Crisis and Disaster Risk Finance Executive Education Program

Disaster risk financing in the agricultural sector

Photo credit : LN-SL004 World Bank

Global Shield Financing Facility

Environmental *Change* Institute

eci

University of Oxford

Disaster Risk Financing & Insurance Program

Supported by World Bank Group

Outline

1. The **Rationale** for DRF in Agriculture
2. What are the **agricultural risks** and their impact?
3. Choosing the Right **Financial Instrument**
4. What is **agricultural insurance** and what is it used for?
5. What is the difference between **indemnity and index insurance?**
6. Global coverage and **challenges to agriculture insurance** in developing countries
7. The **role of Government** in DRF for Agriculture

Photo credit : saxman1597/World Bank

Risks to Agriculture and Rural Livelihoods

Between 2005 and 2015 natural disasters cost US$96 billion in damages or losses to the agricultural and livestock sectors in developing countries

Production risks

Droughts, floods, hurricanes, storms, severe rain/hail or frost, extreme heat

Forest fires, lightning, earthquakes, volcanoes, landslides, etc.

Locust diseases and invasions

Market risks

Market price risk (volatility of prices of agricultural inputs and outputs/products)

Institutional risks (favourable environment)

Conflicts,

Macroeconomic shocks,

Policy risks e.g. price caps

Source: IFAD 2020

Photo credit : StateofIsrael/World Bank

Role of DRF for Agriculture

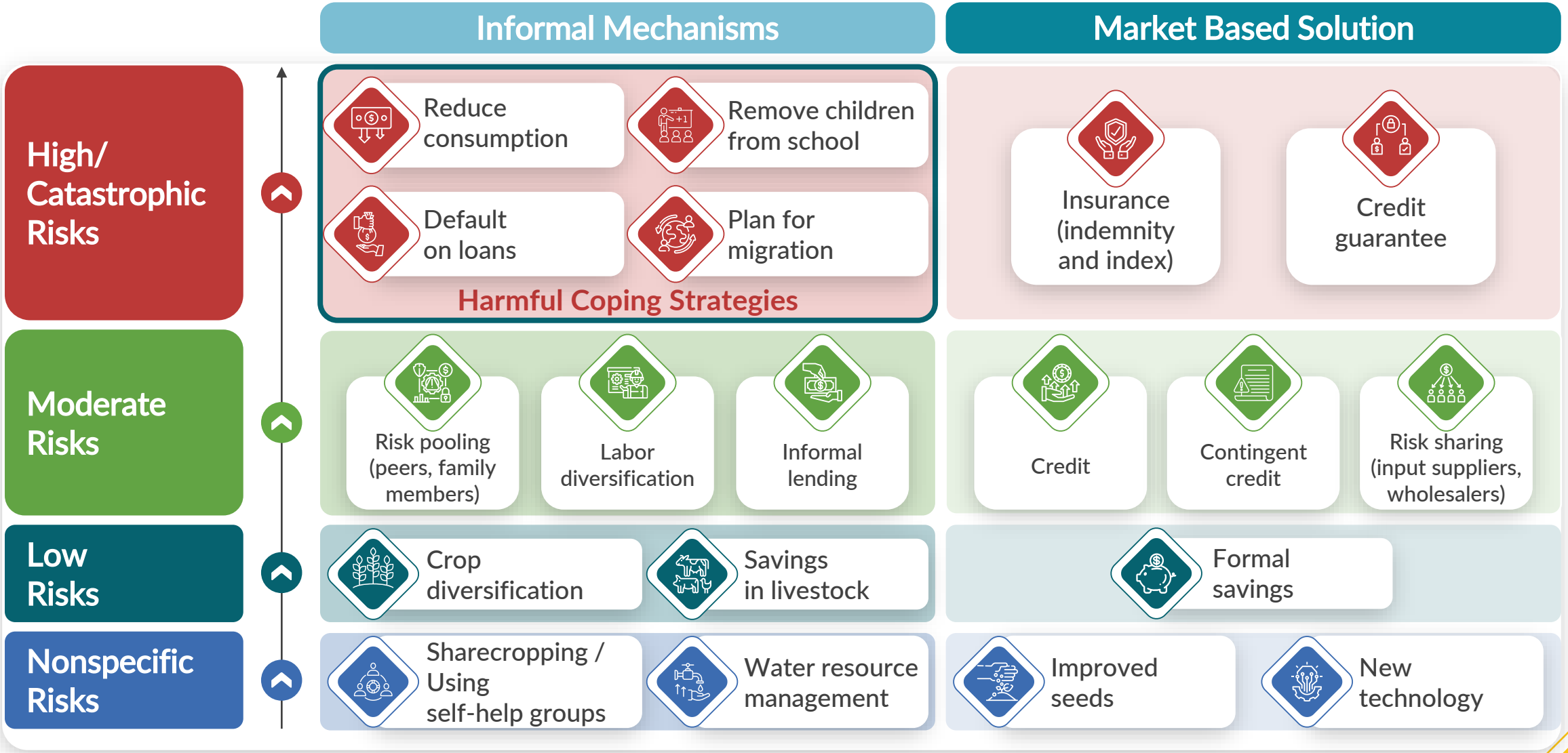
DRF enables financial mechanisms to be put in place before the disaster occurs (ex-ante) to:

