Market-provisioned social protection: The Index-based Livestock Insurance (IBLI) Experiment in Northern Kenya

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Motivation for IBLI

Arid and semi-arid lands (ASAL) cover ~ 2/3 of Africa, home to ~20mn pastoralists – who rely on extensive livestock grazing.

Pastoralist systems adapted to variable climate, but very vulnerable to severe drought events. Big herd losses cause humanitarian crisis.

This prompted a DfID-funded cash transfer program paying ~ $15/indigent family/month.

Our question: might $7/ year for catastrophic herd loss insurance keep vulnerable families from becoming indigent? A market-based form of social protection?

Piloting IBLI in Northern Kenya

- But can insurance be sustainably offered in rangelands?
- Conventional (individual) insurance unlikely to work:
  - Transactions costs
  - Moral hazard/adverse selection
- Index insurance avoids problems that make individual insurance unprofitable for small, remote clients:
  - 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
- Index insurance can, in principle, be used to create an effective safety net to alter poverty dynamics and help address broad-scale shocks.

New commercial Index-Based Livestock Insurance (IBLI) product launched commercially in January 2010 in Marsabit District in northern Kenya. Two periods of IBLI retail sales (Jan-Feb 2010 & 2011).

Described in an online video: http://blip.tv/file/3757148

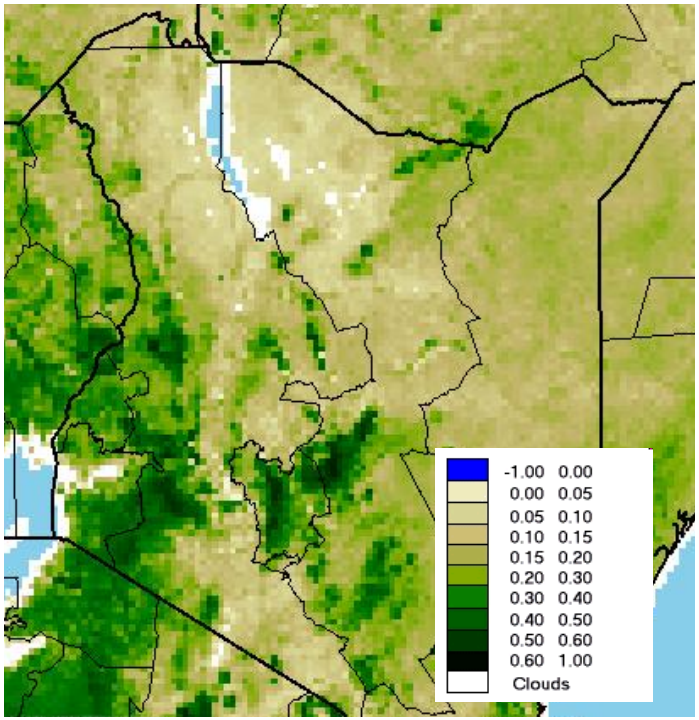
Based on technical design developed at Cornell using multiple longitudinal household data sets; refined and led in the field by the International Livestock Research Institute (ILRI) in collaboration with various university and private sector partners.

Now being adapted and extended to Ethiopia and expanded to other ASAL districts in Kenya, all led by ILRI, with support from USAID, DfID, EU, World Bank, etc.

