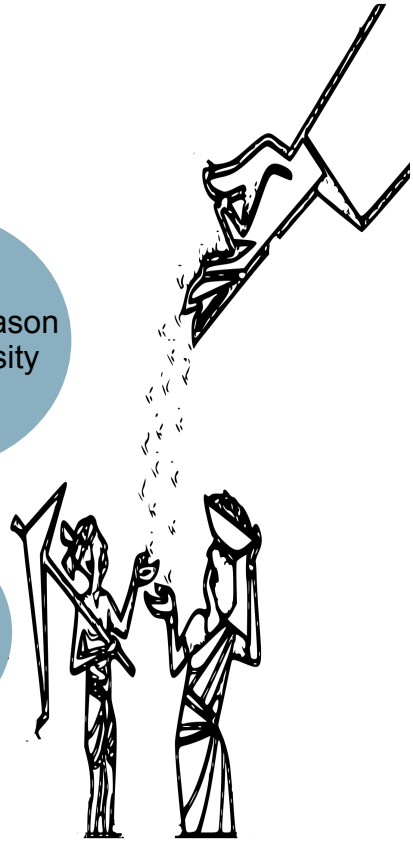
Coverage of Risks and Exclusions – PMFBY

RWBCIS



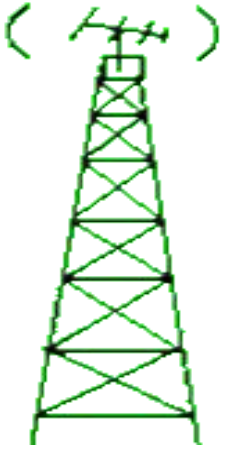
PMFBY





Exclusions - War and nuclear risks, malicious damage and other preventable risks

AWS (AUTOMATIC WEATHER STATION)



Types of Claims

Individual Approach

Area Approach

Assessment of Claims – PMFBY

Area Approach (Widespread)

- **Prevented Sowing**
- **Mid-Season Adversity**
- **Final yield losses**

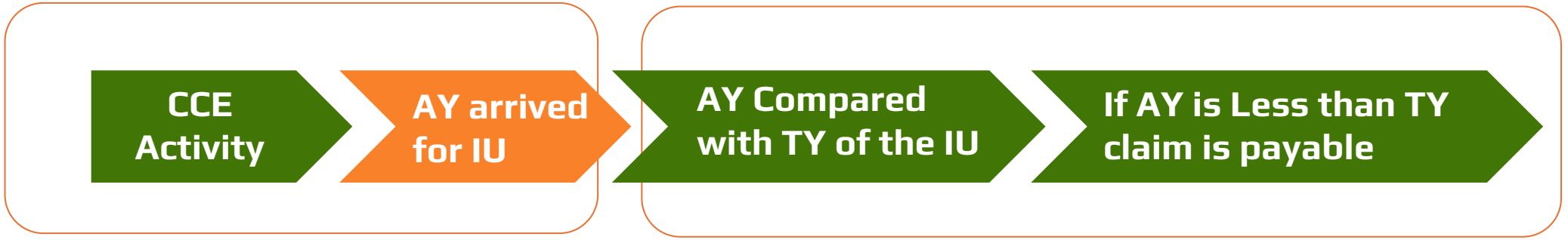
Individual Insured Farm

- **localised calamities**
- **Post-Harvest losses**

Crop Cutting Experiments (CCE)

End of Season Yield-based Claims

Yield-based claims are compensations paid to farmers when the actual harvested yield (AY) of a crop in an Insurance Unit (IU) is less than the predetermined Threshold Yield (TY).



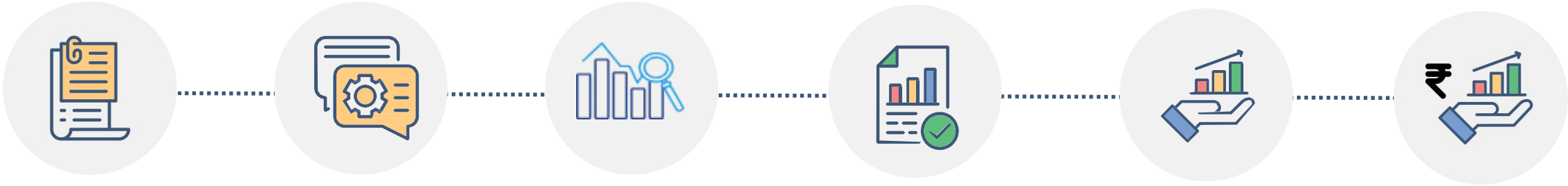
Yield Shortfall (%) = (Threshold Yield(TY) – Actual Yield(AY)) / Threshold Yield (TY) × 100%

Alternate Risk Transfer Mechanisms

A mix of Risk Transfer & Participation

- **Cup & Cap (80-110)**
  Smaller Risk Protection Horizon
  Small Horizon
- **Cup & Cap (60-130)**
  Medium Risk Protection Horizon
  Medium Horizon
- **Profit & Loss Sharing (0-350)**
  Largest Risk Protection Horizon
  Larger Horizon

PRICING PROCESS



Data Cleaning /Substitution

Outlier identification
Missing data
Data standardization

Determination of Threshold Yield

1. *Laddered*
2. *Variable*
3. *Fixed*

Detrending

Technological advancements
Change of crop type
Ground level significance

Pure Burn cost

Weighted average of the historic loss costs of all the NFA's at district crop level

