



Improving farmers' access to agricultural insurance in India

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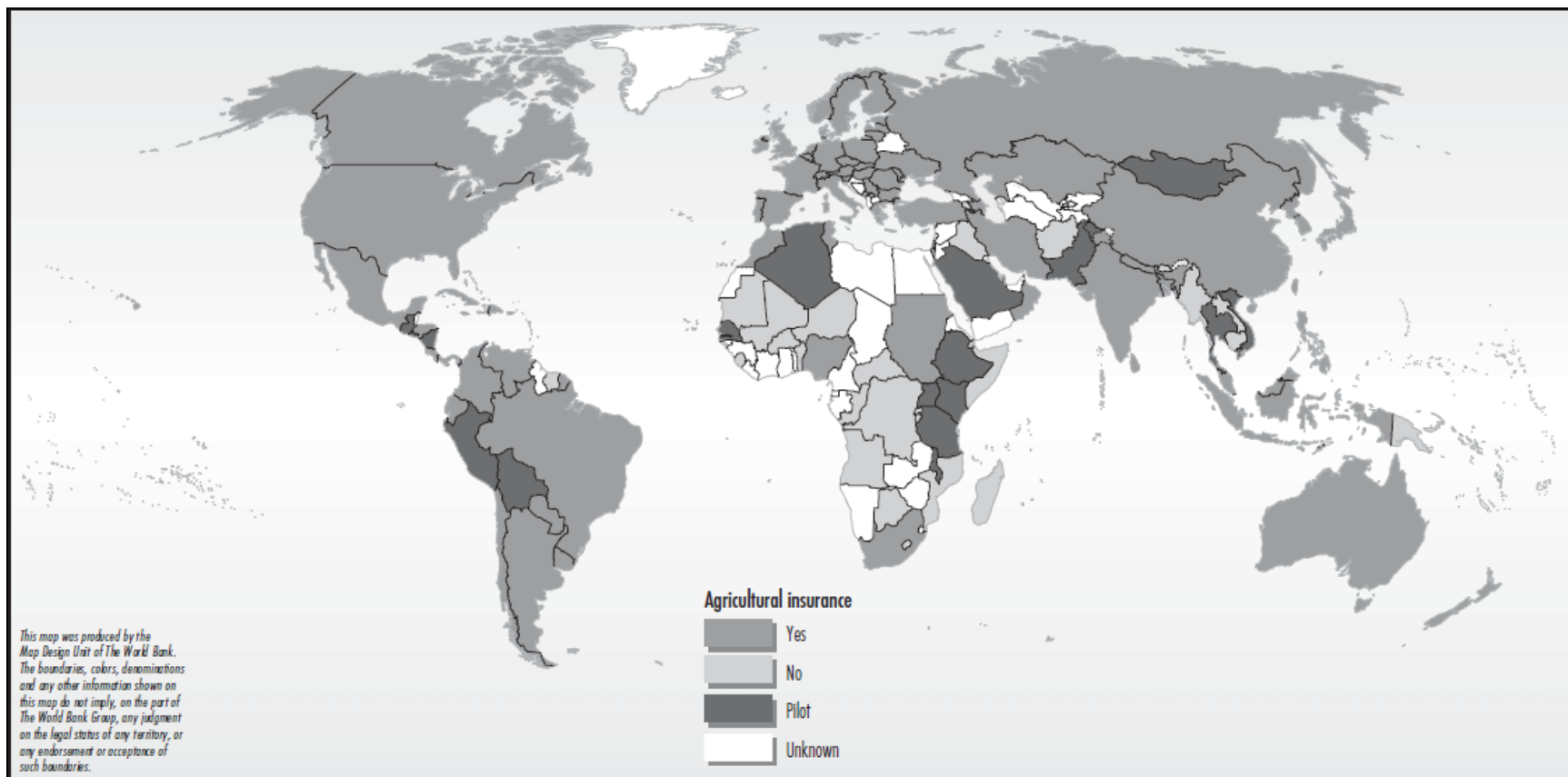
Joint work with Olivier Mahul and Niraj Verma, World Bank
Part of a program of work with the Government of India and AICI

