

Index-based Livestock Insurance for Northern Kenya's Arid and Semi Arid Lands: The Marsabit Pilot

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Impacts of Risk on Agricultural Productivity

- **Climactic extremities a great source of agricultural risk**

- Climate risks and outcomes impact negatively on agricultural production by generating inefficient coping responses and dampening incentives that promote higher return but riskier production and technology adoption

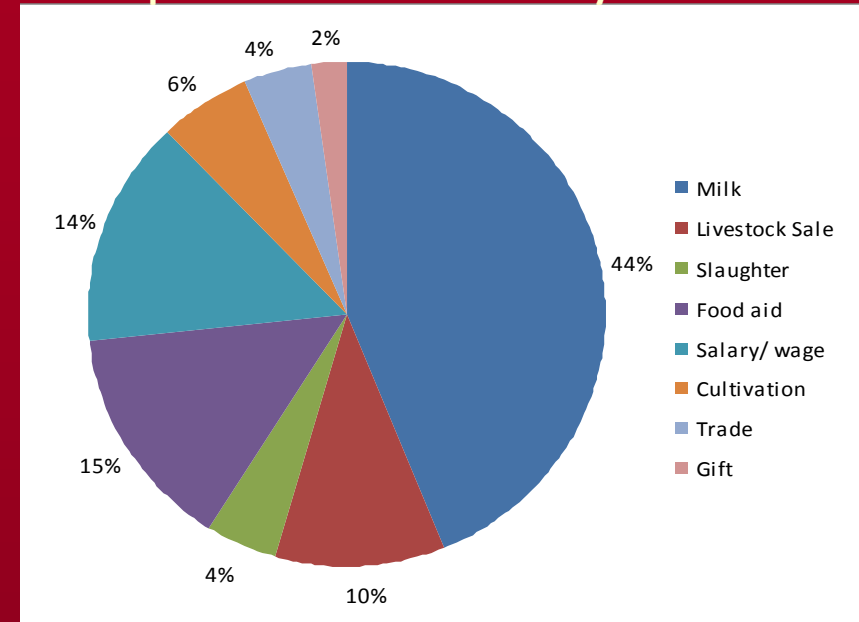


- **Development of relevant risk management interventions becoming a priority in agendas promoting agricultural growth in Africa.**