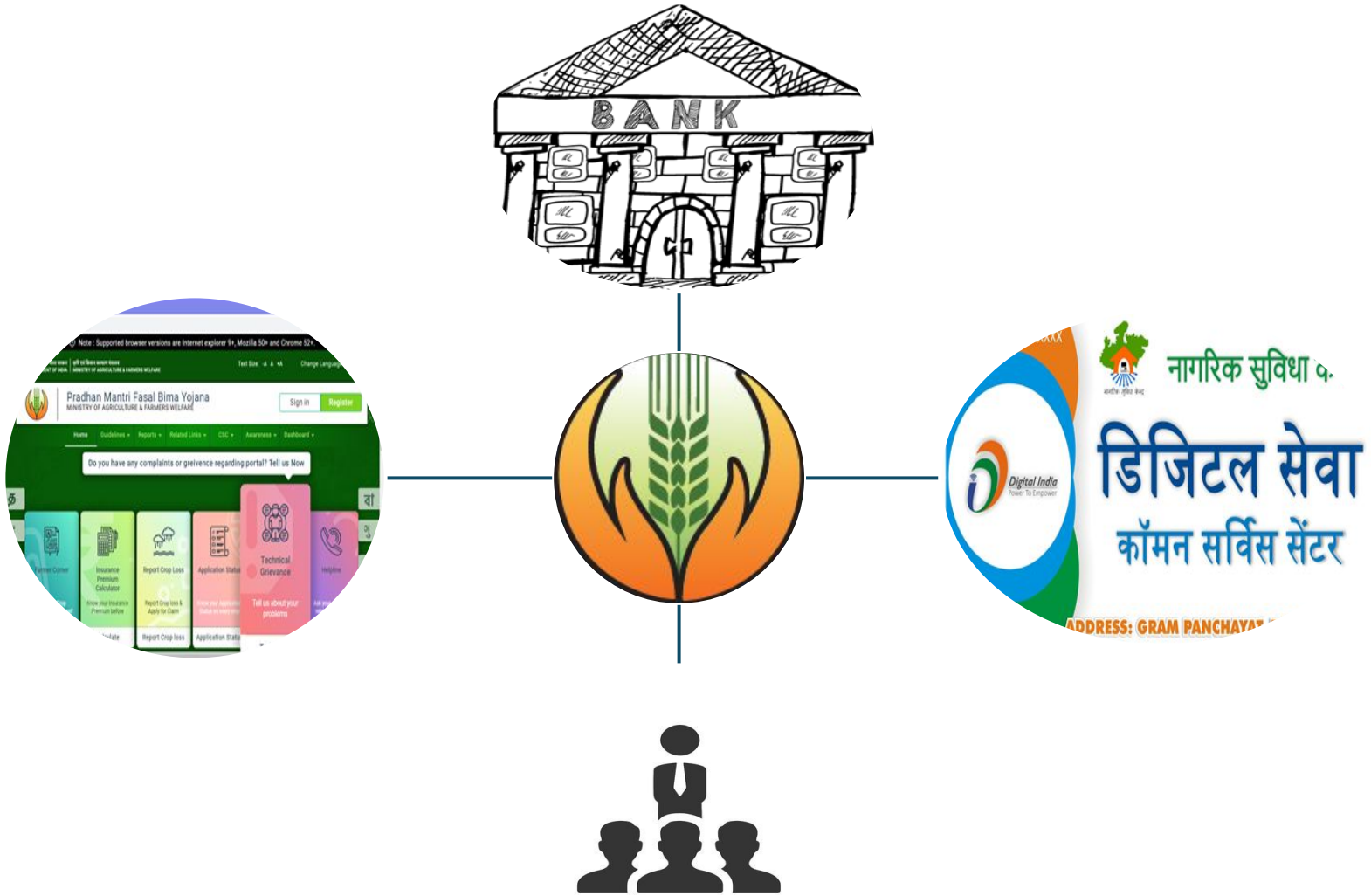
Adjusted Burn Cost

Heterogeneity loading, Data Uncertainty Loading
Cat Loading, Risk Loadings

Commercial Premium Rate

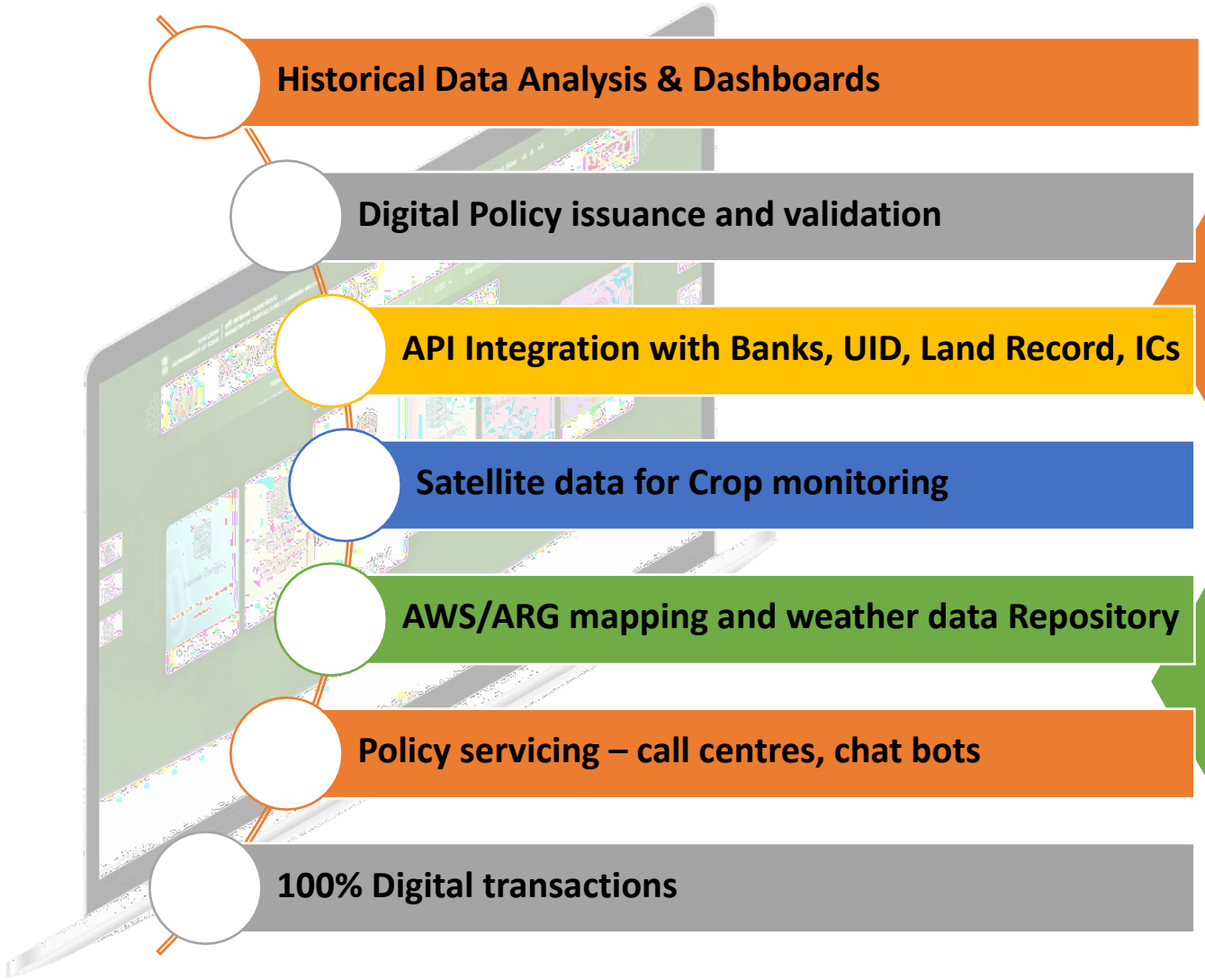
Administration cost, contingency and a small margins