An introduction to hedging in agricultural insurance in developing countries

- Agriculture is an uncertain business, particularly for the poor (Dercon 2004, Collins et al. 2009)
- Traditional indemnity-based approaches to crop insurance were unsustainable (Hazell 1992, Skees et al. 1999).
- Hedging products can be fairly cheap whilst still offering protection against key perils (Hess et al. 2005).
 - Hazard based indices:
 - Weather indexed insurance (rainfall, temperature, humidity, wind speed, etc.)
 - Flood indexed insurance
 - Sample based indices
 - Area yield indexed insurance
 - Sample based livestock index insurance
- However, indices need to be able to capture locally aggregate shocks to be attractive to farmers



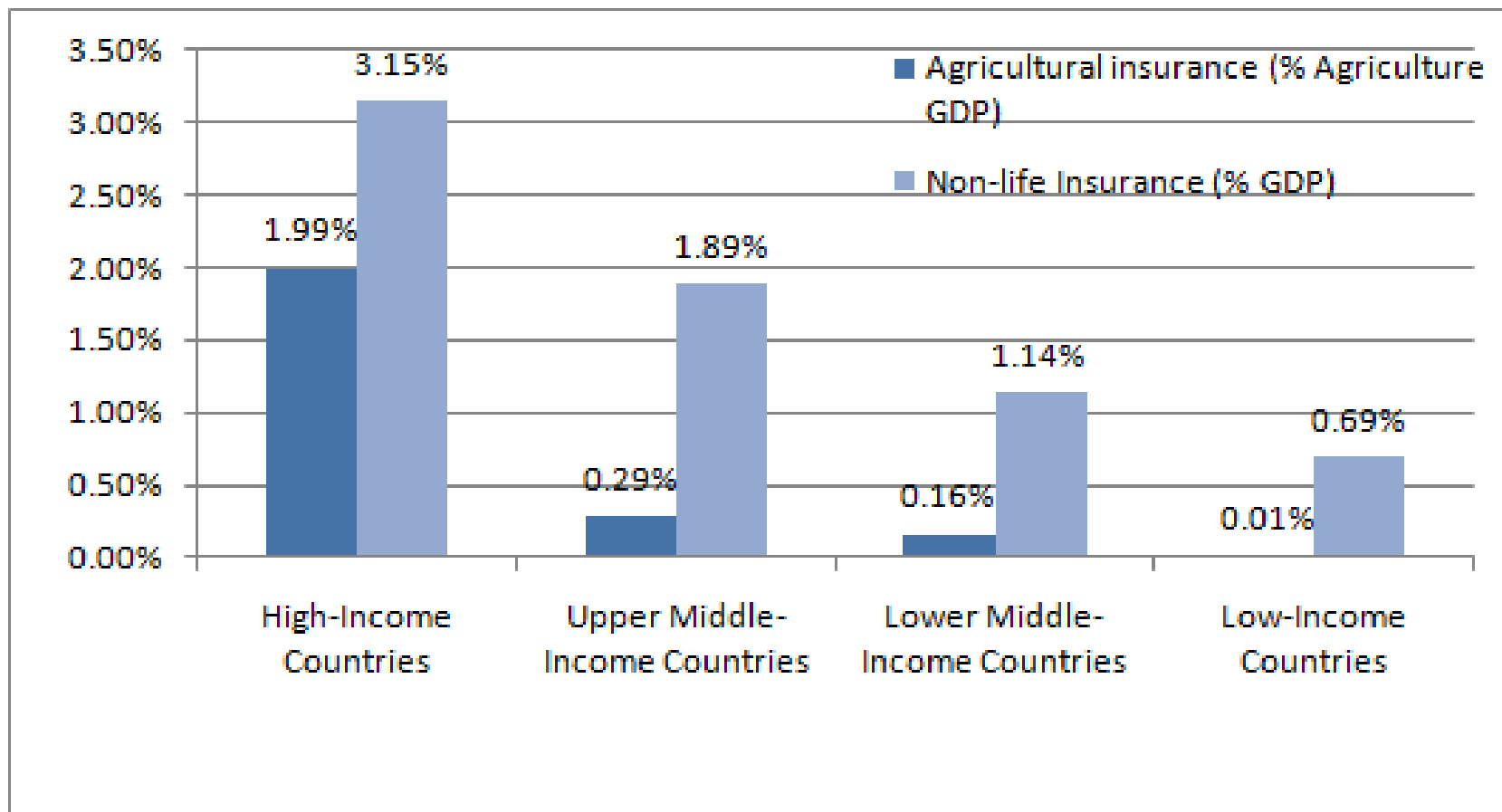
In 2007, agricultural insurance was available in 100+ countries as program or pilot



