

International Microinsurance Conference – Learning Sessions
Daniel Clarke

Improving farmers' access to agricultural insurance in India

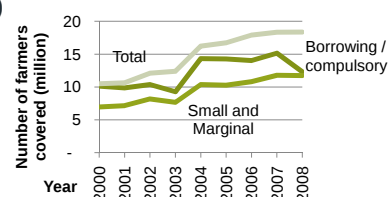
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Background: the world's largest insurance program...

- National Agricultural Insurance Scheme (NAIS)

- Decades of experience
- Insures close to 25m farmers annually
- Compulsory for farmers who borrow from financial institutions (and voluntary for others)



How NAIS works:

- Area yield based approach
 - Yields measured in given area (subdistrict) through crop cutting experiments
 - Claim payable if estimated yield < Indemnity Level × historical average yield
- Farmers pay capped premiums to the public insurer AICI
 - Historical claim payments = 3.5 × historical premiums
- Ex-post financing for claims processing
 - Central and state governments raise budgets (50:50) and transfer to AICI
 - AICI pays claims in farmers' bank accounts (low leakage)

...yet 95 million farmers not covered

- **Long delays in farmer claim payments** (often >1 year)
 - Ex post financing
 - CCE data collection and analysis takes time
- **Inequitable:**
 - Low risk farmers excessively cross subsidize high risk farmers
 - Level of cover is something of a lottery (based on 3 or 5 year moving average yield)
- **Challenges in yield assessment**
 - Variable **quality of CCE data**
 - Yield measured at subdistrict need **not reflect individual farmer yields** within the subdistrict
- **Open-ended fiscal exposure** for government

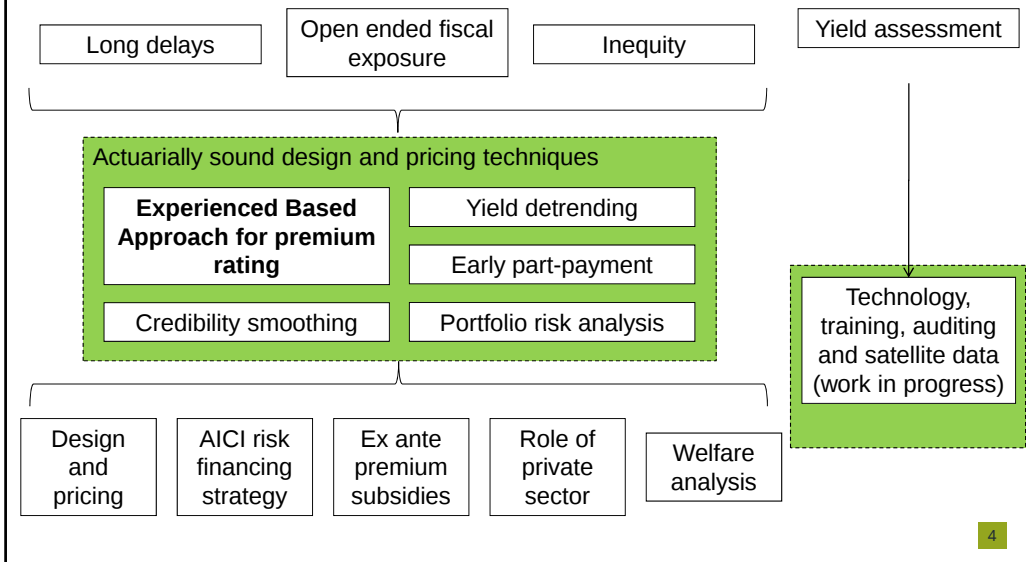
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Government of India is piloting two potential successors to NAIS

	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 & weather
Farmers covered per year	>22m	>3m	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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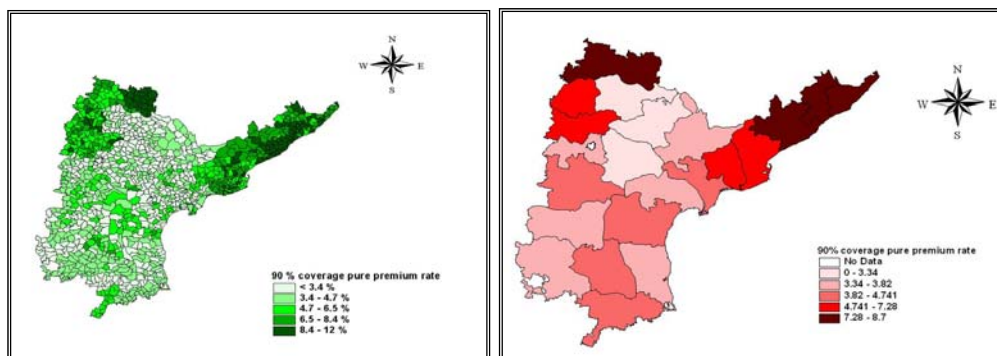
World Bank has provided technical support on many aspects of the pilot programs



mNAIS: actuarial risk classification increases equity

Can differentiate risks by:

1. Varying premium rate
2. Varying coverage levels (threshold yields)
 - #1 may be more challenging for political economy and implementation



Pure premium rate at 90 % coverage level, Rice crop, AP

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Benefits from 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, supporting the crowding-in of private sector innovations.
 - Faster claim settlement benefits farmers
 - Improved budget management benefits government
- Increases equity
 - The actuarial value of all products for one crop within one state is constant (unlike under NAIS)
- Price discovery has far-reaching policy implications
 - Subsidies to different farmer groups are explicit
- Well-documented methodology is a public good
 - State of the art techniques, adapted to developing country context, can be used by other insurers / other countries

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mNAIS ratemaking:

Reducing premium rates while maintaining actuarial soundness

- Simple rule-based approach to design and ratemaking led to low cover and high premium rate for cotton
 - Caused by trend in yield on account of improved seed (Bt cotton)
- An actuarially robust detrending methodology can account for technology trend
 - Result was substantial increase in cover and reduction in premium rates for cotton

Percentage reduction in NAIS cotton premium rates from detrending, Kharif 2009

	Gujarat	Maharashtra	Madhya Pradesh
Percentage reduction	47%	78%	54%

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mNAIS Ratemaking: Smoothing Threshold Yields to increase equity

- NAIS average historical yield based on 3 or 5 year moving average yield
 - Unstable year to year
 - Not reflective of agronomic fundamentals
- mNAIS uses 7 year moving average yield, smoothed within crop/district.
 - Subtle statistical motivation
 - But large potential benefits
 - Technically sound and acceptable within political economy constraints

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Fiscal impact analysis to guide policy decisions

- Undertook analysis of NAIS and mNAIS which showed
 - Who gets subsidy: which farmer category
 - What is the fiscal cost of scaling up
 - Which states benefit more/less
 - What is the price impact of mNAIS

Scheme	Estimated average commercial premium rate	Estimated average farmer premium rate	Estimated subsidy for small/marginal farmers, as percentage of total subsidy
NAIS	10.2%	2.8%	46%
Illustrative modified scheme	14.4%	5.1%	44%

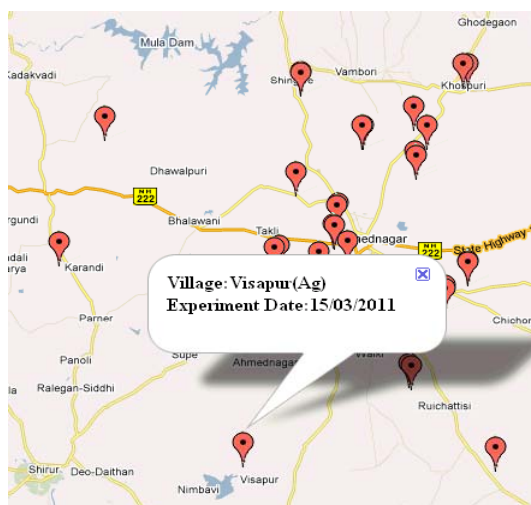
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mNAIS yield assessment Improving Crop Cutting Experiments (CCEs)

- CCEs provide very valuable information on crop yields for insurance purpose
 - Provided they are accurate, robust and timely
 - Approximately 1.2 million CCEs conducted annually under NAIS
 - Move from ex-ante to ex-post financing increases moral hazard
 - Area yield indexed schemes exposed to local pressures to underreport yields (triggering high claim payments)
 - Under mNAIS, state governments have reduced incentives to monitor relative to NAIS; state government liability capped at the premium subsidy
 - Reduction of insurance unit size from subdistrict to village Panchayat dramatically increases number of CCEs (8-10x)
 - Exacerbates problems of quality, standardisation and protection against manipulation
- ⇒ Can use technology to improve CCEs

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mNAIS CCEs technology pilot: mobile phones Illustration of geotagged CCE data



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mNAIS CCEs technology pilot: mobile phones Web interface for CCE data