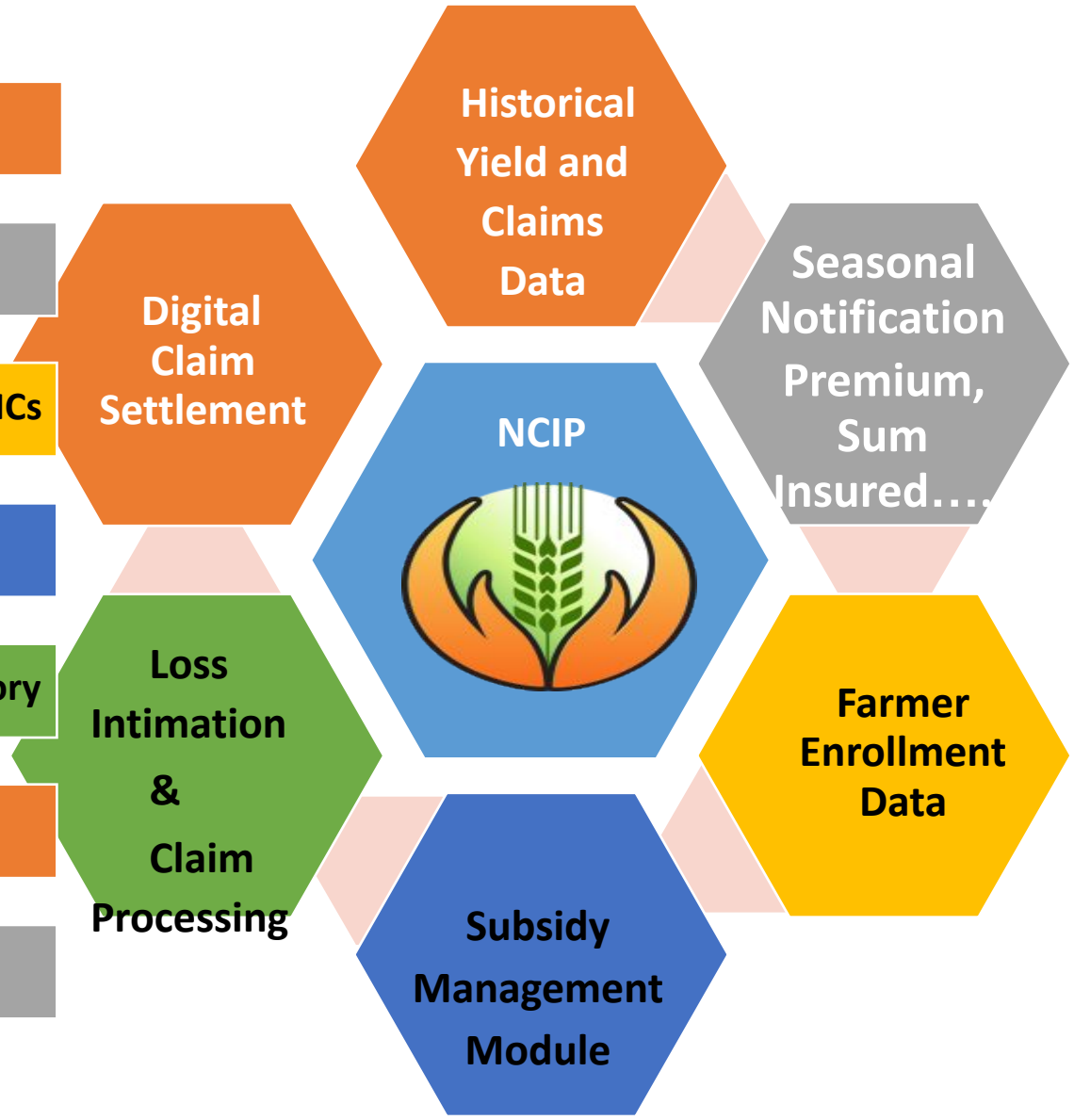
Channel for Insurance



National Crop Insurance Portal

- Historical Data Analysis & Dashboards
- Digital Policy issuance and validation
- API Integration with Banks, UID, Land Record, ICs
- Satellite data for Crop monitoring
- AWS/ARG mapping and weather data Repository
- Policy servicing – call centres, chat bots
- 100% Digital transactions





Technology in Crop Insurance

- Factual data
- Synthesised from multiple input indicators
- Input indicators cover all crop stages - **sowing to harvest**
- Highly compatible because of its uniform methodology
- Not prone to manipulation by any stakeholder
- Reduced the TAT for claims computation & Settlement from **5-6 months to 30-45 days**

How Remote Sensing works

Vector Dataset

- Geocoded Boundaries
- Hierarchy w.r.t each Insurance Unit
- Ground Truthing

Raster Dataset

- Satellite Granular dataset (Pixel size 10*10m)
- Temporal availability i.e., 2017 onwards for Sentinel 1 (Microwave) & Sentinel 2 (Optical)
- Identification of Crop i.e., Paddy & Wheat

This forms the base data of all Analysis

On-ground Activities

Crop Health Monitoring/Ground Truthing

- To assess General Health of Insured Crops from sowing to harvest
- To have Ground Truthing Data Set for Satellite based Analysis
- Supporting Evidence for Loss Disputes.