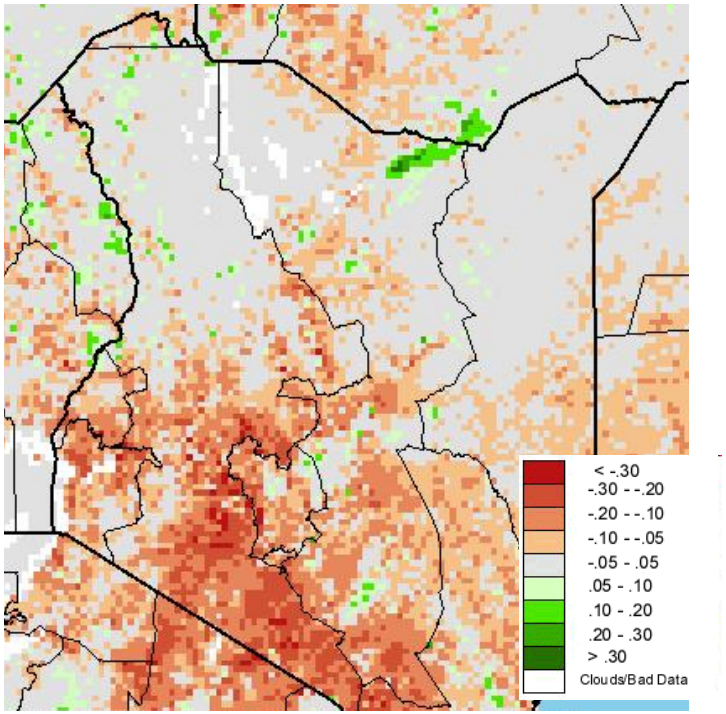
Designing IBLI for Northern Kenya

IBLI insures against area average herd loss predicted based on NDVI data fitted to past livestock mortality data.

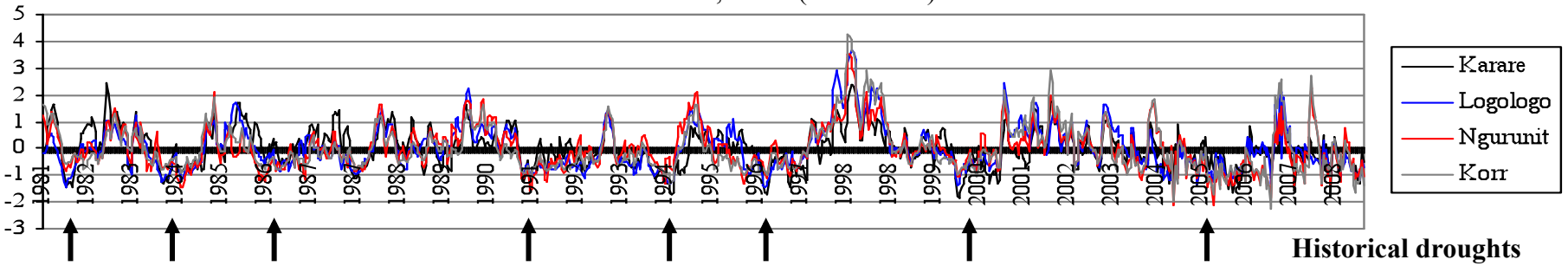
NDVI (Feb 2009, Dekad 3)



ZNDVI: Deviation of NDVI from long-term average



Laisamis Cluster, zndvi (1982-2008)



