Can crop insurance be designed to be nutrition-sensitive?

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Presentation outline

1. Agricultural production risk as a constraint for crop diversification
2. Insurance as a tool to mitigate production risks
3. Existing insurance landscape and challenges
4. Opportunities to leverage technology in designing insurance for horticulture crops
5. Preliminary evidence from Haryana, India

Agricultural production risk as a constraint for crop diversification

- Smallholder farmers suffer increasingly from weather extremes in the context of climate change
- Rising production risk can have an impact on health and nutrition by
  - Reducing incomes and investments in nutrition and health
  - Discouraging risk averse farmers from investing in profitable yet high-risk horticultural crops

Horticultural crops in particular are susceptible to high production and price risk

- In comparison to cereal crops, horticultural crop farmers typically have
  - Smaller landholding sizes
  - Higher costs of production and (potentially) higher returns
  - Higher probability of risk
  - Higher probability of idiosyncratic risks such as pest and diseases
  - Different coping strategies

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A comparison between wheat and tomato in Haryana, India

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	Wheat	Tomato
Cost of production	INR 12000	INR 30000
Typical revenue per acre	1,19,639	83,468
Percentage farming on own land	82%	24%
Average area under crop	3.9 acres	1.6 acres
Percentage affected by crop damage in the last 5 years	22%	76%
Instance of crop damage due to pest and disease in the last 5 years	17%	67%
Average severity of damage due to pests and diseases	38%	54%
Finance operations through credit	Informal loans: 48% Formal loans: 21% Informal credit for inputs: 17%	Informal loans: 27% Formal loans: 3% Informal credit for inputs: 48%

Source: HH survey 2018 in project sites

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A comparison between wheat and tomato in Haryana, India