Insured Crop Verification

- Field Level Verification of crops supports robust underwriting decisions and identifies potential malpractices.

Insured Record Verification

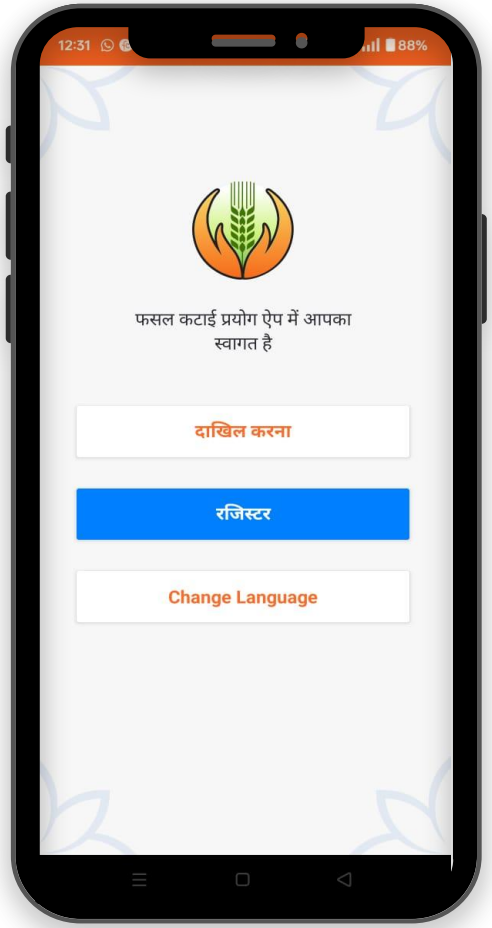
- Office Level Verification of Insured's record supports robust underwriting decisions and identifies potential malpractices.

Weather Station Inspection

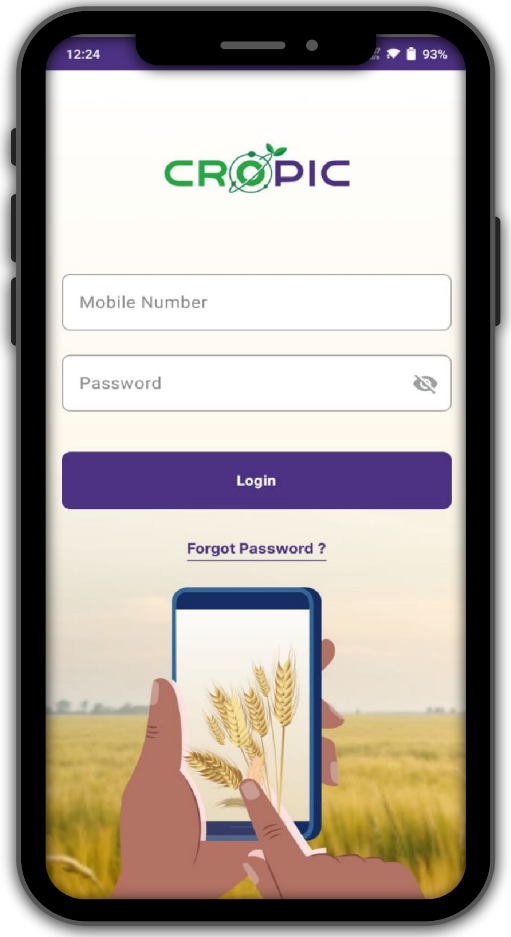
- Monitors the functionality and integrity of weather stations to ensure accurate data collection.