NASA NDVI Image Produced By: USGS-EROS Data Center. Source: FEWS-NET

NDVI-based Livestock Mortality Index

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

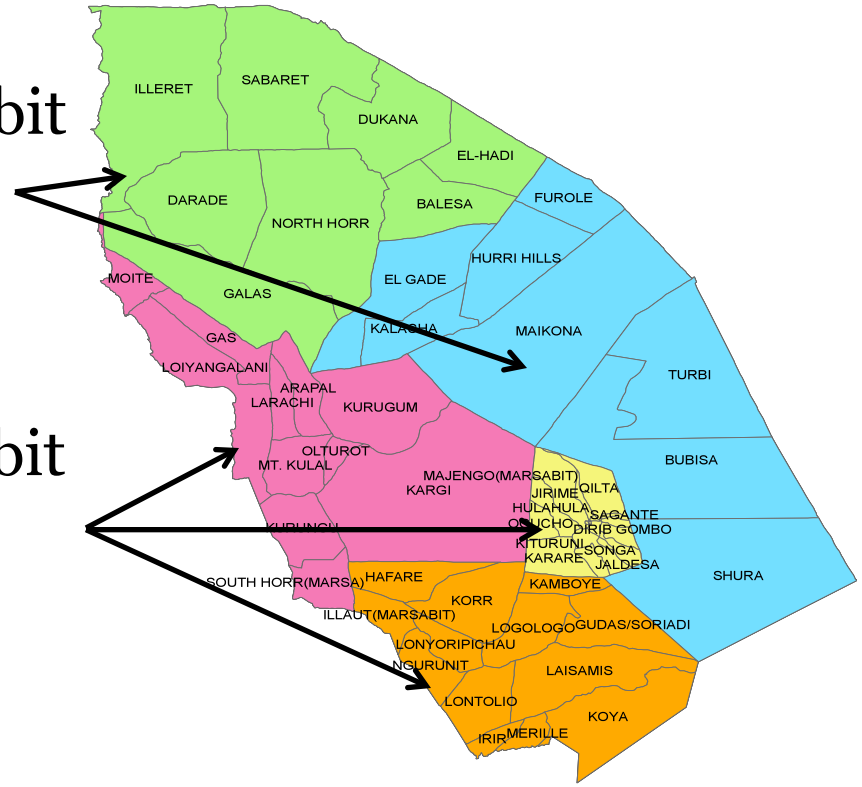
$$M_{ls} = M_g(ndvi) + \varepsilon_{gls} \quad \text{if good climate regime } (Czndvi\_pos_{ls} \geq 0)$$
$$M_{ls} = M_b(ndvi) + \varepsilon_{bls} \quad \text{if bad climate regime } (Czndvi\_pos_{ls} < 0)$$