- Increase certainty of financing and planning;
- To provide timely financial assistance to affected farming populations to put them back into business, in the;
- Quickest possible time.

DRF focuses on achieving a balance of financial mechanisms which maximize:

- Welfare for rural/agricultural households, protection of their economic farming activity and resilience building;
- Financial protection for agricultural |value chain actors and businesses;
- Fiscal/budget efficiency and certainty for Governments.

Managing Risk in Agriculture: Market-based financial solutions complement informal mechanisms and are more effective in building resilience as part of a comprehensive risk management strategy.



Identifying the Potential Policy Role for Agricultural Insurance

- Reduce the **risk exposure** of commercial farmers, **stabilizing incomes/production** so that they can invest with more confidence?
- Protect loans and allow smallholders to use insurance **as collateral to access credit** from MFIs at better terms? (for regular banks, insurance may not be considered a sufficient replacement of collateral)
- Reduce the need for **ad-hoc ex-post relief** intervention following shocks, rationalizing public expenditure and a more efficient response? Transfer part of that responsibility to the farmer/private sector?
- Use agricultural insurance as a tool to **replace other forms of support (e.g. direct transfers)?**

It is critical to clearly define the objective (or objectives) as different implementation strategies may be required

Different products for different farmers

Multi-peril crop insurance — **Farm**

- Payouts are determined through a farm-level loss assessment process
- Multi-Peril Crop Insurance (MPCI) is a traditional indemnity insurance product against all perils

Area-yield index insurance — **Village**

- Based on average losses at the regional level, rather than the farm
- It is often based on crop-cutting experiments
- More suited to small farmer conditions
- Must be carefully designed to minimize basis risk
- AY estimation is costly, time-consuming, and subject to moral hazard