Mobile App used

MOA App



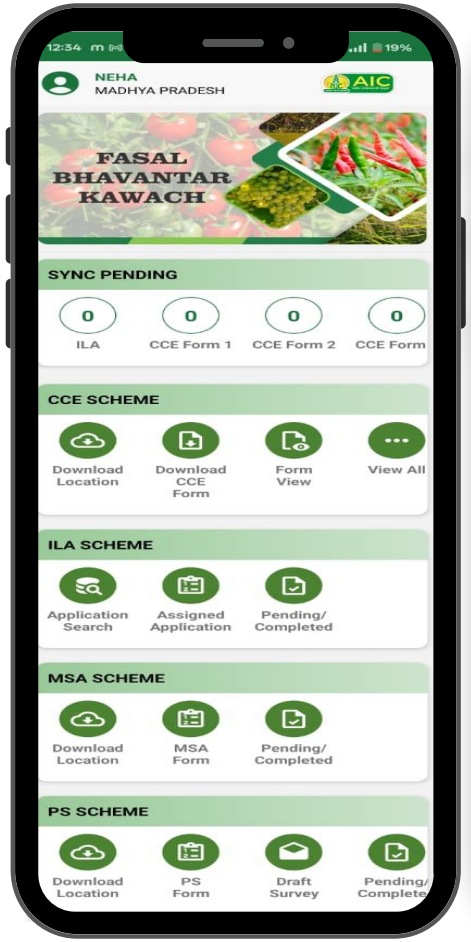
CCE App



CROPIC

CLAP

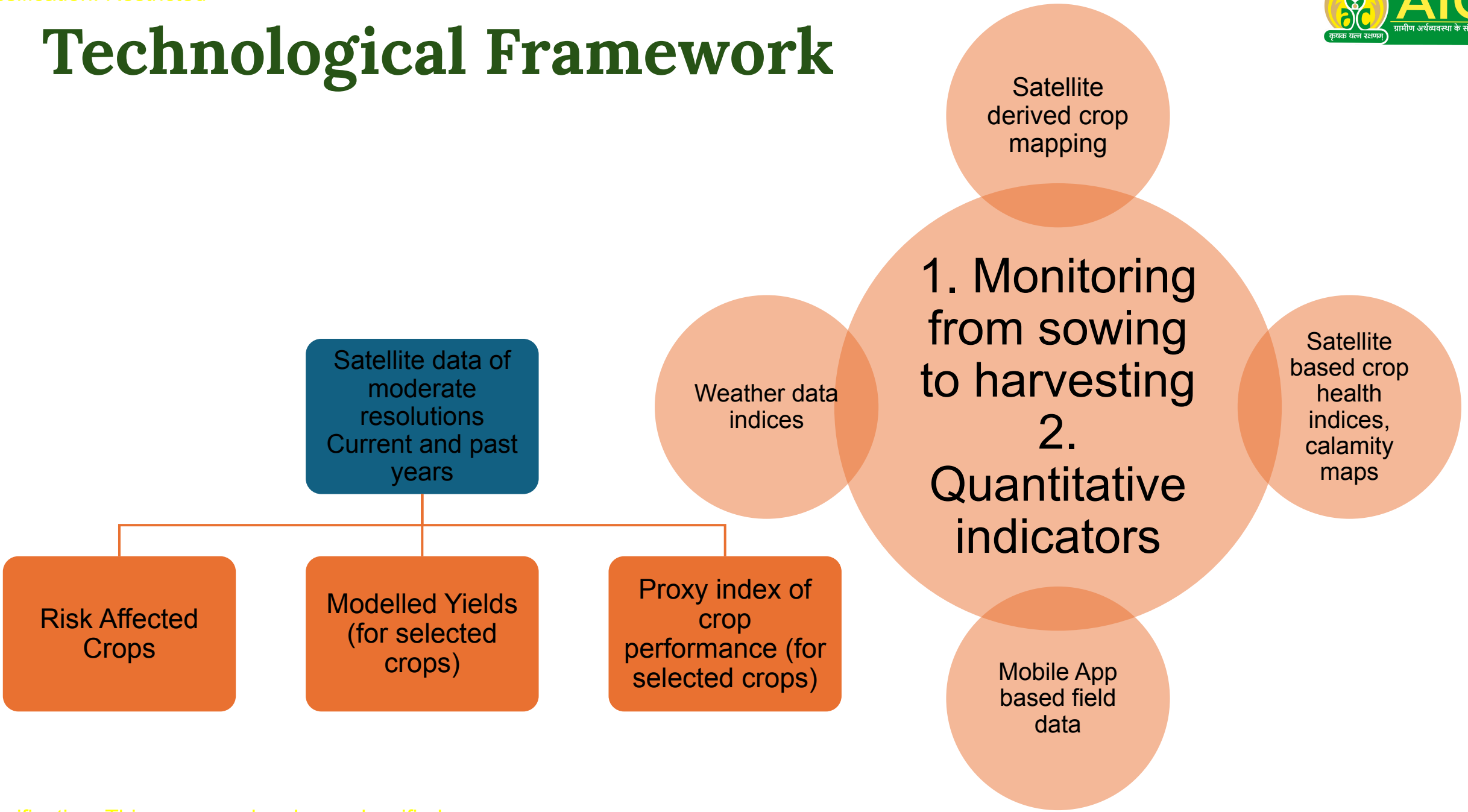
Inhouse App



SARUS

AIC Form

Technological Framework



Tech Initiatives under PMFBY

YESTECH

Satellite-based wide-area crop yield forecasting, reducing the need for manual surveys, and enhancing precision.

WINDS

Real-time and historical weather data, enabling more precise risk assessment and crop damage evaluation

CROPIC

Enhances the accuracy and efficiency of crop insurance claims by collecting real-time photos of crop conditions

DigiClaim

Digitalized claim settlement module under PMFBY, helps farmers receive the disbursed amount electronically to their accounts.

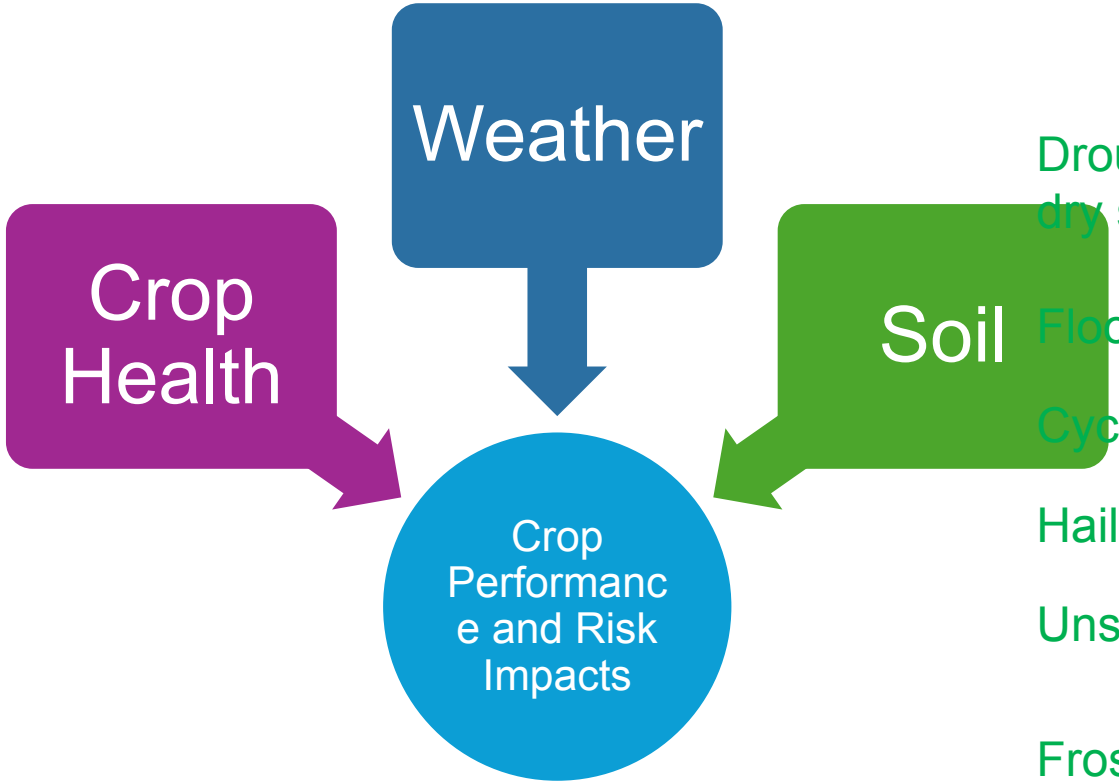
AIDE

Insurance intermediary mobile application designed to simplify the PMFBY enrolment process

YESTECH Models

Semi-Physical	•Radiation Use Efficiency(RUE) models based on conversion of solar radiation into biomass •Harvest Index (HI) based on special CCEs
Machine Learning/ Deep Learning	•ML/AI model able to generate yield proxy based on self learning ability of training & validation dataset •Special CCEs
Crop Simulation	•Simulated environment to predicts yield based on parameters. •Intensive parametrization dataset required (soil, weather, crop variety & other details, management aspects etc) •Crop Models defined inside DSAT(CSM)
Parametric indexing approach – CHF	•Parametrization from satellite proxy indicators to generate Crop Health Factors (CHF) •CHF is proportional to crop performance and proxy yield.
Ensembled models	•Combination of models- to improve accuracy.