Source: Mahul & Stutley 2010



Agricultural sector is underserved by insurers in many developing countries, relative to developed countries



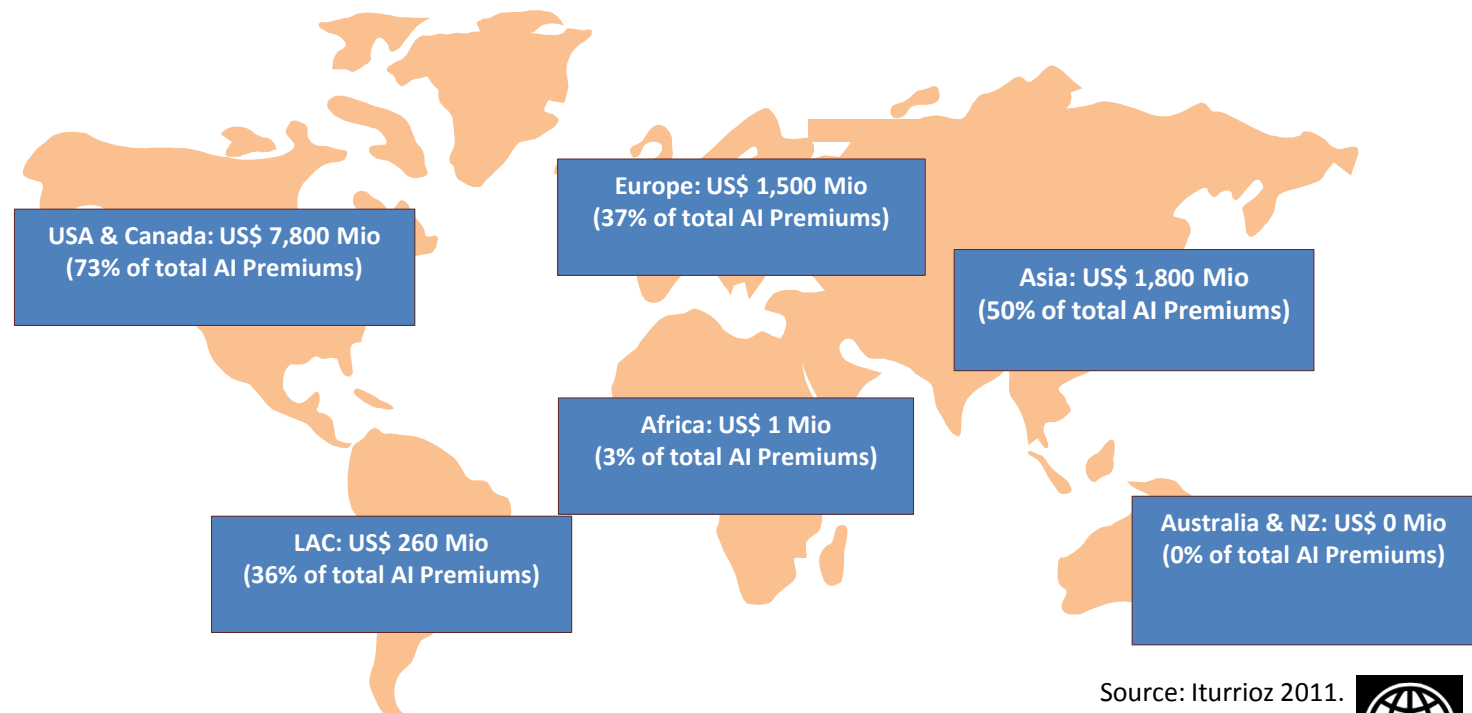
Source: Mahul & Stutley 2010



Public Sector often supports agricultural insurance

- Most common form of intervention is premium subsidies, provided in 63% of countries
- In 2009, public sector expenditures in agricultural insurance (US\$ 11.5 billion) accounted for 59% of the total premiums written worldwide

Estimated Government Expenditures in Agricultural Insurance: Geographic Distribution



For example, crop insurance premium subsidies in the US are substantial...