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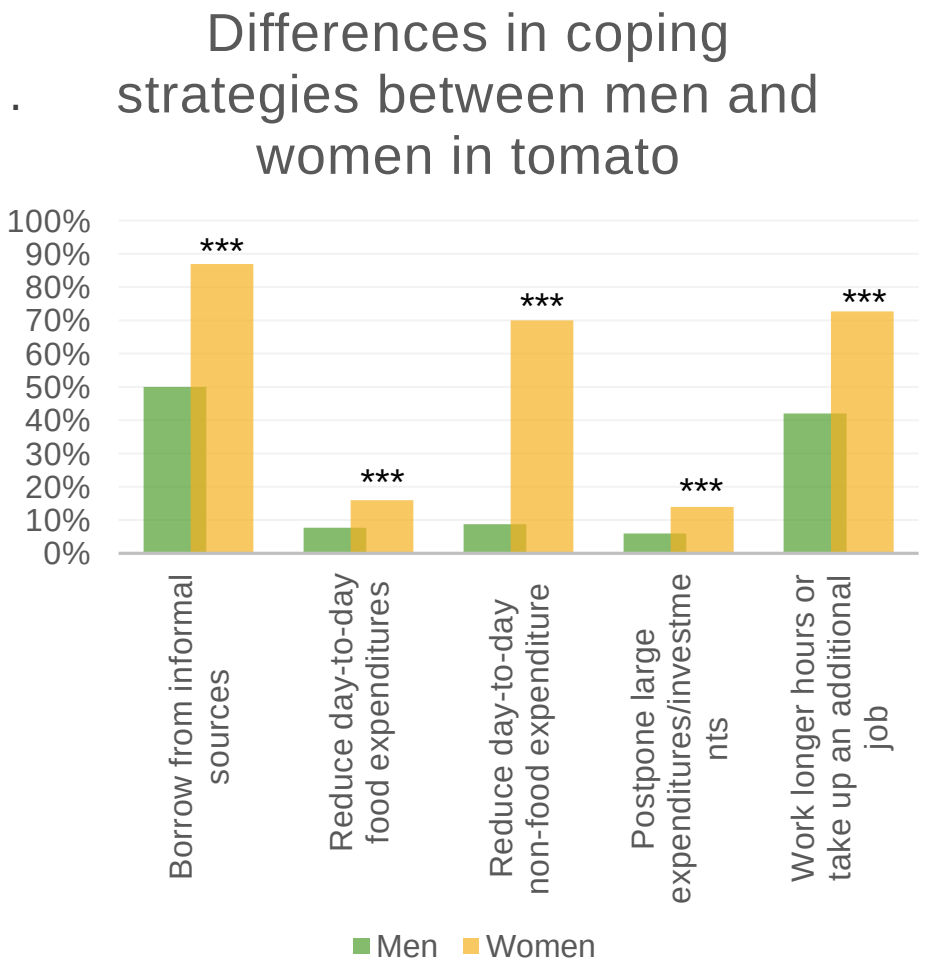
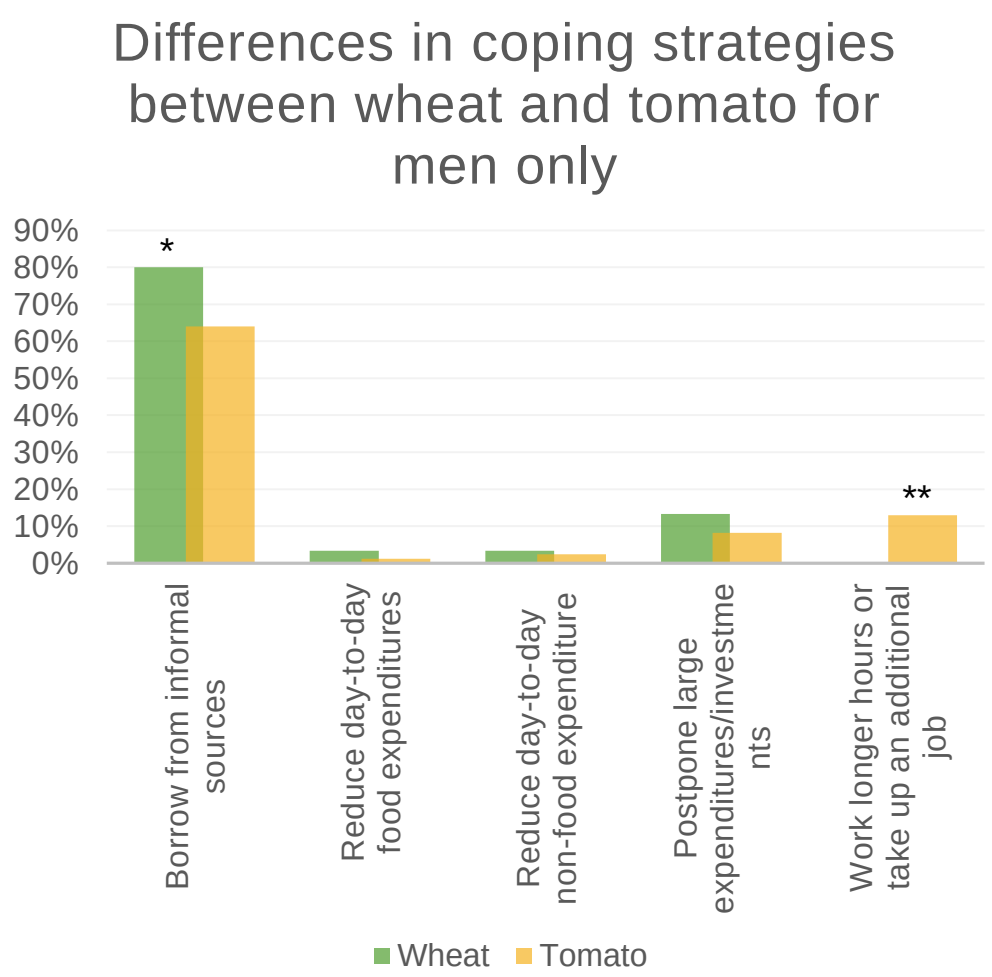


