



Picture-Based Insurance (PBI)

Smartphone Pictures for Affordable Crop Insurance

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Borlaug Institute for South Asia



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Challenges in agricultural insurance

Traditional **indemnity-based insurance**:

- High administrative costs, asymmetric information (e.g. moral hazard)
- Limited supply to small farmers

Index-based insurance designed to overcome these challenges



- Issues: Basis risk, understanding, and farmer engagement

Picture-Based Insurance (PBI) to combine the best of both worlds?

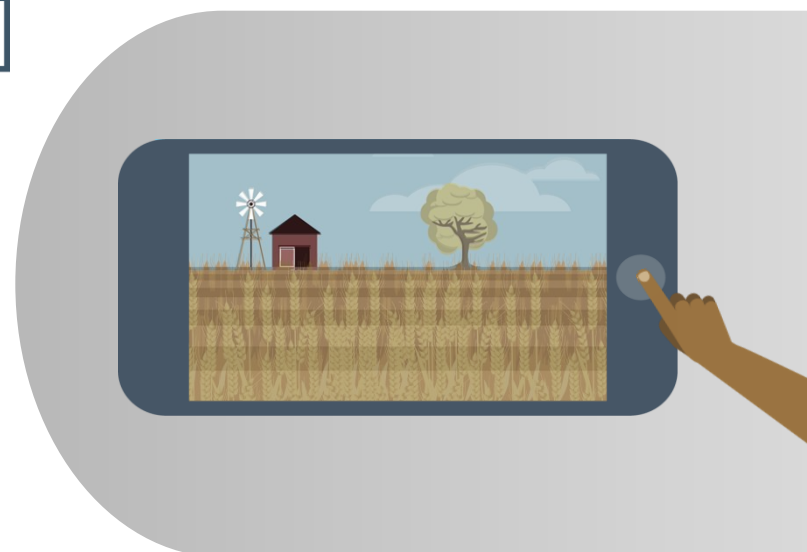
- Taking advantage of increasing smartphone penetration in rural areas
- Easy-to-understand, high farmer engagement, and reduced basis risk
- Augmenting information flow to the insurer

PBI: Seeing through a farmer's eyes



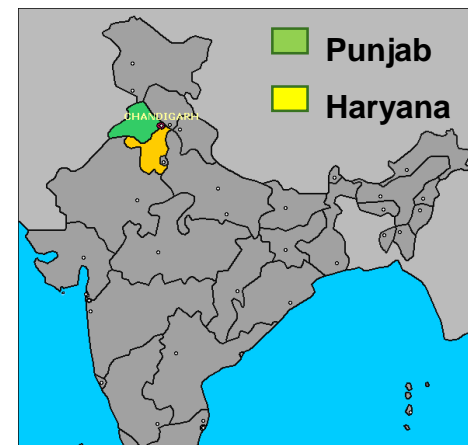
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	✗	✓	✓	✓
Degree of damage	0-19% (none/mild)	20-49% (moderate)	50-74% (severe)	75-100% (extreme)
% of sum insured	0%	35%	65%	100%



Formative evaluation

RCT in Haryana and Punjab, India
50 villages, 750 wheat producers



RESULTS:

1. Considerable farmer engagement ✓
 - 67% provided at least one picture per month
 - Many farmers liked visiting plot more often
2. Picture-based monitoring helps reduce basis risk ✓
 - Particularly suitable for severe damage (where WBI performed poorly)
3. The approach improves demand for insurance ✓
 - Higher WTP for PBI, but still below actuarially-fair premiums
4. No evidence of tampering or moral hazard ✓
 - No moral hazard: Similar input use and yield
 - No tampering or fraud observed (manual review of pictures)

Value-added services: Advisories



Incorporated during second year, evidence indicates:

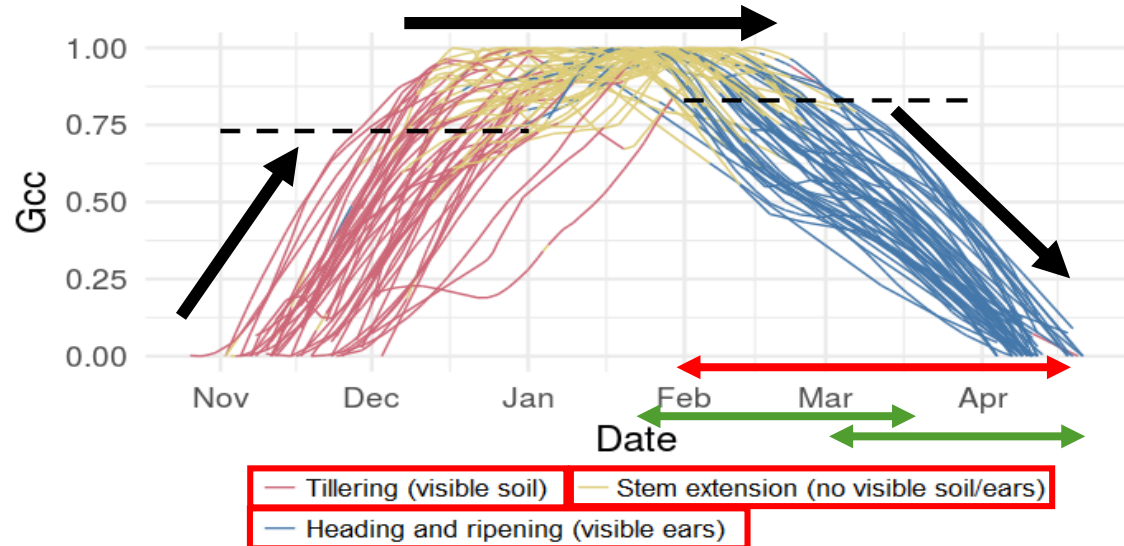
- Enhanced farmer engagement
- Improved knowledge of agricultural practices
- Potential reduction in insurer's risk exposure

Looking ahead: Automation is key to bring to scale

Horizon detection and region-of-interest (ROI)



Normalized greenness predictive of growth stage



Work in progress: Automating damage detection through ML algorithms

- Large training sets required, two seasons is not sufficient



Picture-Based Insurance: What's Next?

- **4-Year Impact evaluation**, with focus on higher value/risk crops (e.g. tomatoes) and other states (e.g. Odisha)
- **Alternative scaling-up strategies + value-added services** (advisories, pest detection, credit, etc.)
- **Ensuring technology is transferable to other geographies and crops**, with particular interest in Africa
- **Vision:** Not a stand-alone product; use PBI to reduce basis risk within existing index-based products



For more information:



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PROJECT NOTE 01 | JULY 31 2017

PICTURE-BASED CROP INSURANCE: IS IT FEASIBLE?
 Using farmers' smartphone pictures to minimize the costs of loss verification

BERBER KRAMER*, FRANCISCO CEBALLOS, KOEN HUFKENS, ELI MELAAZ, AZAD MISHRA, MICHAEL MANN, MANN S. TOOR, AND MIGUEL ROBLES


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 **International
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Impact Evaluation**

PICTURE-BASED INSURANCE: IS IT SUSTAINABLE?
 Effects on Willingness to Pay, Adverse Selection, and Moral Hazard

BERBER KRAMER*, FRANCISCO CEBALLOS, MATTHEW KRUPPOFF, MANN S. TOOR, AZAD MISHRA, SIDDESH KAREKAR, AND MIGUEL ROBLES

Project notes and more available at: <https://www.ifpri.org/project/PBInsurance>

THANK YOU!