Table I. Crop Insurance Premium Subsidies
(government-paid portion of premium as a percent of total premium)

Yield coverage level (%)	CAT	50	55	60	65	70	75	80	85
Premium subsidy (%) for most policies (including those using basic and optional units)	100	67	64	64	59	59	55	48	38
Premium subsidy (%) for enterprise units		80	80	80	80	80	77	68	53
Premium subsidy (%) for whole farm units					80	80	80	71	56

Source: Shields (2010)

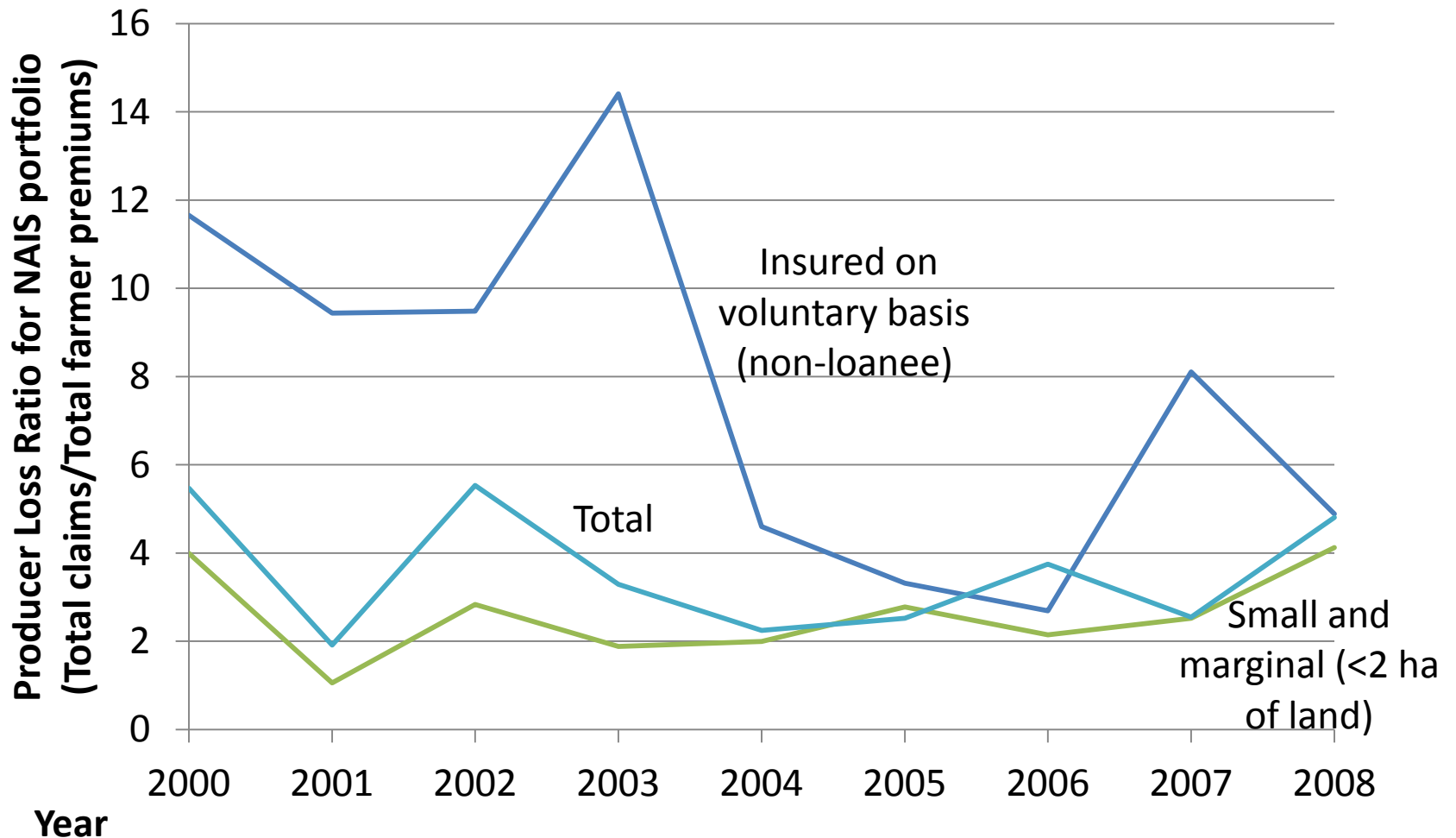


National Agricultural Insurance Scheme (NAIS)