Spatial Coverage

- Two separate area-specific “response functions” map NDVI into predicted livestock mortality.
- Five separate index coverage regions (2 in one area, 3 in the other).

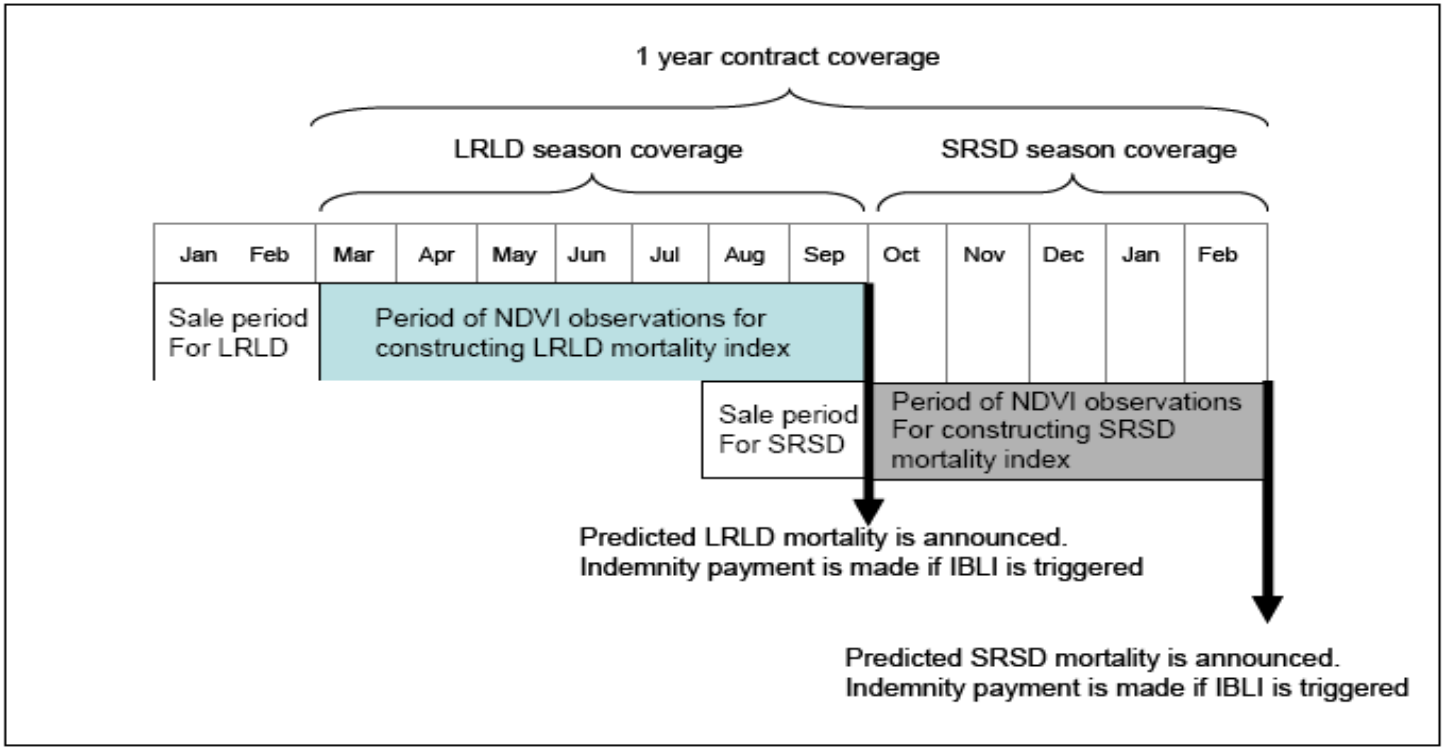
Upper Marsabit cluster

Lower Marsabit cluster



Temporal Coverage

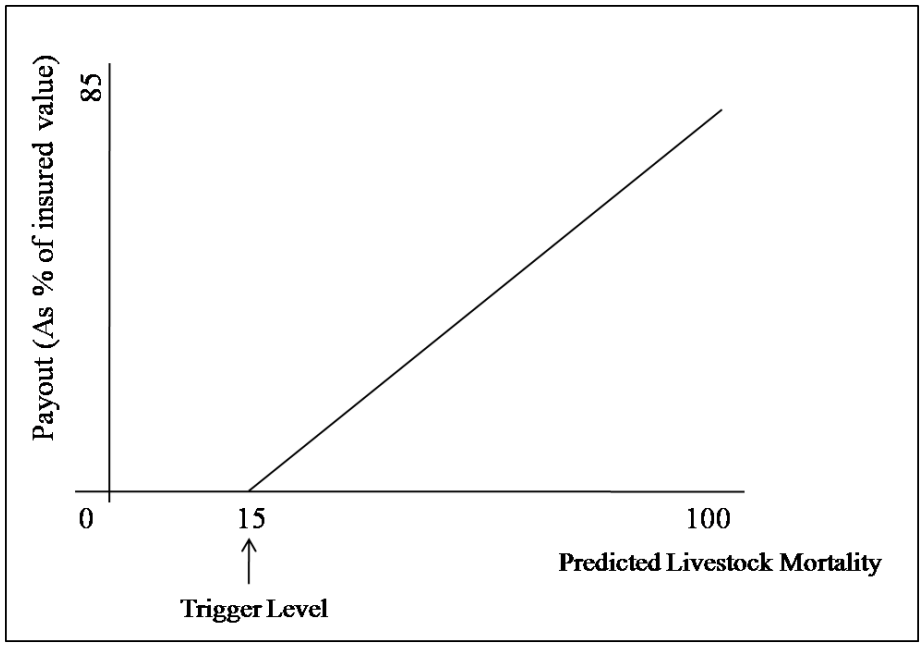
- Year-long contract, with two prospective indemnity payment dates, following each dry season.
- Two marketing campaigns, just prior to rainy season.
- NDVI observed and index updated continuously.



Risk Coverage and Pricing

Payoffs for predicted losses above 15% (“strike point”).