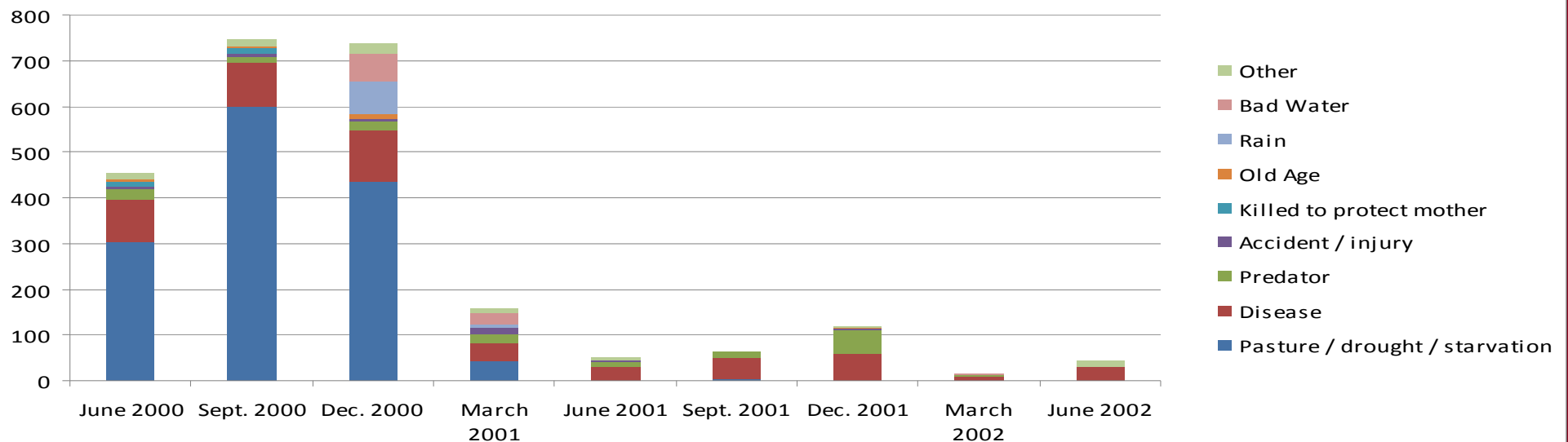
Drought Risk in Northern Kenya

- Livestock is both the principal asset and source of income for the vast majority of Arid and Semi-Arid Land (ASAL) residents. Contributes considerably to national livestock production.
- Drought is the single greatest cause of livestock mortality
- Most drought related livestock mortality occurs under severe conditions

Proportion of total income by source



Livestock mortality by cause



Insurance and Agricultural Development

- Such risk imposes considerable economic and welfare costs
- Sustainable insurance can prevent this by:
 - Stabilizing expectations & crowding-in investment and accumulation by poor populations
 - Preventing downward slide of vulnerable populations
 - Inducing financial deepening by crowding-in credit supply and demand
- But can insurance be sustainably offered in the ASAL?
- Conventional (individual) insurance unlikely to work, especially in small scale agro-pastoral sector:
 - Transactions costs
 - Moral hazard/adverse selection

Index Based Insurance

- New innovation in insurance avoids problems that make traditional insurance unprofitable for small, remote clients:
- Policy holders paid based on external “index” that triggers payments to all insured clients
- Suited for risks affecting a large number of people simultaneously and for which a suitable index exists.
 - No transactions costs of measuring individual losses
 - Preserves effort incentives (no moral hazard) as no single individual can influence index.
 - Adverse selection does not matter as payouts do not depend on the riskiness of those who buy the insurance
 - Available on near real-time basis: faster response than conventional humanitarian relief

Piloting Index Based Livestock Insurance in Marsabit

- **Why Marsabit?**

- Relative to other ASAL districts, meets more of the preconditions for a successful pilot – we should start with safest bet.

- Pastoral production is a key livelihood facing a risk profile suitable for targeting with an index insurance product
- Data availability affords precise contract design
- Rich understanding of pastoral economy, seasonal herd dynamics of populations in Marsabit
- Strong delivery partners and relationship with other key stakeholders on the ground

Contract Design and Development

1. *High quality data (reliable, timely, non-manipulable, long-term)* to calculate premium and to determine payouts
2. *Minimize uncovered basis risk* through product design

- **Data**

- Neutraized Difference Vegetation Index (NDVI) indicator of forage availability – (Satellite based)
- Livestock mortality data – (Arid Land Resource Management Program (ALRMP), Pastoral Risk Management Project (PARIMA))
- Livelihoods, Assets, Risk Experience (Project, PARIMA)

- **Contract currently designed and priced for two clusters in Marsabit**
- **Preliminary work indicating that basis risk for severe losses (>10%) not a great problem but we're still working on this.**

Contract Design and Development

Livestock mortality index underlying IBLI contract based on area average livestock mortality predicted by remotely-sensed (satellite) information on vegetative cover (NDVI):

$$M_{ls} = M_g(ndvi) + \varepsilon_{gls} \quad \text{if good climate regime } (Czndvi_pos_{ls} \geq 0)$$
$$M_{ls} = M_b(ndvi) + \varepsilon_{bls} \quad \text{if bad climate regime } (Czndvi_pos_{ls} < 0)$$