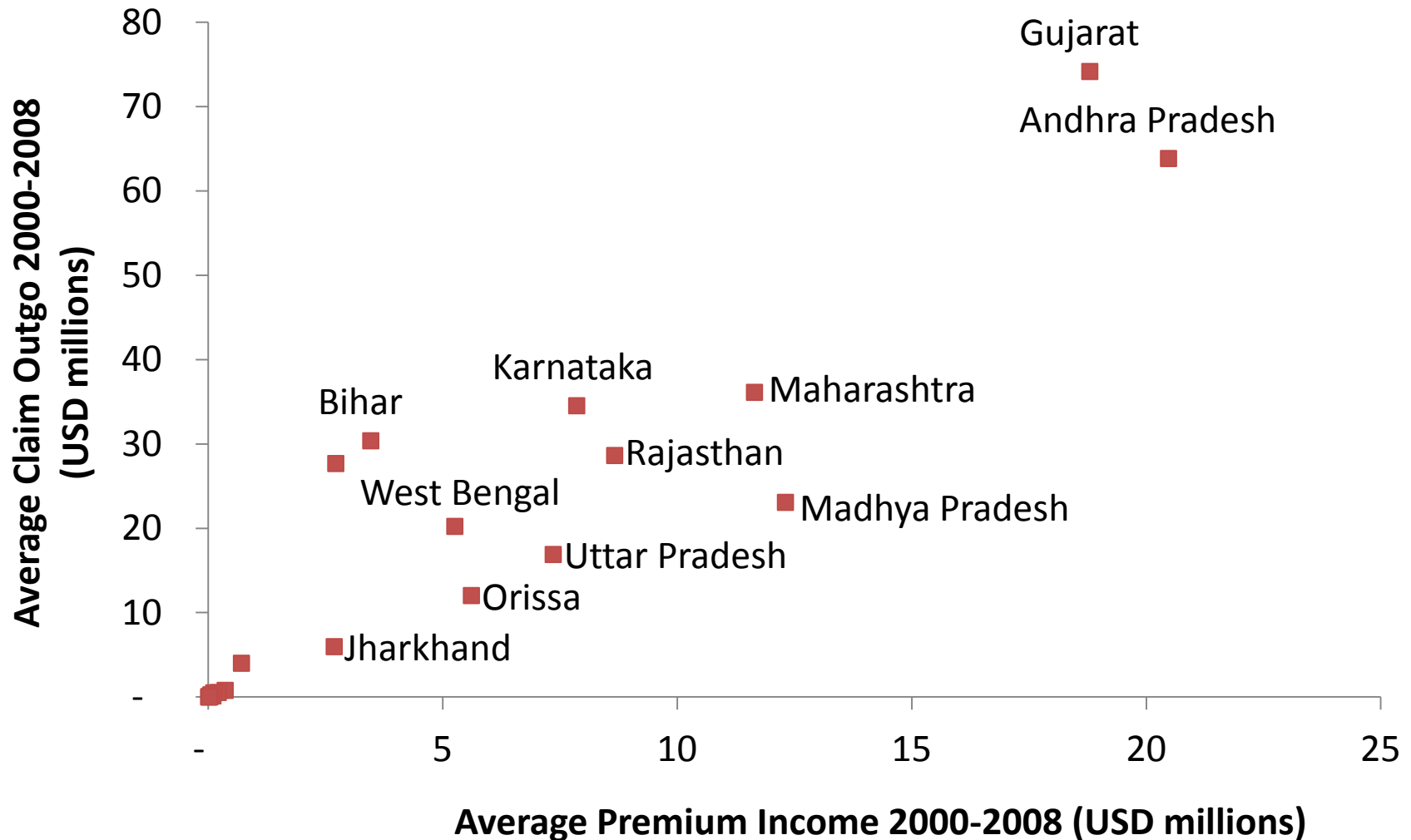
- The world's largest crop insurance program...
 - Size: ~25m farmers insured annually
 - Farmer premiums: Capped
 - Historical NAIS claim payments $\approx 3.5\times$ historical premiums (2000-2008)
 - Implemented by: Public insurer AICI
 - Index: Area yield
 - Financing: Public, ex-post financing of claims.
 - Compulsory: for farmers who borrow from financial institutions
- ...yet there are significant challenges
 - Open-ended fiscal exposure for government
 - Long delays in farmer claim payments
 - Inequitable risk classification
 - Challenges in yield assessment
 - Private sector not utilised