Weather index insurance — **Village**

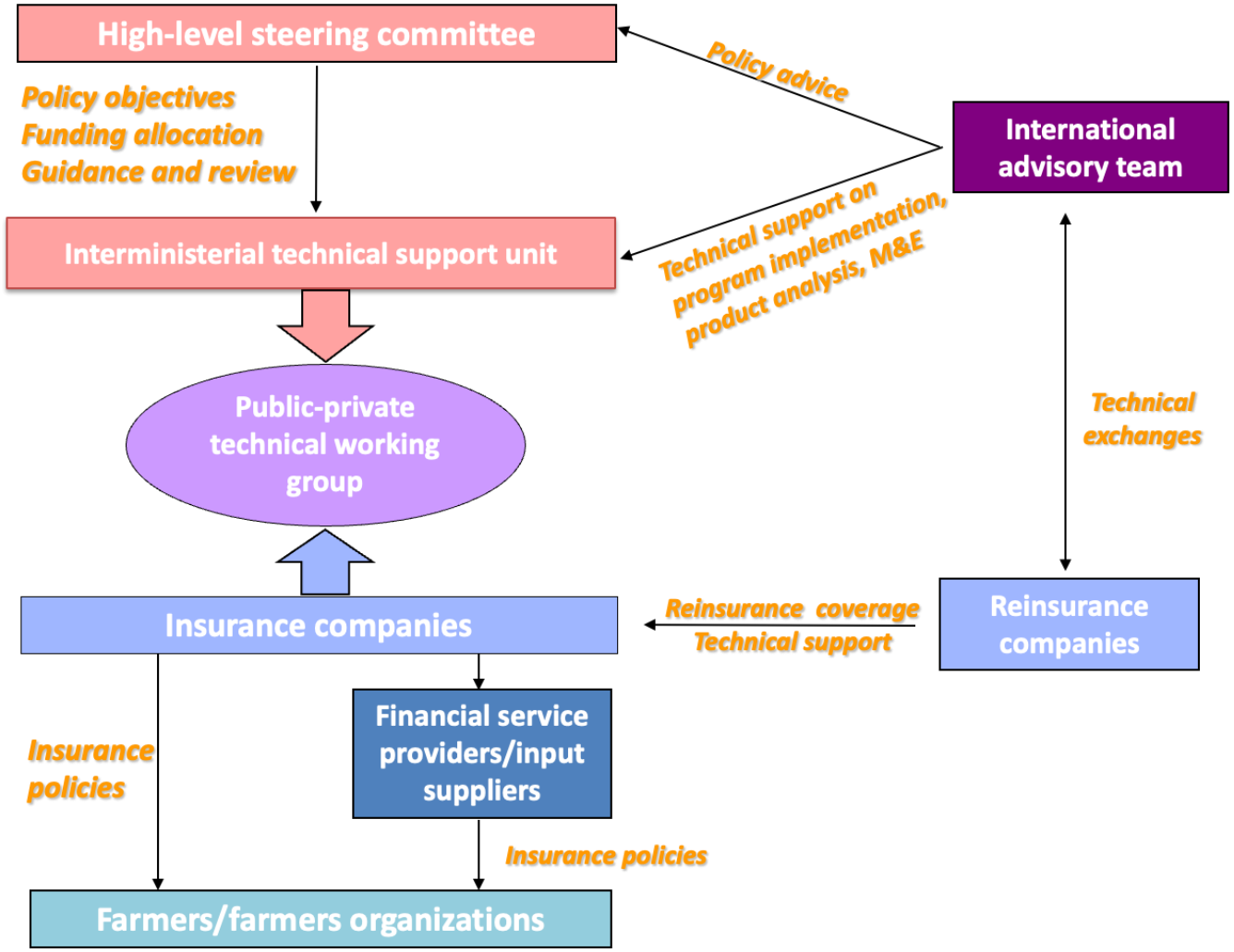
- Based on weather parameters (such as rainfall, temperature, or soil moisture) correlated with farm-level yields or revenue outcomes
- Doesn't cover Multiple-peril yield shortfall cover (e.g., against pests and diseases)

Comparison Between Indemnity and Index Insurance

	Set-up implementation	Operating costs	Transaction costs	Compensation deadlines	Moral hazard and adverse selection	Basic risk	Difficulty of actuarial modelling
Multi-risk (indemnity)	Medium	High	High	Slow	High	Low	Low
Agricultural yield (indexed)	Low	Medium	Medium	Medium	Low	Low-medium	Medium
Weather conditions (index)	High	Low	Low	Fast	Low	High	High

Source: Raithatha, 2022

Successful agricultural insurance programs for smallholder farmers are typically based on a Public-Private Partnership (PPP) model