WINDS Technology



Risks	Weather Variable
Drought/Prolonged dry spell	Rainfall, Rainy days, Dry days
Flood	Cumulative Rainfall, Rainfall Intensity
Cyclone	Same as in Flood, wind Speed
Hailstorm	Rainfall
Unseasonal Rain	Rainfall Amount, Rainfall intensity & Duration
Frost	Minimum Temperature, Sunshine hours, Wind
Heat Waves	Maximum Temperature
Pest/Disease	Humidity, Temperature

CROPIC

Crop Health Monitoring

Crop Loss Surveys

Integration with RS & GIS Data

Field Tracking

Farm Geofencing

Data Analytics

Objectives

- Real-time crop health monitoring
- Integrating photo analytics for yield estimation

AIC Tech Initiatives

- **Chandra-Tech** (Centre for High-Resolution Analytics with Drone-based Risk Assessment Technology) in collaboration with State Govt of Madhya Pradesh - Crop Health & loss assessment through Drones implemented at Rajgarh & Gwalior districts of Madhya Pradesh.
- **Kesar Project, Kashmir** – (Knowledge for Education and Sustainable Agriculture Risk Management) in collaboration with Kashmir Agricultural University - Crop classification analysis in Hilly terrain of J&K using Satellite data & knowledge transfer between organizations.

Crop Insurance Ecosystem

Loanee Farmers

Non Loanee Farmers

Tenant Farmers

Rural Financial Bank Branches

Nationwide digital and government services centres

Insurance intermediary Mobile Application

Digital Verification
- Identity
- Land
- Crop

Scheme Administration & Premium Subsidy

Insurance & RI Support

YES-TECH Yield Estimation System based on Technology

WINDS Weather Information Network & Data System

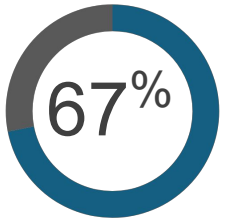
CROPIC

Krishi Rakshak Portal & Helpline : 14447

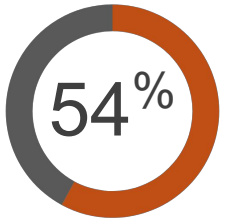
Tech Support

Direct Benefit Transfer

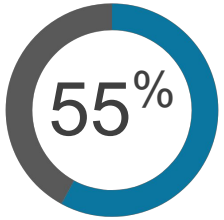
Crop Insurance Portfolio AICIL



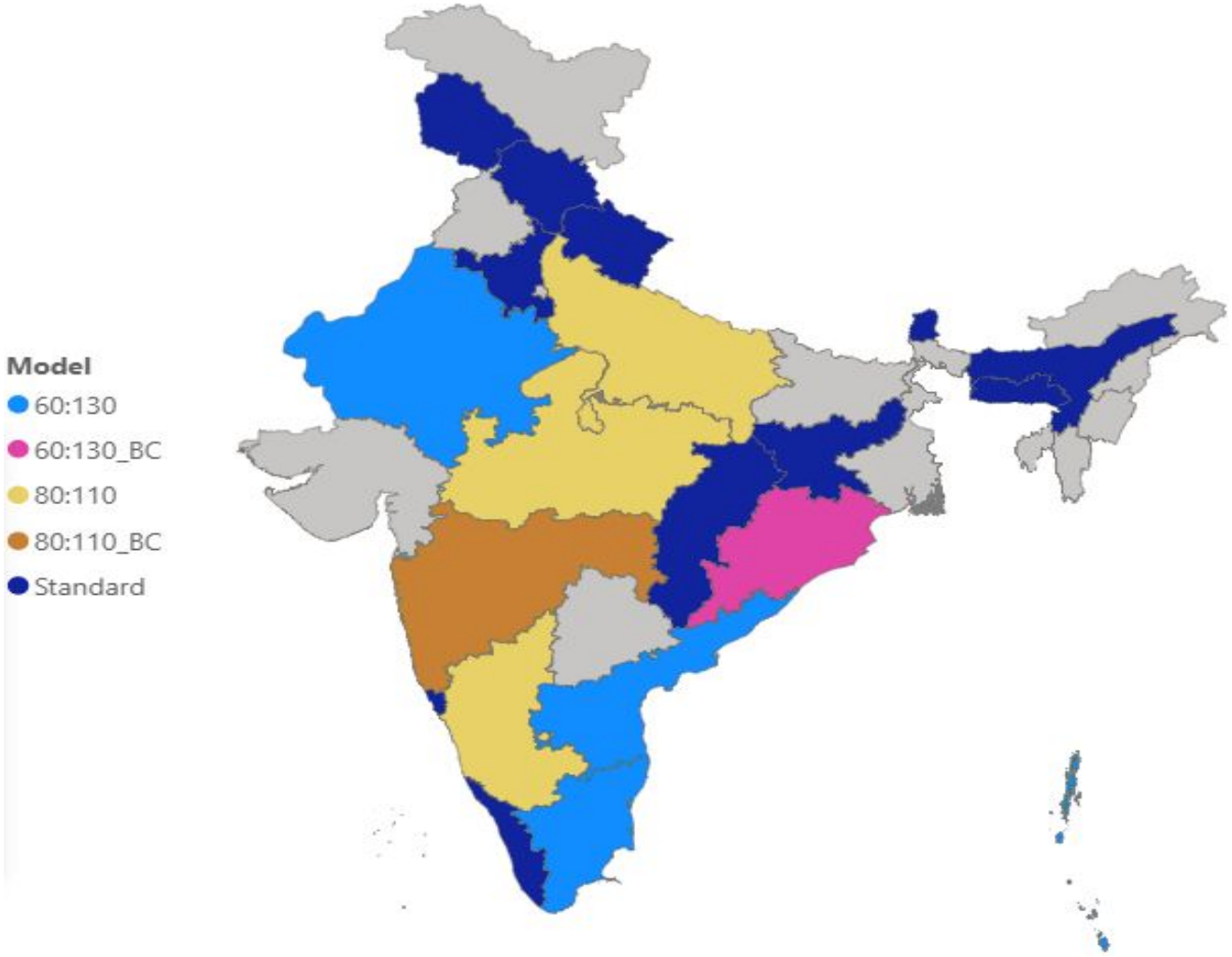
AIC is Implementing Crop Insurance Scheme in 16 States out of 24 participating States