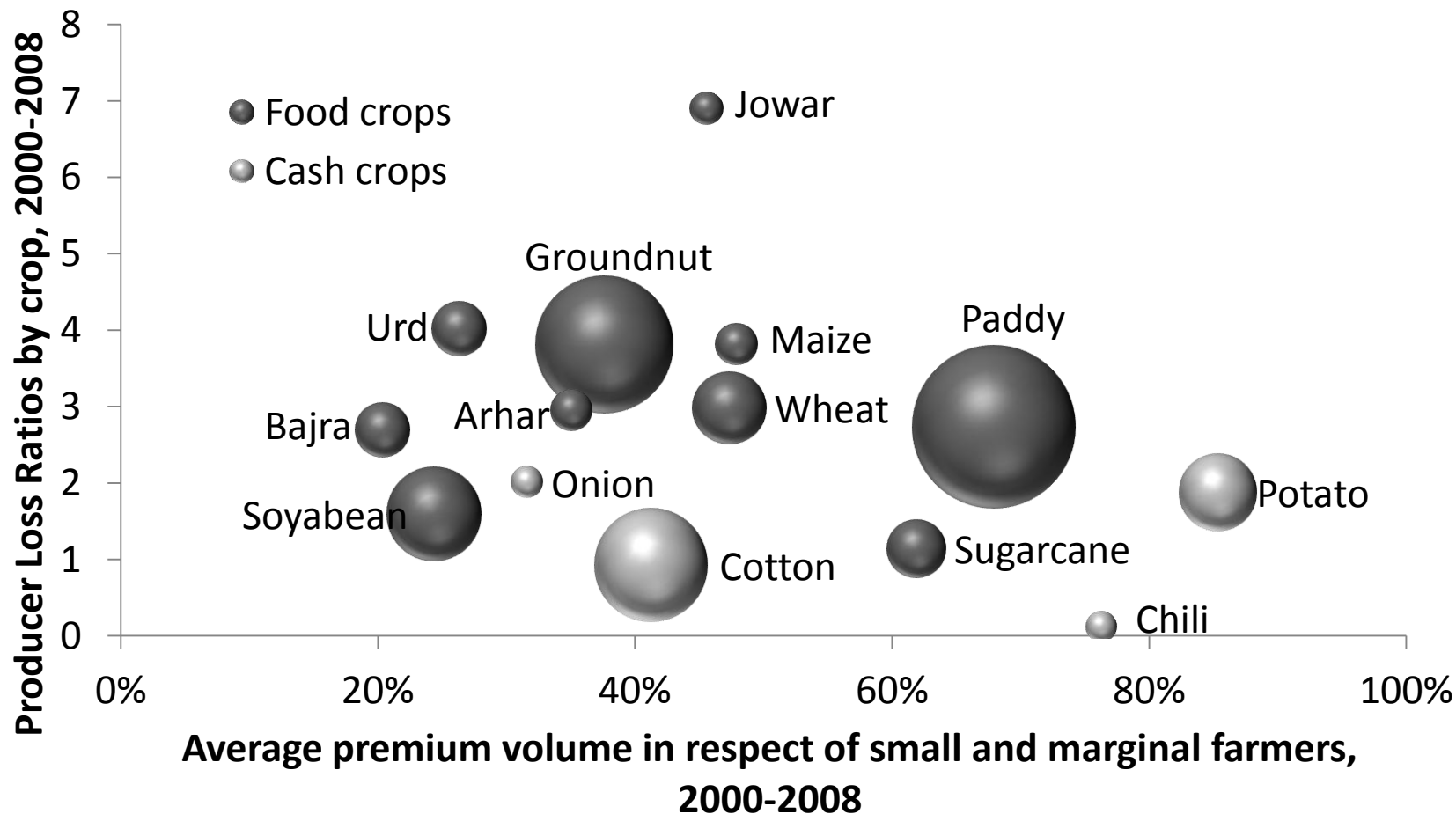
Strong evidence of adverse selection



Different states have benefited to different degrees



Farmers of different crops have benefited to different degrees



Note: Bubble area is proportional to average premium volume for crop, 2000-2008. Minor crops by premium volume are excluded



How the NAIS achieved scale

- Long term work by the Government of India

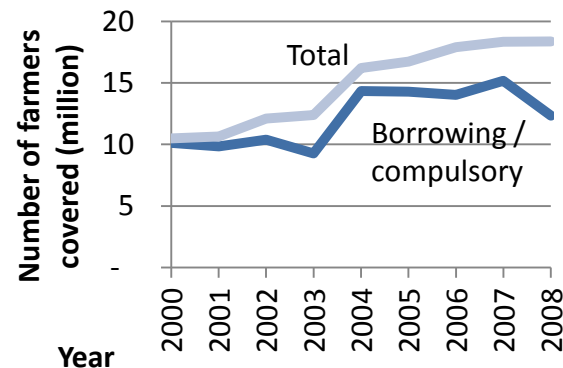
- Decades of experience
 - CCIS from 1985→NAIS from 1999
- Product design
- Data collection (yield and weather)

- Compulsory for farmers who borrow from financial institutions

- Supporting agricultural credit markets and productivity

- Subsidies

- Historical NAIS claim payments $\approx 3.5 \times$ historical premiums (2000-2008)