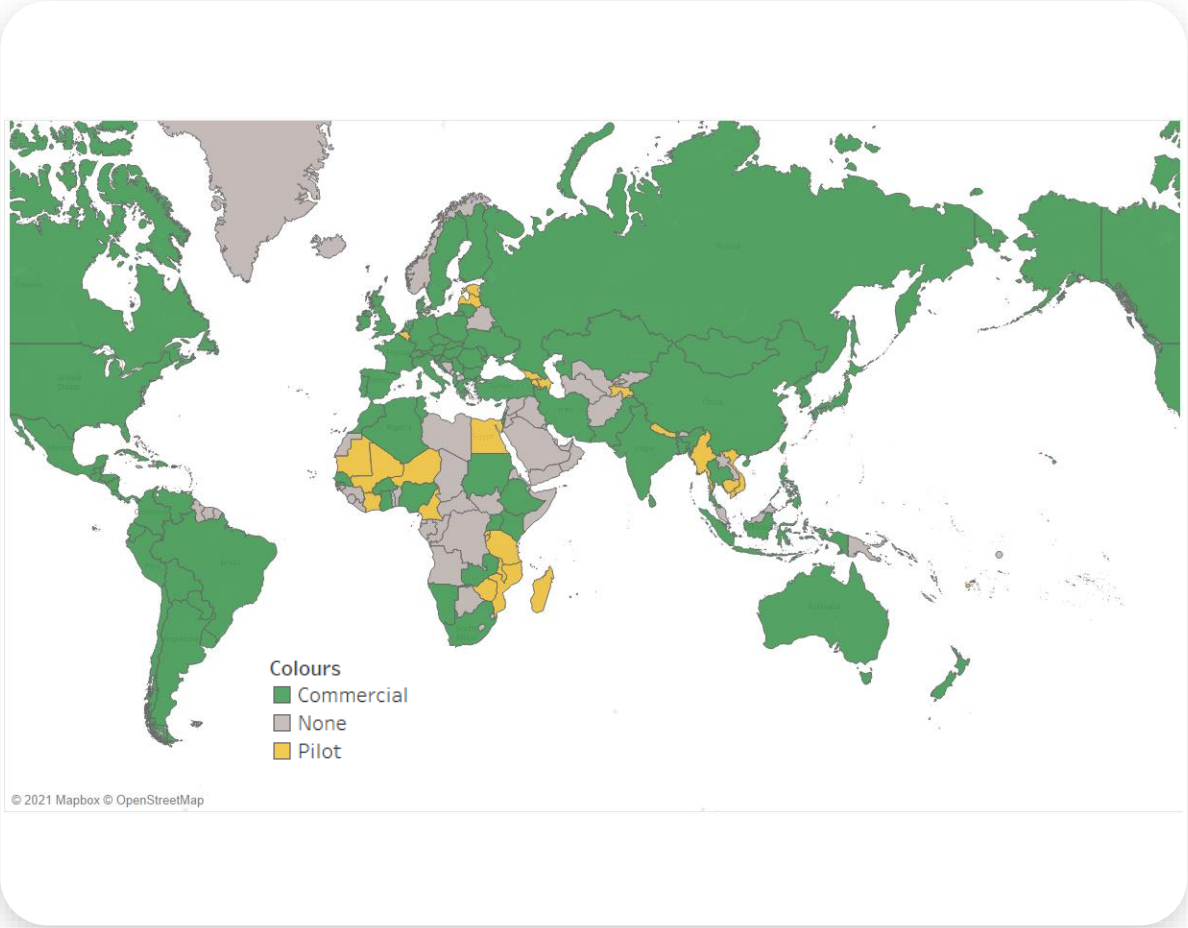
Agricultural Insurance has Extensive Global Coverage and is Available in Around 125 Countries

82% Percentage of countries with **crop and livestock insurance**

22% Percentage of countries with **index-based crop or livestock insurance (>40% by 2020)**

40% Percentage of countries with **tree insurance**

31% Percentage of countries with **aquaculture insurance**



Conclusions On Agriculture Insurance

Financial risk management solutions, such as **credit, savings, remittances and insurance,** can reduce risk and provide financial protection for farmers.

Agricultural insurance offers **cost-effective and rapid protection**, can lead to improved agricultural productivity and can benefit lending institutions but must be well designed.

On a global scale, **index insurance** is making rapid progress in a market with **digital technologies** supporting this.

Sustainable agriculture insurance programs require long-term **partnerships between the public and the private sector.**

Case Study :

India’s Pradhan Mantri Fasal Bima Yojana (PMFBY)

Outline

India crop insurance: PMFBY overview

PMFBY: key challenges & solutions

Q&A

India's Area Yield Index Insurance Program: Pradhan Mantri Fasal Bima Yojana (PMFBY)

Photo credit : LN-SL004 World Bank

Context:

- 1.4 billion population: 70% in rural areas
- 146 million farms - average farm size 1.08 Ha.
- 85% farmers small & marginal
- Most growing cereals, pulses, oilseeds, but depends on location.
- 7th largest country: heterogeneous geography & climate, 36 States/Union Territories
- 2 seasons: Kharif and Rabi
- Key risks: drought, floods, heatwaves, coldwaves, cyclones

Objectives of national crop insurance scheme:

- Provide smallholder farmers access to seasonal crop loans Reduce levels of indebtedness/default
- Smooth consumption, increased crop productivity and incomes

India's Solution since 1980:

- **Area Yield Index Insurance (AYII)** to overcome issues of offering individual MPCI policies to smallholder farmers
- + Weather Index Insurance (WII) since 2003 for crops unsuitable for AYII, but far less widespread
- **New government scheme PMFBY launched in 2016 & revamped 2020**