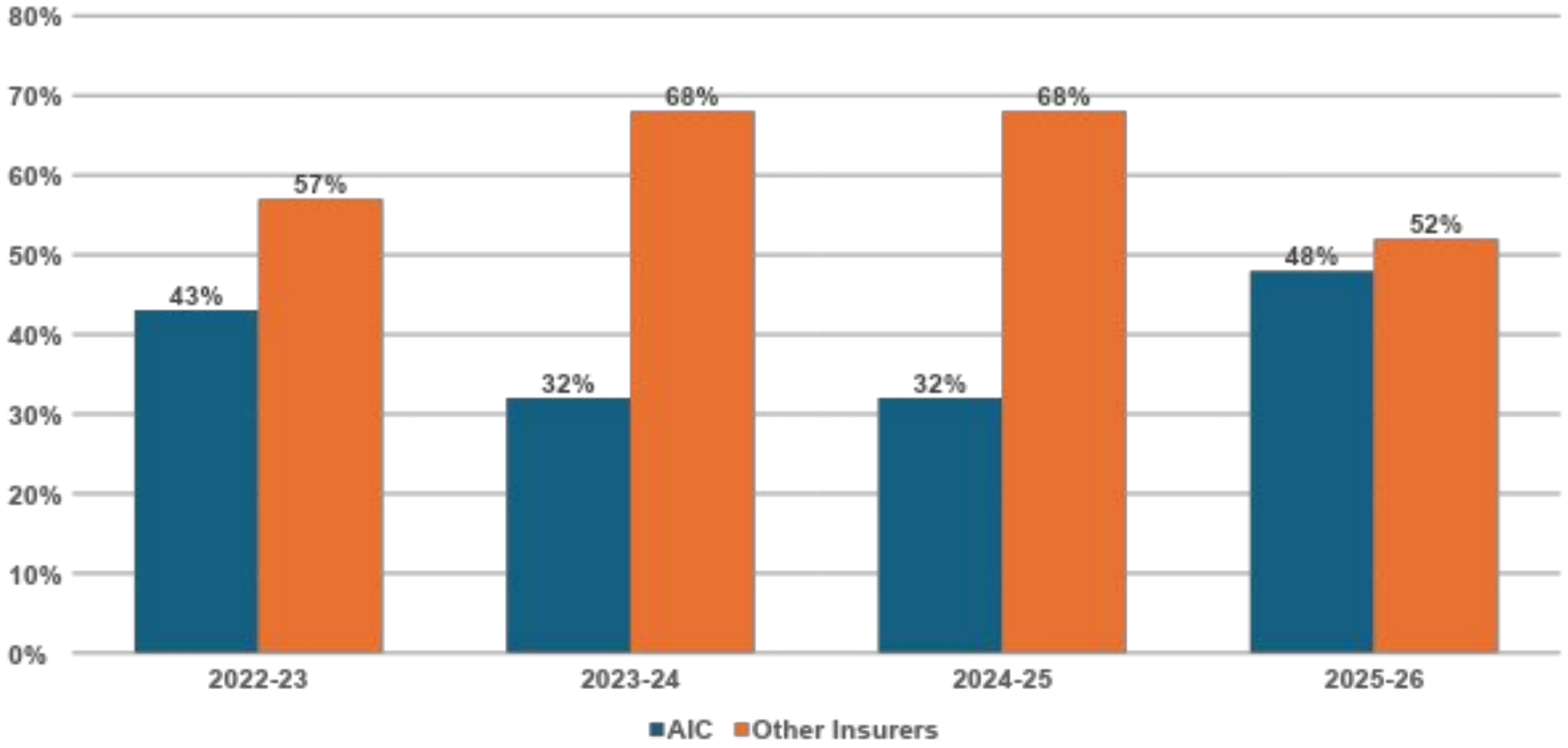
AIC is presence in 252 Districts out of 468 implementing Districts



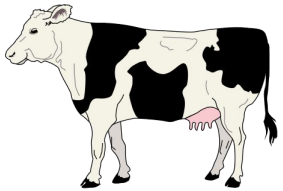
On average 15.8 million farmers insured yearly against the industry average of 28.8 million farmers

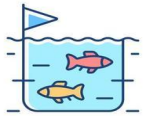


PMFBY Market Share Position



Agriculture Insurance Products in AICIL





Indemnity Products:

- Cattle Insurance
- Shrimp Insurance
- Aquaculture Insurance
- Irrigation equipment Insurance

