Index Based Livestock Insurance

Protecting Vulnerable Pastoralists from Drought-related Shocks

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Panel: How Risks and Shocks Impact Poverty, and Why, When, and Where Can Better Financial Protection Help





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Motivation: Target Population and Events

IBLI: Covers drought-related mortality and morbidity risks for pastoralist livestock

A SIZEABLE CONSTITUENT

• Over 50 million pastoralists in Sub-Saharan Africa: over 20 million in the Horn of Africa

• THE CENTRALITY OF LIVESTOCK

- In northern Kenya and Southern Ethiopia:
- Livestock products and sales of livestock are 40%
 of income for average household

• VULNERABILITY TO LIVESTOCK LOSSES

- Catastrophic herd loss due to drought identified as the major source of vulnerability and cause of poverty
- Between 2008 and 2011 Kenyan economy suffered US\$ 12.1 billion in damages due to drought, over 70% due to livestock losses.





Motivation: Poverty Traps and Catastrophic Risk

There is strong evidence of poverty traps in the arid and semi-arid lands (ASAL) of northern Kenya and southern Ethiopia. These put a premium on risk mgmt.

Catastrophic herd loss risk due to major droughts identified as <u>the</u> major cause of these dynamics.





Source: Lybbert et al. (2004 *EJ*) on Boran pastoralists in s. Ethiopia. See also Barrett et al. (2006 *JDS*) among n. Kenyan pastoralists, Santos & Barrett (2011 *JDE*) on s. Ethiopian Boran.

Motivation: Increased Risk From Climate Change

Pastoralist systems adapted to climate regime. But resilient to a shift in climate? Many models predict increased rainfall variability (i.e., increased risk of drought).

Herd dynamics differ b/n good and poor rainfall states, and so change with drought (<250 mm/ year) risk.

Key: In so. Ethiopia, doubling drought risk would lead to system collapse in expectation in the absence of any change to prevailing herd dynamics.



Motivation: Standard Responses To Drought

STANDARD RESPONSES TO DROUGHT ARE COSTLY & INSUFFICIENT

- Destocking/Restocking slow, expensive, targeting challenges, inefficiency
- Food aid slow, expensive, targeting challenges, foster dependency
- Cash aid targeting challenges, fiscal sustainability, not equally effective for all.
- HSNP Plus Need to supplement to provision of well targeted cash transfers to the poor, with productive safety needs in the from of livestock insurance to minimize slide into poverty resulting for drought shocks. Particularly in pastoral systems where poverty trap dynamics enhance this problem.



Livestock Insurance as a complement

Sustainable insurance can:

- Prevent downward slide of vulnerable populations
- Allows focus humanitarian resources on the needy
- Crowd-in investment and accumulation by the poor

But can insurance be sustainably offered in the ASAL? Conventional insurance unlikely to work in pastoral context.

INDEX-BASED LIVESTOCK INSURANCE program launched in Northern Kenya (Jan 2010) and S. Ethiopia (July 2012).

- Comprehensive program contract design, impact assessment, market and capacity development, policy support....
- Program scaling in both Kenya and Ethiopia spearheaded by private/public arrangements.

In this talk, will focus on research evidence about IBLI impacts on a range of socioeconomic variables.

IBLI Pilots, and research design, in Ethiopia and Kenya

- IBLI survey launched in Marsabit, Kenya in Oct 2009 and in Borana, Ethiopia, Mar 2012 both before the respective launch of IBLI sales
- Marsabit survey: 925 households over 16 locations currently 5 rounds of panel data
- Borana survey: 515 households over 17 kebeles currently 4 rounds of panel data



IBLI Impacts: Herd mortality risk

Proportion of households for whom IBLI improves their position with respect to each statistic

Statistic	Proportion				
	Loaded & Unsubsidized	Subsidized			
Mean	0.232	1.000			
Variance	0.359	0.359			
Skewness	0.817	0.817			
Semi- Variance	0.374	0.609			

- Even at unsubsidized premiums (40% loading) purchasing IBLI increases herd survival rates by considerably reducing risk of catastrophic loss.
- Majority of households are better off (reductions in herd losses) purchasing IBLI coverage than otherwise

IBLI Impacts: Livestock productivity/income

	IBLI				
Dependent Variable	Cumulative Past Coverage	Current Coverage (TLU)			
Production strategies:					
Herd Size	-5.634*** (1.970)	-0.270 (0.693) [3.543]			
Veterinary Expenditures (KSH)	584.8* (324.7)	-46.21 (127.2) [15.17]			
Household is Partially or Fully Mobile	-0.0669 (0.111)	0.0386 (0.0481) [14.86]			
Production outcomes:					
Milk income (KSH)	1,688* (970.0)	840.6* (473.6) [11.46]			
Milk income per TLU (KSH)	423.5*** (118.1)	63.81 (47.23) [13.05]			

A complete list of covariates, coefficient estimates, and model statistics can be found in Jensen, Mude & Barrett (2014). Clustered and robust standard errors in parentheses. Model F-stat in brackets. *** p<0.01, ** p<0.05, * p<0.1.