PMFBY AYII Scheme: Key Features and Achievements

Highly subsidized:

Affordability/accessibility:
farmers only pay very low % of premium share: 2.0% (Kharif) & 1.5% (Rabi)

Premium subsidies:
GoI and the state governments fund balance of premium subsidies

2023 Central government US$1.6 billion allocation to PMFBY
mostly for premium subsidies

State governments pay remaining 50% share
(10% for some states)

States can opt in or out

Achievements By 2023-24:

- Largest subsidized crop insurance scheme in the world: c. 35 million insured farmers
- 3rd largest scheme by volume of Gross Written Premiums - nearly US$4 billion
- The total insured area: 59 million ha = c. 30% gross sown area (but below 50% target)
- c.60% farmers now have access to formal crop credit
- Farmer value for money: for every US$ 1.2 premium paid by the farmer, received US$ 6 in claims

PMFBY AYII Scheme: Challenges and Solutions

Crowding in the private sector

From public insurer monopoly to PPP:

- Public sector monopoly insurer 1980 to 2005: state-owned specialized agricultural insurer AIC
- 2011+: market reforms → actuarial premium rates
- 2015/16+: GoI encouraged Private Sector competition
- Now: government-approved public & private insurers can bid to insure the scheme at a state-level
- 2020+: tenders issued for 3-years instead of 1-year = increased commitment to investing in infrastructure and manpower

Today's PPP structural overview:

- c.18 General Insurance companies, including 5 Government Sector Companies are empaneled to underwrite PMFBY
- Agriculture Insurance Company of India Ltd. (AIC) is the largest PMFBY insurer (33% market share)
- The Department of Agriculture and Farmers Welfare manages the scheme at central level through a 70-person strong National Technical Support Unit (NTSU)
- In collaboration with the NTSU, the state-level Departments of Agriculture are responsible for managing and overseeing scheme implementation.

PMFBY AYII Scheme: Challenges and Solutions

Improving farmer perception

1985 – Kharif 2020: compulsory insurance for loanees, but very unpopular with farmers and state governments:

For governments:
increasing premium rates & premium volumes

For farmers:
lack of awareness, transparency, & timeliness

Kharif 2020+:

made voluntary for all farmers

2023-24: insured farmers increased by 36% Vs 2021-22.

Many changes to improve service, e.g.:

Penalties for delay in claim settlement for states, insurers & banks going beyond 10-days of prescribed cut-off date for payment of claims.

States banned from implementing scheme in subsequent seasons if premium subsidy release delay to insurance companies

GoI back-end technology investment for easier farmer enrolment & automation of all processes.

Government-funded **insurance awareness** drives

Add-on covers option for states to provide more comprehensive risk protection throughout season

Insurance company longer tenure & CCE improvements

PMFBY AYII Scheme: Challenges and Solutions

Addressing basis risk in AYII

Too big UAIs:
higher basis risk

Too small UAIs:
higher operational costs, and possible farmer moral hazard

India PMFBY AYII experience AYII since 1980. Area yield estimation and settlement of payouts is based on State-level system of Crop-Cutting Experiments (CCEs). Carried out by extension officers (Indian equivalent)

Addressing basis risk through UAIs + CCEs:

1 **Spatial basis risk** reduced UAI size from the sub-district level (block of 6-8 villages) to individual village level.

2 **Impact:** CCEs **quality deteriorated** and **major delays** in finalizing CCEs and settling claims payouts:

- CCE numbers required: 4 CCEs per village for all major crops and 8 CCEs for minor crops
- Increased total annual number of CCEs required in the whole country from c. 2-3 million to about 6-8 million.
- Short time-frame to conduct CCEs
- Extension officer overburdened with multiple activities
- Insurance company agents and district agricultural dept. officials are supposed to be present to ensure integrity of CCEs, but in reality doesn't happen