NDVI Data →

Response
Function

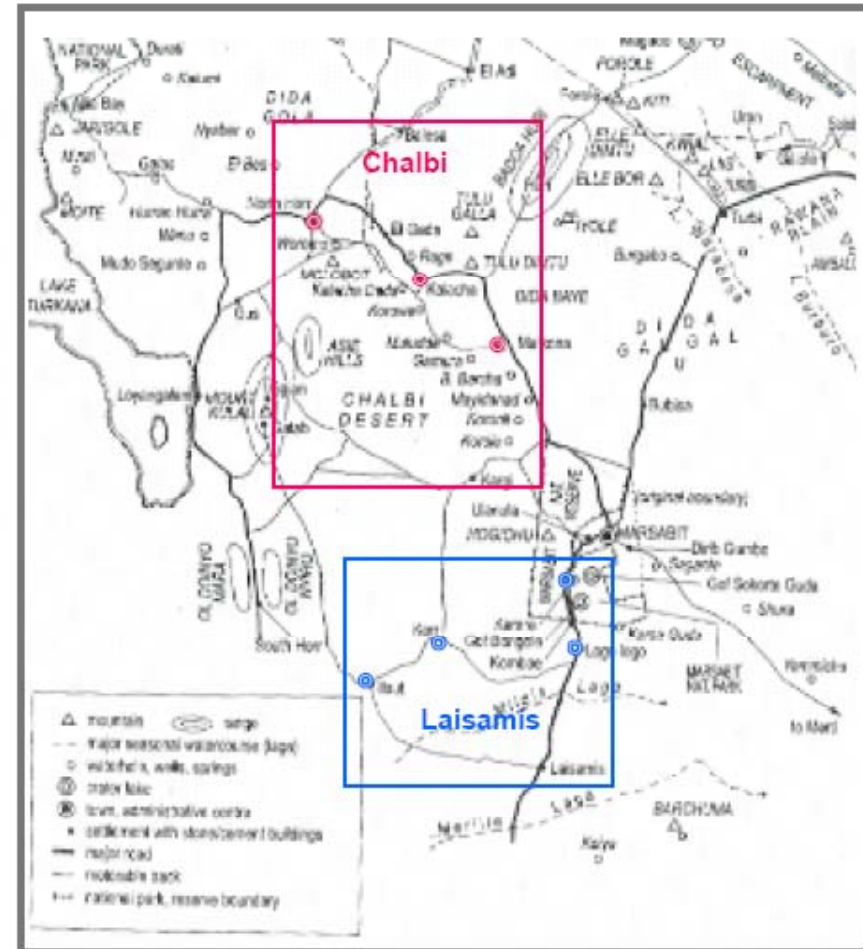
→ Predicted Mortality
Index

Contract Design and Development

Estimate separate response functions for distinct clusters (Marsabit District)

- Geographic clustering based on statistical bundling of spatial locations with similarities in characteristics that influence predictive relationship between livestock mortality and NDVI

