Index Based Livestock Insurance
Toward Sustainable Livestock Insurance for Pastoralists

From Research to Practice and Impact

IBLI ADRAS Policy Workshop,
ILRI Nairobi, 9 June 2015
Motivation: Why IBLI?

A SIZEABLE CONSTITUENT

- Over 50 million pastoralists in Sub-Saharan Africa: over 20 million in the Horn of Africa
- In the Horn of Africa: Exports of livestock and livestock products exceed $1 billion annually, 90% of which from pastoral flock.
- In the region, estimated contribution to the livestock economy at 40%

THE CENTRALITY OF LIVESTOCK

- In northern Kenya and Southern Ethiopia:
  - Median pastoralist household holds **100% of their productive assets** in livestock
  - Livestock products and sales of livestock are **40% of income** for average household
  - **15%** of income in the form of **food aid, cash aid** or gifts
Motivation: Why IBLI?

VULNERABILITY TO LIVESTOCK LOSSES
- 75% of livestock losses, among pastoralists, due to drought
- Strong evidence of the asset-based poverty traps putting a premium of productive safety nets
- 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.

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:
- Very high transactions costs, esp. w/little financial intermediation among pastoralists
- Moral hazard/adverse selection

INDEX-BASED LIVESTOCK INSURANCE
- Insurance and independent “index” measure strongly correlated with individual loss
- Better suited to the pastoral production system and risk profile
COMPONENTS OF A SUSTAINABLE INDEX-INSURANCE PROGRAM

1. **Contract design:** Data demands (long term series, reliable, non-manipulable). Contract precision (minimizing “basis risk”, maximizing value)

2. **Evidence of value and impact:** Household level: Welfare improvements, behavioral change. National level: Operational and fiscal efficiency

3. **Establish informed effective demand**, especially among a clientele with little experience with any insurance. Extension, capacity development, marketing.

4. **Low cost delivery mechanisms (supply chain),** to build critical mass of clients/recipients. Sales transactions platforms, information and extension, indemnity payments

5. **Policy and institutional development.** Regulations, oversight, effective public provision etc.
IBLI Contract Design


- **Response Function**: Regress historic livestock mortality data onto transformations of Normalized Differenced Vegetation Index (NDVI) – satellite-based proxy of forage availability

- IBLI Contract is for **Asset Replacement**: Pays out when forage scarcity is predicted to cause livestock deaths in an area.

DATA → Response Function → Index

**Product performance**

- Quality of prediction is highest for more catastrophic drought events
- 85-88% accuracy for average herd losses of at least 20%,
- Even with this subsequent study calls contract precision into question, “basis risk”

Chantarat, Mude, Barrett and Carter (2013, *JRI*)
Upgrading IBLI Model for Scale Out

- **ALRMP Livestock Mortality Data** – increasing gaps beyond Marsabit
- Employ **spatial methods** to estimate district/division-specific index response functions
  - Missing mortality observations will be filled in using spatial indexing scheme
  - Spatial lag model of estimate optimal response function

- **Rolled Out** in August 2013
  - APA Insurance – Isiolo
  - Takaful Insurance of Africa – Wajir

- Deficiencies in precision – overestimated losses in March 2014

Woodard, Shee, Mude (2014, JRI under review)
NDVI-based Forage Scarcity contracts

- Complexity of design, data scarcity, and precision concern resulted in a move to NDVI-only contracts.
  - Area-average seasonal availability of forage (NDVI) compared to historical seasons.

- First employed in Borena, S. Ethiopia from July 2012 by Oromia Insurance Company (no livestock mortality data)
  - Easier to explain, seemingly more precise, very easy to scale up
  - Planned to transition in Kenya

- Fast-track due to demands of the Kenya Livestock Insurance Program (KLIP) and collaboration with World Bank

- New Kenya Contract: **Asset Protection** – intervention prior to mortality
  - Payout at the beginning of the dry season rather than the end
  - Insured unit: cost to keep livestock alive during drought
  - APA Insurance (Marsabit and Isiolo), Takaful Insurance of Africa (Wajir, Isiolo, Mandera, Garissa) launched asset protection contracts in January 2015

- Greater attention to the science of remote sensing

Vrieling, Meroni, Shee, Mude, Woodard, and de Bie Rambold (2014, *IAEOG*)
Vrieling, Meroni, Mude, Chantarat, Ummenhofer and de Bie Kees (2015)
Taking IBLI to the Ground

Sounds like a good idea: Is it something pastoralists will really want, value or pay for?