PMFBY AYII Scheme: Challenges and Solutions

Improving CCE quality & timeliness

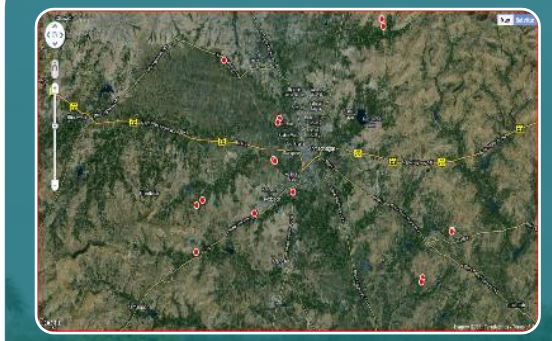
Solutions 2016+ under PMFBY
Technology investment & training to increase accuracy, reliability & allow processes to be finalized in real time:

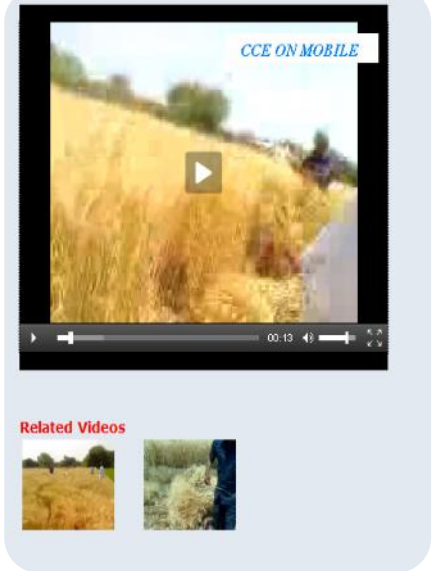
Government funded technology & training

Enumerators smart phone & moisture metres to:

- Georeference sample plots
- **Geotag enumerators' visits**
- Georeference and timestamped **photographs** and crop cuts videoed
- Measure grain moisture in the field with moisture meters
- **Send data to central server directly** from the field
- Auditing of CCEs carried out in near real time.

Photo credit : ID183S03 World Bank





Crop cutting experiment sample data

Crop Name :	Wheat
Plot Size :	0.5
Cultivator Name :	Rabhaji kishan
Type of Crop :	Mono
CropRatio :	0
CCE Date :	2011-03-27
CCE_count :	CCE1
Weight(kg) :	25
Primary Worker : Name	Mayura gaikwad
Supervisor :	Deshmukh agrl office
Supervisor : Designation	Agrl officer
VillageCommity :	Sarpanch
NO.OF.Bundles :	40
Weight Of Bundles :	80
Cause :	No Low Yield
Department :	Zilla Parishad Department

PMFBY AYII Scheme: Challenges and Solutions

Reducing reliance on manual yield estimates (CCEs)

Remote sensing a potential game changer for AYII - overcoming issues with CCEs leading to huge efficiencies

Remotely sensed average yield estimates

- ➕ No CCEs or reduced CCEs
- ➕ Moral hazard reduced
- ➕ Timely availability of data

- ➖ Relatively untested
- ➖ Will require monitoring & management of basis risk
- ➖ Farmer education is more important to avoid misunderstandings

India: YES-TECH

- India at the forefront of this technological development.
- Objective: blend remotely-sensed (satellite data) yield assessment with manual CCE to eventually reduce dependency on manual methods in future
- Government conducted R&D and approved roll-out of 5 technologies in 2023
- From 2023-24: 10 states started supplementing manual CCEs through YES-TECH-approved technology for paddy and wheat
- Phased approach in each state: start with ratio of 30% through remotely-sensed yield estimation technology & 70% through traditional CCEs & increase
- For Kharif 2024, 19 states will adopt partial remotely-sensed yield estimation for paddy and Madya Pradesh plans to completely replace its manual CCEs with remotely-sensed yield estimates.
- From Kharif 2024, plans to use remotely-sensed yield estimations for soybean

Summary on India Crop Insurance Overview

Photo credit : DP-PH006 World Bank

India has had great success, but government financial commitment is significant and has been key

Challenges encountered and solutions offer important lessons for other countries, e.g.

- Benefits and challenges of AYII for smallholders
- Public-private partnership model and how to crowd in private sector insurers
- Continued monitoring and improvements to achieve and maintain scale, and improve offering for all stakeholders

Sheer land and population size of India and its objectives to cover majority of smallholders should be taken into account

Crop insurance is still continually evolving after 40+ years and new challenges emerge

Some lessons from other countries will equally be important for India now scheme is voluntary, i.e. alternative distribution channels

Role of technology is key – for all back-end and front-end processes. India is at the forefront of this technological revolution and remote sensing for AYII could be a game-changer on a global scale.


Thank you
Questions ?