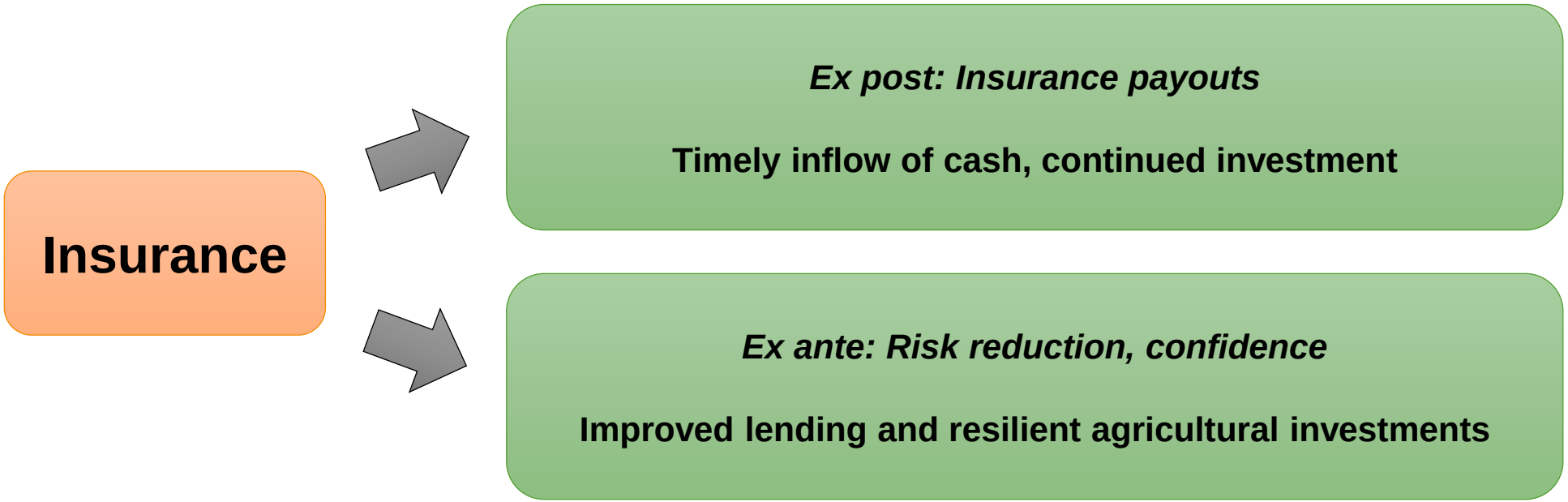


- **Although women are not directly involved in agricultural decision-making, they suffer consequences of production shocks differently than men**

Source: HH survey 2018 in project sites

Insurance as a tool to mitigate production risks

Many low-income countries are exploring subsidized crop insurance as a solution to mitigate impacts of climate change on nutrition, health and gender outcomes



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Existing insurance landscape

Commercially available insurance

- Traditional indemnity-based insurance: Costly to supply
- Index-based insurance: Difficult to generate demand and awareness
- Area-yield based insurance: Large infrastructure requirement

Challenges

- Basis risk - Low payout-yield correlation in the presence of idiosyncratic risk
  - Basis risk in horticulture – exacerbated as difficult to verify losses because of smaller scale and multiple harvests, less investment in technology to monitor losses
- Few policymakers pay attention to designing insurance schemes in a nutrition-, health- and gender-sensitive way