Figure A1. Chalbi and Laisamis contract coverage clusters



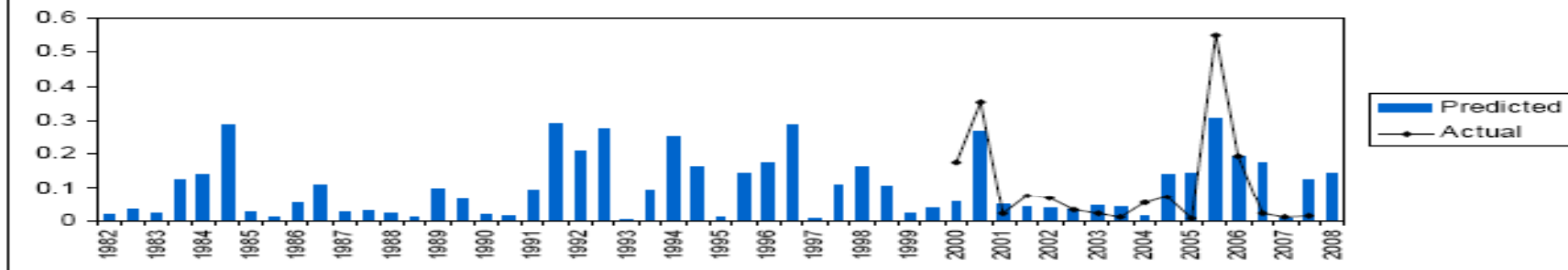
Contract Design and Development

Calculated Premiums for Contracts by Strike

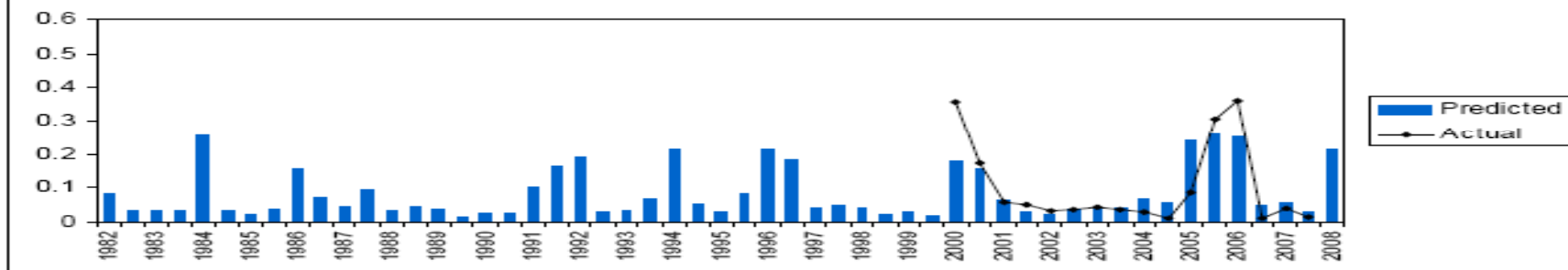
Cluster/Contract	Premium Rate (% of insured value)			
	10% Strike point	15% Strike Point	20% Strike Point	25% Point
<i>Chalbi Cluster</i>	9%	5%	3%	1%
<i>Laisamis Cluster</i>	5%	3%	1%	1%

Contract Performance

Actual Vs. Predicted Seasonal Mortality Rate - Chalbi Cluster



Actual Vs. Predicted Seasonal Mortality Rate - Laisamis Cluster



Establishing Informed Demand

- **Critically important given target clientele and novelty of the product**
- **Experimental game as Educational tool**
- **Willingness to Pay Survey**






The Index Insurance Game

- Game mirrored to pastoral production system
- Climate-based dynamics represented by balls of different color determining season and growth impact

-30%	-20%	0%	10%	20%
(1/16)	(1/16)	(2/16)	(7/16)	(5/16)

- Insurance pays out during severe drought (-30%) and normal drought (-20%) conditions.
- To emphasize that payment is based on climate experience, we introduce idiosyncratic shocks.

		
Ball-10%	Ball+0%	Ball +10

The Index Insurance Game

- **Lessons Emphasized**
 - **You must pay a premium every period to get coverage**
 - **You do not receive your premium back if risk insuring against does not occur**
 - **You are paid only if the index indicates a drought has occurred**
 - **You are not paid based on your individual experience and for no drought-related mortality**
 - **You may get over or under compensated compared to your actual losses**



Willingness to Pay for IBLI

Some preliminary statistics from WTP study

- (1) Proportion of respondents whose WTP exceed the pure premium, and pure premium+20% loading:

10% Strike		30% Strike	
Pure Premium	20% loading	Pure Premium	20% loading
50%	34%	69%	69%

- (2) And for respondents whose WTP exceeds the pure premium...
Proportion of herd that respondents would like to insure:

Contract type	Proportion of Herd would like to insure			
	1/4	1/2	3/4	Full
10% strike	18%	24%	13%	45%
30% strike	4%	17%	18%	62%

Implementation Partners

- **Delivery Channel Partners**
 - The challenge of delivering contracts to target clientele
 - The Hunger Safety Net Program (HSNP) – unconditional cash transfer program targeted at chronically improvised populations in Mandera, Marsabit, Turkana and Wajir
 - The Financial Sector Deepening Trust (FSD), in conjunction with Equity Bank is opening over 150 payment points in the 4 districts
- **Insurance and Reinsurance Companies**
 - Have established links with interested local insurance companies
 - Reinsurance will be necessary. Local insurance companies are already linked. Demonstrated interest by established companies.
- **Government and Regulatory Agencies**
 - Demonstrated commitment
 - Discussions with IRA underway. Partners helpful in steering through necessary regulation

The Way Forward

- **Piloting contract for February 2010**

- Launch currently scheduled for February 2010
- Prior to sale, signed commitment from insurance company, their reinsurance partner and a delivery channel partner
- Need to train insurance/delivery channel agents
- Extensive education/marketing campaign including the insurance game

- **Learning from the Pilot**

- Monitoring & Evaluation (M&E): Learning lessons from pilot to improve design and assist in scale-up efforts
- Impact assessment: To examine the welfare/livelihood benefits of IBLI to target population.

Thank you