- Supporting rural livelihoods



Government of India is piloting two potential successors to NAIS

	National Agricultural Insurance Scheme (NAIS)	Weather Based Crop Insurance Scheme (WBCIS)	Modified National Agricultural Insurance Scheme (mNAIS)
Scheme maturity	Established	Potential successor	
Year started	1999	2007	2010
Index	Area yield	Weather	Area yield+
Farmers covered per year	>22m	>9m	340,000 (Winter season 2010 only)
Government financing	Ex-post	Upfront premium subsidy	
Open to private sector	No	Yes	
Average claims ÷ farmer premiums	3.5 (2000-2008)	1.4 (2007-2010)	(expected to be similar to WBCIS)



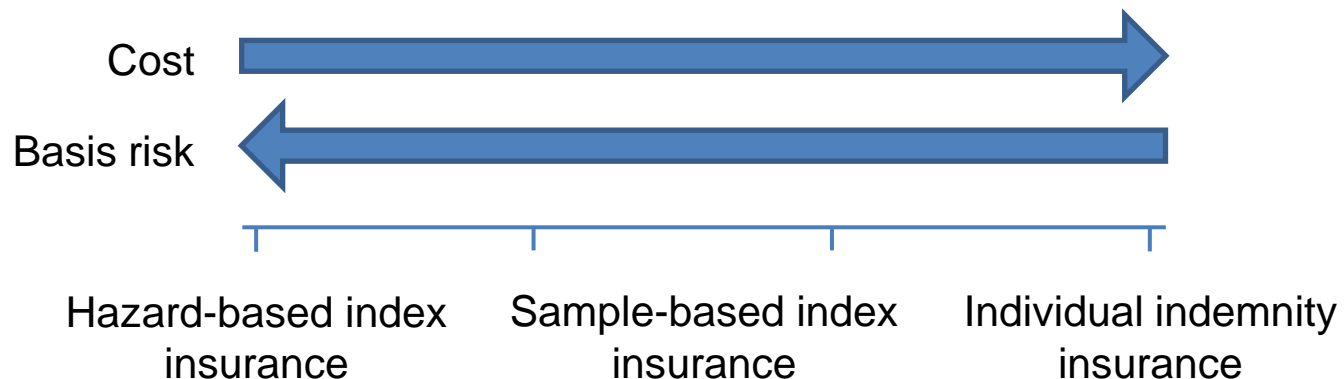
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Sample and hazard based index insurance; Cost versus basis risk