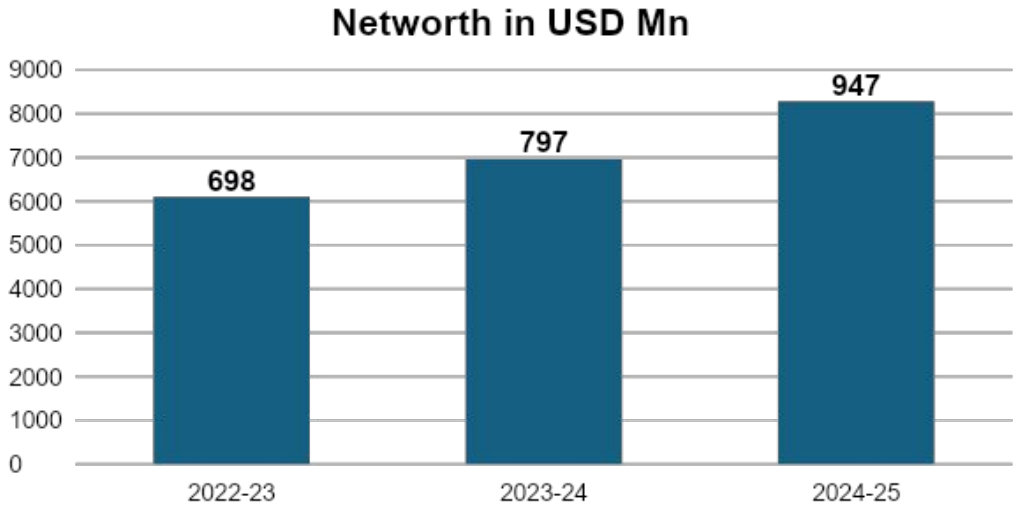
Parametric Indices products:

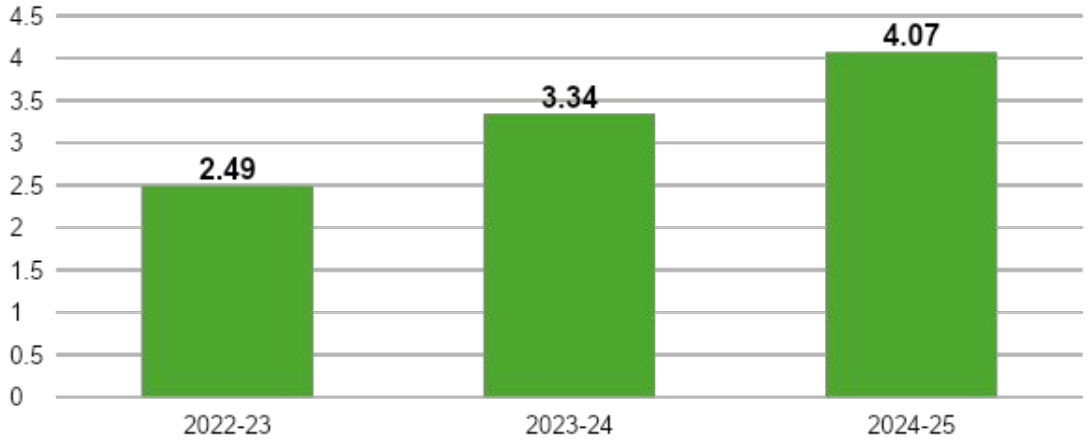
- Sampoorna Ritu Kawach (SRK) - Coverage for non scheme crops
- Saral Krishi Bima (SKB) - for non Crop Risk like sericulture, livestock, fisheries etc.
- Consequential Crop Loss (CCL) – Loss of revenue for cold storage etc.

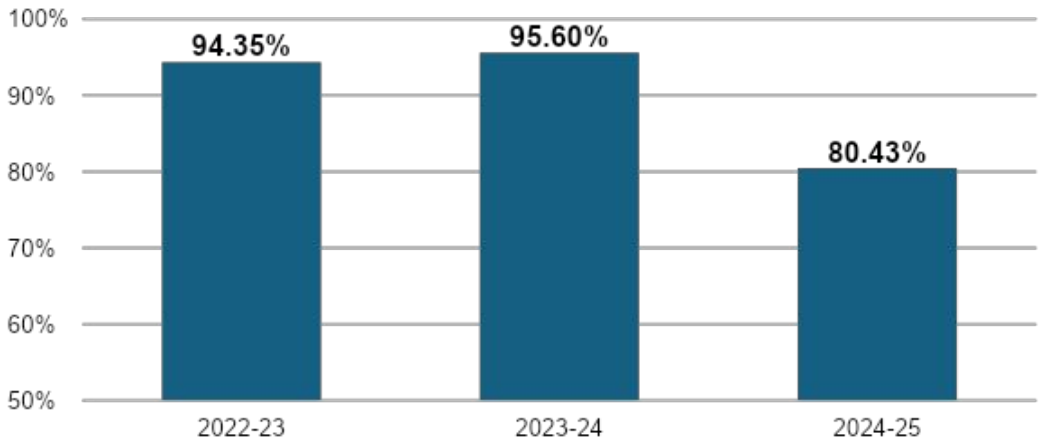
Hybrid Products:

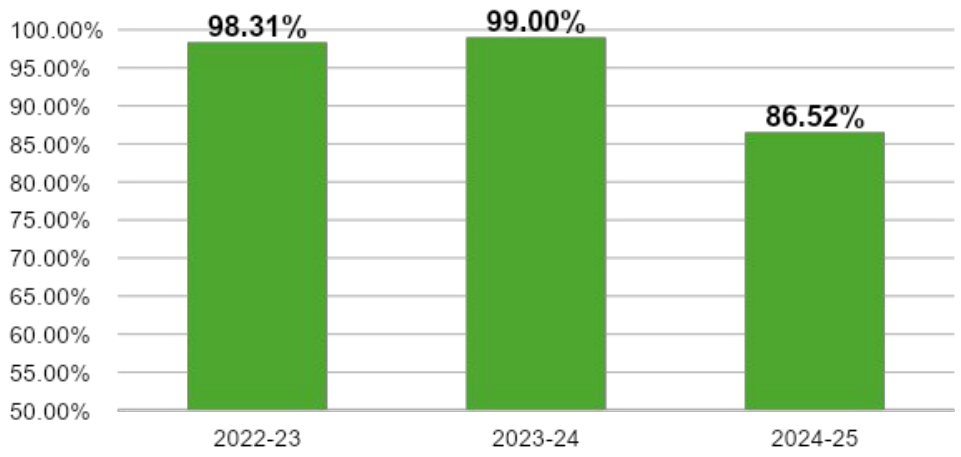
- Innovative products on hybrid basis were also developed depending on the requirements

Operational Performance - AICIL









Thank You!!!