Summary Data Report Year : ALL Crop:ALL

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State	District	Tahsil	Circle	Village	Survey Number	Date	Crop	Weight	Longitude	Latitude	Photo	Harved Video	On Map
Maharashtra	Ahmednagar	Shingonda	Kolgaon	Vinapur(Ag)	81-0	2011-03-15	Wheat	26	74.605412342744	18.832634555773	Image	Video	Map
Maharashtra	Ahmednagar	Ahmednagar	Nalegaon	Nalegaon(Ag)	191-0	2011-03-25	Jowar	35	74.71367589680901	19.113226369621	Image	Video	Map
Maharashtra	Ahmednagar	Ahmednagar	Sawedi	Islak	09-0	2011-03-26	Wheat	2	74.665834609998	19.148835698305	Image	Video	Map

Use of mobile phones supports

- Standardised procedure
- Improved data quality, lowering reinsurance premium
- Real-time auditing of CCE reports
- Increased speed of claims settlement

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mNAIS CCEs technology pilot: Utilising remote sensing data

Objectives of Kharif 2011 pilot

1. Use remote sensing technology to better target CCEs
2. Use remote sensing as independent check on real-time CCE reports
3. Assess the cost of scaling up the use of remote sensing – for state/national level roll out

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WBCIS design:

Products should be designed to minimise basis risk

- Designer should try to ensure that correlation between weather index and farmer losses is high
 - Product not suitable for the most vulnerable unless it can be relied upon to pay out in the worst years.
- Preliminary analysis for WBCIS portfolio across one state suggests high basis risk
- More work needed on designing and evaluating products intended to minimise basis risk

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WBCIS design: product design should rely on sound agronomic principles

- Heavy reliance on historical data in insurance product design can lead to systematic under-pricing
- Actuarially sound weather based crop insurance products should be designed using basic and robust agronomic principles

Expected crop yield loss (%) due to deficit in rainfall

Crop: Sorghum								
Rajasthan					AEZ 4:			
	Period of rainfall deficit/Intensity of deficit							
	July 1 - July 31	Aug 1 - Aug 31	Sep 1 - Sep 30	Oct 1 - Oct 30	July 1 - Aug 31	Aug 1 - Sep 30	Sep 1 - Oct 30	Jul 1 - Sep 30
Rainfall deficit, %/ Total rainfall, mm								
	116	141	32	0	257	173	32	289
100	35.4	74.0	3.4	0.0	88.0	74.0	3.4	93.4
90	30.0	73.2	3.4	0.0	88.0	73.2	3.4	88.1
80	28.5	72.9	3.4	0.0	84.7	72.9	3.4	84.7
70	20.5	70.3	3.4	0.0	81.4	70.3	3.4	81.4
60	16.5	65.2	3.4	0.0	72.6	65.6	3.4	72.6
50	11.4	56.4	3.4	0.0	62.9	58.3	3.4	62.9

Source: IARI (2009)

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Combining area yield and weather based indices to offer the best of both products

- mNAIS combines the best features of area yield index and weather index
- Potentially powerful feature needs strong communication campaign

Weather Based Index	Area Yield Index
Can only capture weather perils	All peril cover (includes pests, disease, etc.)
Faster claims settlement	Slow 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.

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Conclusion

- Implementing scaled-up agricultural insurance schemes requires many technical inputs
 - Product design and pricing software
 - Portfolio risk management software
 - Technological tools
 - Other technical and actuarial tools
 - Second-best, implementable solutions
- Large benefits to very large number of farmers

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Challenges for the future

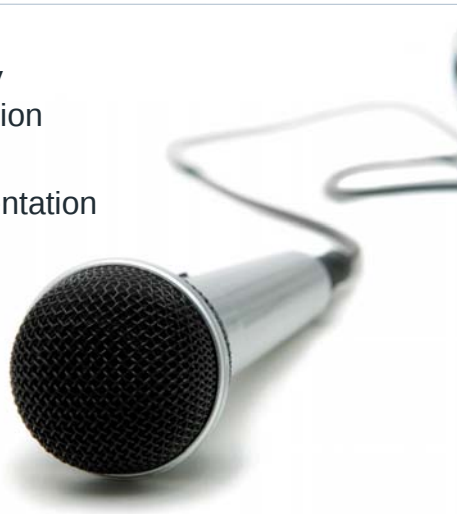
1. Improving robustness of yield estimation
2. Learning how to increase outreach
3. Fine-tuning the mNAIS product
4. Leveraging the private insurance and reinsurance sectors
5. Institutional capacity building
6. Monitoring and evaluation

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Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.



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