Trade off: Higher Strike → Lower Risk Coverage → Lower Cost

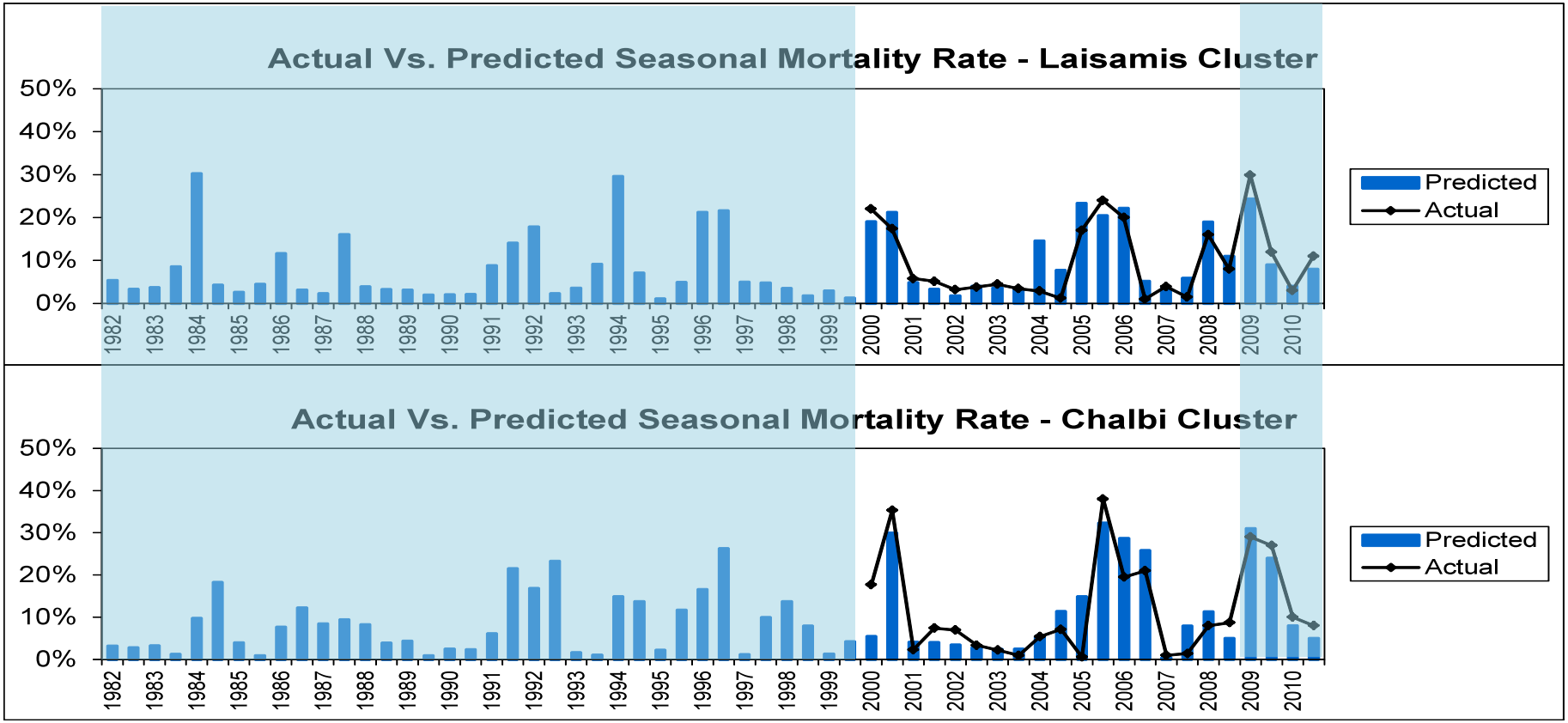


Contract Cluster	Consumer Price
Upper Marsabit	5.5%
Lower Marsabit	3.25%

Testing the Index Performance

Performance of predicted herd mortality rate in predicting area-average livestock mortality observed in longitudinal data

- Out-of-sample prediction errors within 10% (especially in bad years)
- Predicts historical droughts well



IBLI Implementation

Commercially launched in January 2010

<u>Two sales periods of varying experience</u>:

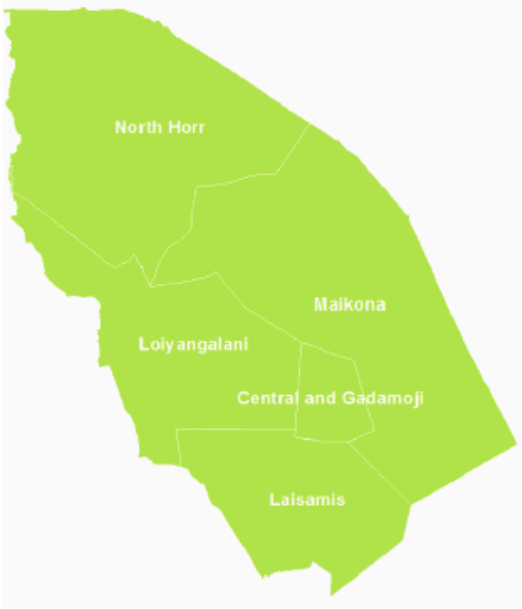
- Jan/Feb 2010: Sold 1979 contracts. 2.8 TLU insured/contract. Premiums collected ~ $46,597. Value of livestock covered ~ $1,200,000
- Jan/Feb 2011: Sold 638 contracts. 1.7 TLU insured/contract. Premiums collected ~ $8,185 Value of livestock covered ~$218,000