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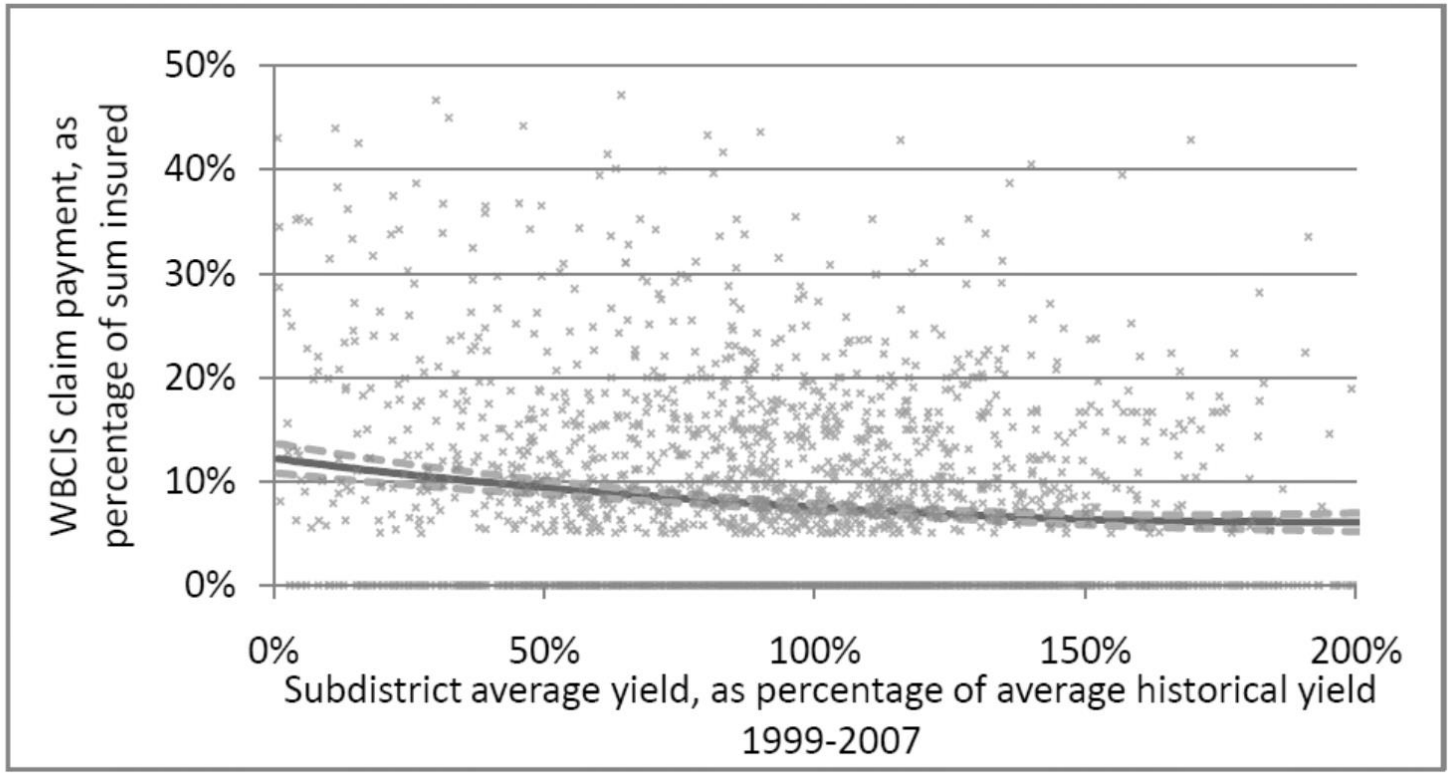
Existing insurance landscape: PMFBY and RWBCIS in India

Provides subsidized crop insurance to predominantly male holders of land documents and recipients of agricultural loans.



Source: Clarke, Mahul, Rao and Verma (2012). Weather based crop insurance in India. *World Bank Policy Research Working Paper* 5985

- Number of states with
  - Cereals, pulses, oilseeds and cash crops in PMFBY(area-yield based index
  - Horticulture crops only in RWBCIS (weather index)
- Significant basis risk in PMFBY and WBCIS
  - Claims ratios have fluctuated between 65-101% (PMFBY)

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How can we design crop insurance to be more nutrition-sensitive

- Improve insurance coverage for particular risks affecting nutrient-dense horticultural crops
- Reduce basis risk by leveraging technology
- Design schemes to incentivize insurance adoption for horticultural crops, adoption of best practices
- Provide complementary risk management services such as advisory and price guarantees
- Pay attention to how impact of insurance payouts are distributed within the household to mitigate adverse consequences of production risk to all members.