IBLI coverage:

- Increases investments in maintaining livestock through vet expenditures
- Increases total and per TLU income from milk.
- Reduces herd size (consistent with precautionary savings hypothesis)

Note: TLU veterinary expenditures are pos/sign related to milk productivity

IBLI Impacts: Welfare

- **IBLI improves post-drought coping**. After catastrophic 2011 drought, IBLI covered households reported better expected behaviours/outcomes
 - **36% reduction in likelihood of distress livestock sales**, especially (64%) among modestly better-off HHs (>8.4 TLU)
 - **25% reduction in likelihood of reducing meals** as a coping strategy, especially (43%) among those with small or no herds
- IBLI shown to have a **positive impact on improvements** to mid-upper arm circumference (MUAC), a strong predictor of **child malnutrition**
- IBLI households also post greater household income per adult equivalent
- In Ethiopia no payment (pre November 2014). In principal insurance should be beneficial even without paying out (a "piece of mind" effect).
 - Our Ethiopia survey collects measures of **subjective well-being** to gauge overall life satisfaction.
 - IBLI has a positive, stat sig effect on HH well-being, even after premium payment and w/o any indemnity payments

Hirfrot , Barrett, Lentz and Taddesse 2014; Janzen and Carter 2013 NBER

IBLI: A cost-effective social protection tool

- Positive IBLI impacts do not necessary justify investing scarce development or social protection funds in IBLI.
- Need to understand the opportunity cost vis-à-vis comparative interventions: HSNP
- Research design resulting in strategically overlapping IBLI and HSNP units, and timing of provision allows for comparative evaluation.

• **RESULTS**:

- Both IBLI coverage and HSNP participation increase household income from milk, income per AE, and Mid-Upper Arm Circumference (MUAC) of children.
- From a total cost point of view, HSNP and IBLI are similar in terms of impact.
- From marginal cost perspective (more important for scaling out), IBLI considerably more cost effective than HSNP

- Note that this refers to IBLI product where client pays full risk premium plus loading of 40%

Insurance vs. cash transfers: Normalized by cost

IBLI generates comparable impact/KSh on average at pilot scale. But philanthropic/public funding is largely fixed cost, so the marginal benefit/cost ratios are <u>> an order of magnitude</u> larger!

			Income from Milk		Income per AE		MUAC	
Cost structure		Cost/	Impact	Impact/	Impact	Impact/	Impact	Impact/
		Participant		Cost		Cost ¹		Cost ²
Total Program	HSNP	47,600	992	0.021	394	0.083	1.097	0.022
Cost/Participant	IBLI	37,600	2,631	0.067	263	0.070	0.337	0.026
Marginal Cost of an	HSNP	31,700	992	0.031	394	0.124	1.097	0.033
Additional Participant	IBLI	1,580	2,631	1.667	263	1.666	0.337	0.623

All in real 2009 Kenya Shillings. Impacts are estimated using the average client value and costs from administrative records, and parameter estimates. ¹Results are multiplied by 10. ²Results are multiplied by 1,000.

IBLI clearly has a range of favorable impacts on purchasers and can be shown – in some instances – to be more cost effective than cash transfers.

IBLI can be seen as a promising option for addressing catastrophic drought risk, mitigating against shock-related descent into poverty and promoting ascent

Thank you for time, interest and comments.

For related information, visit ibli.ilri.org/

IBLI Uptake Significant ... But So Is Disadoption

Marsbit survey respondents uptake patterns (n=832)

Sales window	New ¹	Replace- ment ²	Augment- ing ³	Hold- ing⁴	Reenter ⁵	Lapsed ⁶	Total ⁷
J-F 2010	233	0	0	0	0	0	233
J-F 2011	65	62	0	0	0	171	298
A-S 2011	65	0	31	96	22	149	363
A-S 2012	19	25	0	0	33	305	382

¹First time purchasers. ²Replaced a policy about to expire. ³Purchased additional coverage that overlapped with existing coverage. ⁴No purchase but had existing coverage. ⁵Let policy lapse for at least one season but purchased this season. ⁶Past policies have lapsed and did not purchased additional coverage.⁷Total number of households that have purchased to date.

Key determinants of IBLI uptake

General uptake findings — robust across specifications and surveys

Price: Responsive to premium rate (price inelastic). Price elasticity grows w/ design risk.

Design Risk: Design error reduces uptake; greater effect at higher premium rates.
Idiosyncratic Risk: Hh understanding of IBLI increases effect of idiosyncratic risk
Understanding: Extension/marketing improves accuracy of IBLI knowledge but no independent effect of improved understanding on uptake.
Herd size: Likelihood of uptake increasing in HH herd size
Liquidity: IBLI purchase increasing w/HSNP participation and HH savings
Intertemporal Adverse Selection: HHs buy less when expecting good conditions.
Spatial Adverse Selection: HHs in divisions with covariate risk are more likely to purchase and with greater coverage (spatial adverse selection).
Gender: no gender diff in uptake. Women more sensitive to risk of new product.

IBLI Marsabit Contract: An Imperfect Product

Covariate risk is important but household losses vary a lot ...

and the index does not perfectly track covariate losses.



- Only such study of index-insurance products that we know off. Crucial for assessing value and precision of the contract.