- Product designer faces tradeoff between cost and basis risk
 - High cost \Rightarrow zero purchase rational for all but the most risk averse
 - High basis risk \Rightarrow zero purchase rational for all
- If there is local informal insurance for large idiosyncratic shocks, basis risk should be measured relative to aggregate shocks
 - Sample based indices (e.g. area yield) may offer lower basis risk (at higher cost) than hazard based indices (e.g. weather)



Innovations in product design and delivery

1. Combining different indices to offer the best product

Weather Based Index	Area Yield Index
Can only capture weather perils	All peril cover (includes pests, disease, etc.)
Faster claims settlement	Slower claims settlement?
Use simple index to capture severe shocks that are well captured by weather index (drought, excess rainfall, low temperature).	Use to offer final all peril adjustment, offering protection for shocks not adequately captured by early weather indexed claim payment.



Innovations in product design and delivery

2. Actuarially sound design and ratemaking

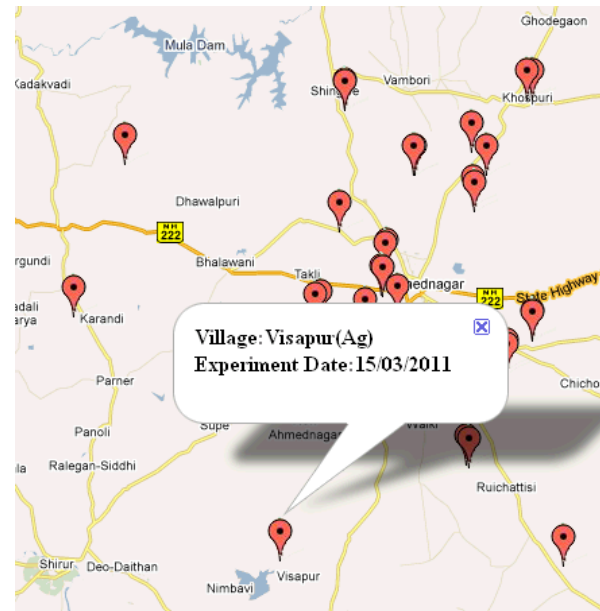
- Allows government to move from ex-post financing to upfront premium subsidy
 - Use market-based instruments to achieve social objectives
 - Private sector insurers can compete with the public sector insurer both for delivery and risk financing (reinsurance)
 - Faster claim settlement benefits farmers
 - Improved budget management benefits government
- Increases equity
 - The actuarial value of all products for one crop within one state can be set to be constant
- Price discovery has far-reaching policy implications
 - Subsidies to different farmer groups are explicit



Innovations in product design and delivery

3. Use of technology to improve delivery

- Use of satellite data to better target crop cutting experiments underlying area yield index
 - Satellite data is used behind the scenes by insurer to improve data quality and improve speed of claims settlement
- Use of GPS/photo/video enabled cell phones to increase accuracy and speed of claims settlement



Potential roles of the public sector

- Coordination in index design/data collection
 - Agricultural insurance indices are club goods
 - Lack of coordination \Rightarrow underinvestment in good indices
- Risk financing
 - In the early years of a new microinsurance program it may not be efficient for private sector to bear medium layers of risk:
 - Financial regulation ensures that insurer/reinsurer must charge high premium if cannot quantify the risk
- Technical support and consumer protection
 - Consumer protection for consumer derivatives is complex but critical
 - Monitoring and evaluation
- Communication/marketing or compulsion
- Financial support
 - Subsidise premiums or data collection/index design



Questions for future research

1. How should yield (CCE) data, weather data, satellite data, etc. be optimally used in agricultural insurance (*theory + empirics*).
 - What should be used behind the scenes and what should affect claim payments to farmers?
2. How to design a risk market infrastructure for agricultural insurance in developing countries (*theory*)
3. How do the benefits from support to agricultural insurance compare with the benefits from other interventions (*empirics*)
 - By smoothing out the worst years, agricultural insurance has the *potential* to increase farmer welfare
 - But there are many other potential interventions (savings, workfare programs, etc.)
 - What does US\$1m of insurance premium subsidies buy?
 - What does US\$1m invested in index data buy?