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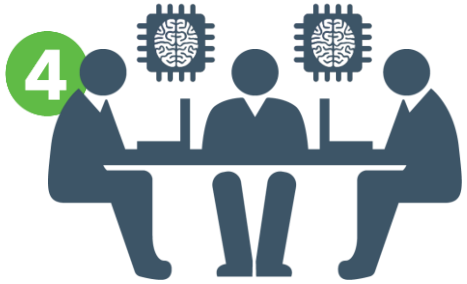
Picture-Based Insurance (PBI): Seeing through a farmer's eyes



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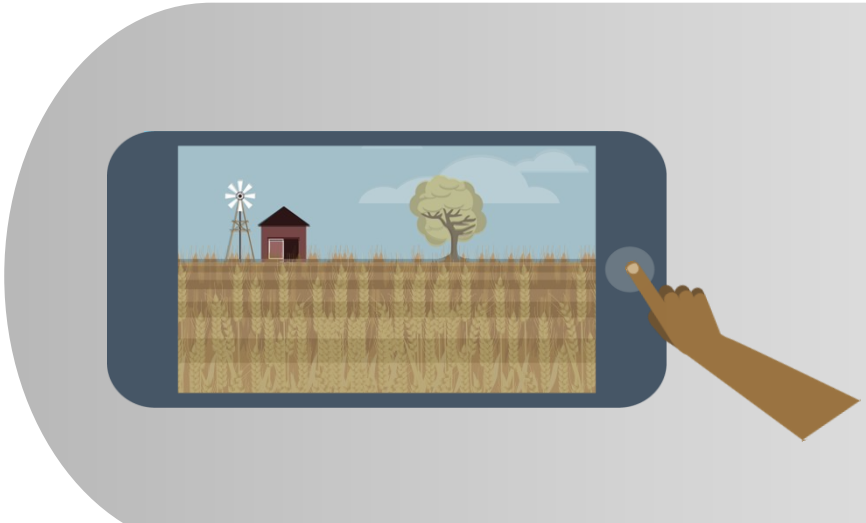
Degree of damage	0-19% (none/mild)	20-49% (moderate)	50-74% (severe)	75-100% (extreme)
% of sum insured	0%	35%	65%	100%

- ✓ 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, which can be used for monitoring and improving satellite-based indices



Preliminary evidence on preference from Haryana, India

Study context

- 5 year impact evaluation 2018-2022
- Data sources: Baseline household survey, WTP elicitation through Becker-DeGroot-Marschak auction, experiments to elicit risk preference and subjective beliefs
- Baseline for 649 tomato farmers from 72 villages in 4 districts

Control 18 villages	PB-Insurance only 18 villages
PB-Advisory only 18 villages	PB-Advisory and insurance 18 villages

Respondent profile: Baseline 2018	
No. of farmers surveyed	649 Wheat: 136
Average age of farmer	43.3
% of farmers with upto 10 years of schooling	85%
Average operational land size (owned or rented)	6.4 acres Small and marginal: 64.%
% with farming as main source of income	95%
No. of female household members surveyed	642