Introduction to IBLI Using Experimental Games

• Innovative way to introduce novel and complex concept to unfamiliar population
• Designed experimental game structured on the pastoral production system
• Pastoralists were eager and game increased understanding and confirmed to researchers that it would be possible to explain

McPeak, Chantarat, and Mude (2010, AFR)

Investigating Demand and Willingness to Pay

• Survey, prior to and just after game to study willingness to pay
• Preliminary results showed strong willingness
• Slightly more that 30% were willing to pay at least the fair price of IBLI; wealthier hhs willing to pay more.

Chantarat, Mude, and Barrett (2009)
Pastoralists seem keen and willing: How to provision?

**IBLI Institutions Feasibility Study**

- How might IBLI complement or compete with existing risk-management practices?
- Is the current institutional and policy environment favourable to an IBLI-type product/program.
- Efforts to understand the various network of stakeholders and institutions that would be relevant and willing

Matsaert, Kariuki and Mude (2011, *DIP*)

**Rallying the troops**

- Building a coalition of partners (insurance companies, technical partners, GoK, donors, NGOs....)
- Launch of pilot in Marsabit 2010
Implementation of IBLI is a joint effort between ILRI (with support of its technical and development partners), commercial underwriters and implementing partners on the ground (government, NGOs, CBOs etc).
Implementing IBLI: Challenges and Debates

- Initial push for commercial sustainability was met with the challenge of low sales.
- Variety of reasons for low sales: Implementation is complex and more still with microinsurance in the challenging terrain of N. Kenya and Southern Ethiopia.
- Can we get to a critical mass of IBLI adoption necessary for sustaining the industry without consistent public support at the early stages?
International experience shows that agricultural insurance programs that have scaled up have strong public and private sector pillars, as part of overall agriculture risk management strategy.

Research showing positive social and economic impacts provide some justification for public support.
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

Legend
- Green: Borana Survey Kebeles
- Light Green: Borana Zone
- Dark Blue: Marsabit Survey Sublocations
- Light Blue: Marsabit District
Marsbit survey respondents uptake patterns (n=832)

<table>
<thead>
<tr>
<th>Sales window</th>
<th>New¹</th>
<th>Replace-ment²</th>
<th>Augment-ing³</th>
<th>Holding⁴</th>
<th>Reenter⁵</th>
<th>Lapsed⁶</th>
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<td>298</td>
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<td>31</td>
<td>96</td>
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<td>25</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>305</td>
<td>382</td>
</tr>
</tbody>
</table>

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 purchase 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.

Bageant 2014; Jensen, Mude & Barrett 2014; Takahashi et al. 2014
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.

Jensen, Barrett & Mude 2014
IBLI Impacts: Production

In spite of the incomplete coverage IBLI provides ("basis risk"), there are strong indications that it benefits – or would benefit – most households.

• 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 covered households increase investments in maintaining livestock through procurement of veterinary and vaccination services and reduce herd sizes

• IBLI covered households experience improved production outcomes: increases milk productivity of livestock and the total value of milk produce

Jensen, Barrett & Mude 2014
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 necessarily 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%

Jensen, Barrett & Mude 2014
Kenya Livestock Insurance Program and IBLI

IBLI contributions to KLIP

• Situational Analysis for a National Agricultural Insurance Policy (NAIP)
• Working closely with the World Bank team with contributions to key outputs
• Leading role in Contract Design
• Supporting on Operations and Implementation
• Been requested to help develop Extension and Capacity Development tools

Program Complementarities and Strategic Approach

• Program intention is similar: proactive risk management support to vulnerable pastoralists
• Bring in considerable expertise and policy making authority (can catalyze development of sustainable IBLI program)
• **RISK 1:** Crowding out private demand and willingness to pay
• **RISK 2:** Political considerations out-of-sync with operational and technical requirements
Commercial Companies Gaining Momentum

- Even as GoK is committed to scaling up IBLI in the form of KLIP, IBLI sales have been gaining momentum

- Range of factors could have contributed to this:
  - Continued efforts on information provision, extension, marketing paying off?
  - Forage Scarcity and Asset protection appears to be easier to explain and more compelling
  - APA – community dialogue, corporate social responsibility
  - Takaful – scaling up, revised agency structure
  - Continued support of key partners

![Contracts Purchased - TIA](image1)
![Contracts Purchased - APA](image2)
From Research to Practice and Impact...and back again
Many thanks for your support and interest

For related information, visit www.ilri.org/ibli