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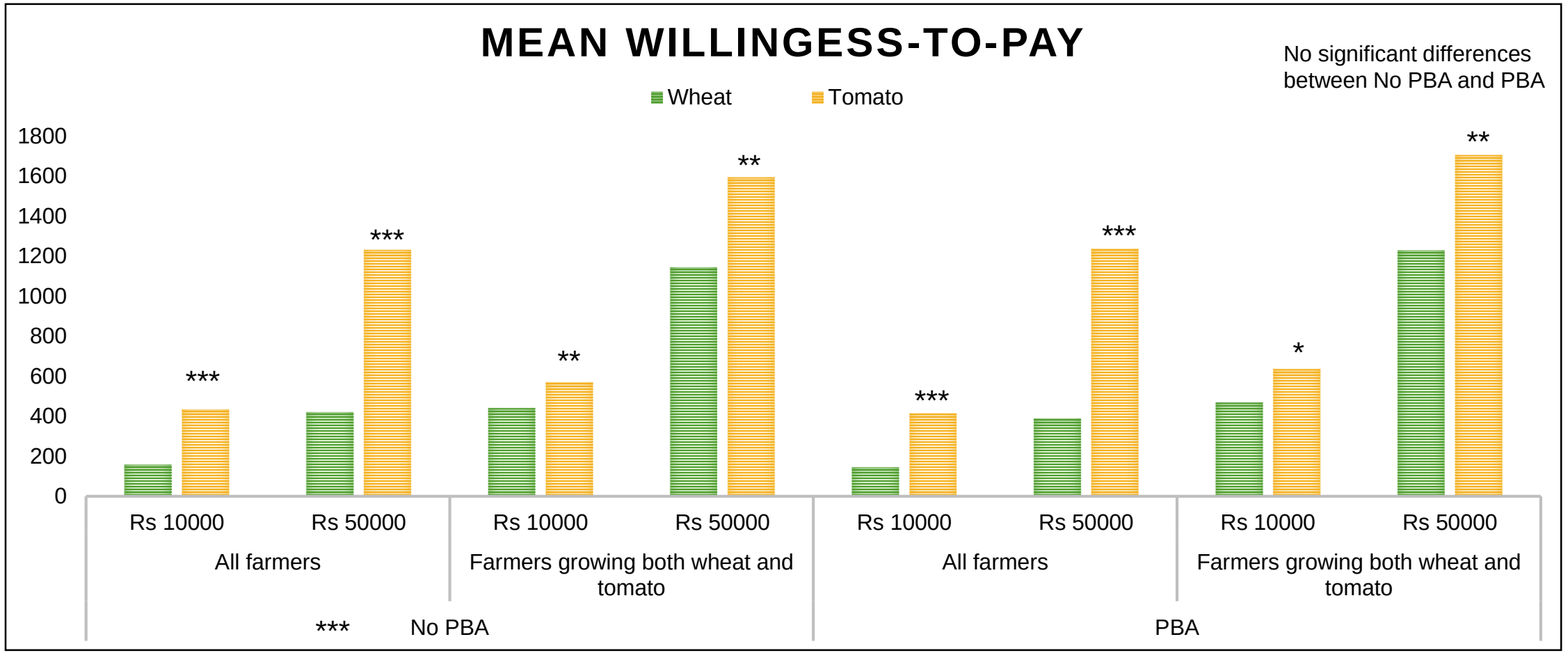
Preliminary evidence on preference from Haryana, India

Differences in WTP for improved insurance in wheat and tomato



	Wheat	Tomato
Percentage with WTP>0	39%	99%

Preliminary evidence on preference from Haryana, India

Factors influencing WTP for improved insurance in wheat and tomato

	Tomato	Wheat
Sum insured Rs 50000	803.0***	252.5***
Experienced damage in wheat in the last 5 years		-57.46
Farmer cultivates wheat		705.0***
WTP elicited for bundled advisory product	-12.83	-7.151
Wealth quintile	132.5***	4.693
Self-efficacy scale (0-1)	182.1	139.3*
Farmer finances operations by procuring inputs on credit	83.51**	44.31*
Farmer possesses other forms of insurance	-24.13	18.77
Experienced damage in tomato in the last five years	70.97	
Mean WTP		
Observations	1,224	1,224
R-squared	0.299	0.335
*** p<0.01, ** p<0.05, * p<0.1		

Other controls- age, education, operational acres, household size

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To summarize

- Horticulture farmers may have different requirements and preferences for insurance
- Insurance products that can reduce basis risk in the presence of idiosyncratic risks, multiple harvests and small landholding sizes by leveraging technology have a promising scope
- In addition, insurance products must cater tenant and landless farmers to mitigate their exposure to risk
- Women cope with agricultural production shocks differently from men. Future insurance design must take into preferences of women and their access to claim settlements.

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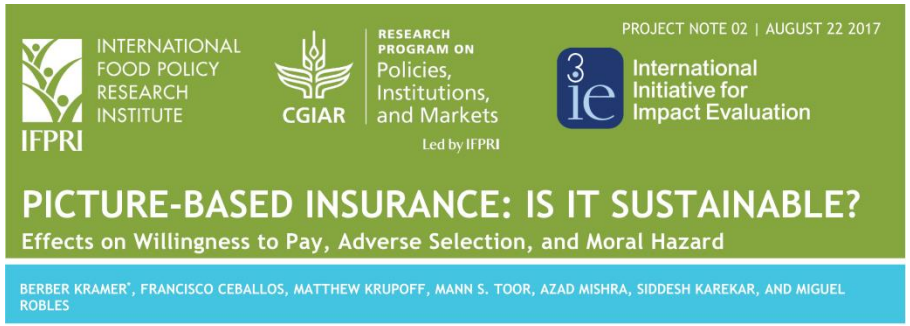
For more information:



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

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