<u>Key ongoing considerations/challenges</u>:

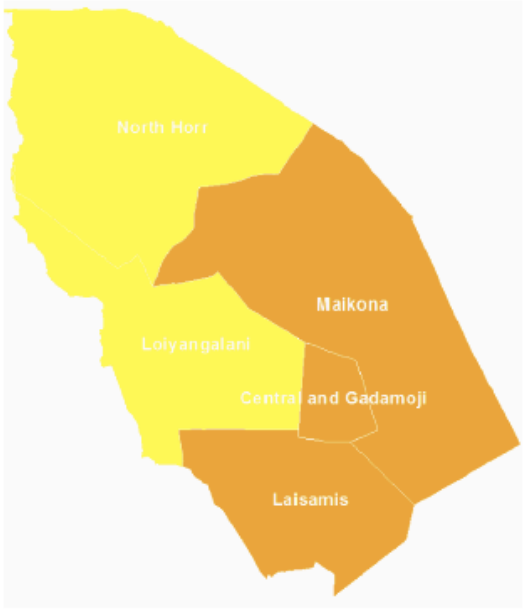
- Delivery Channel
- Extension/Education
- Information Dissemination and Trust Building
- Regulation

Likely first indemnity payout coming in a few weeks!

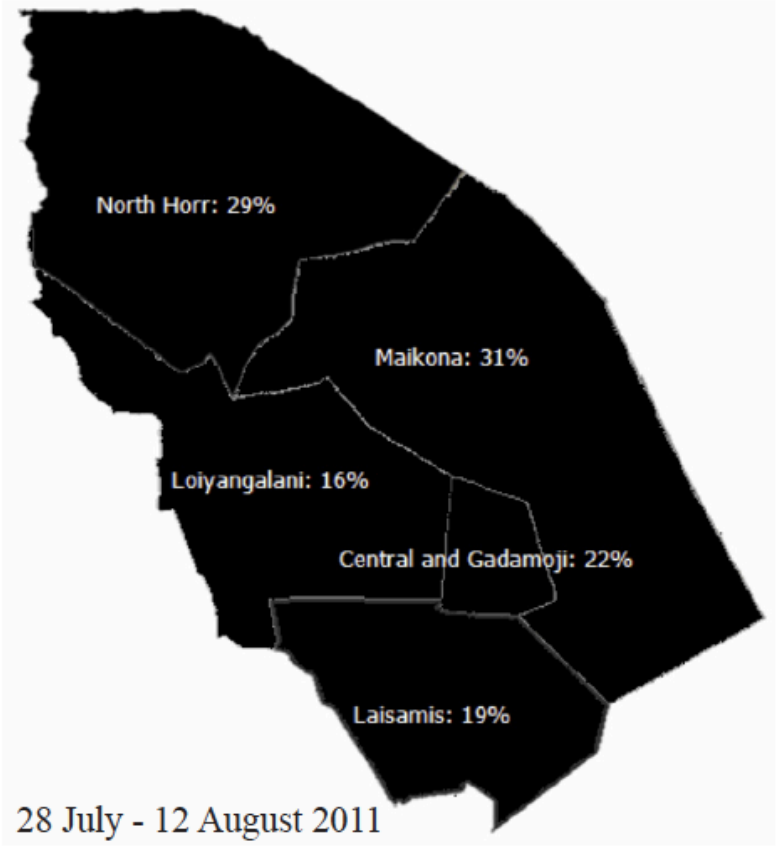
Figure 1: IBLI Index Readings and Color Legend



October 2010



March 2011



28 July - 12 August 2011

Green	**Good Regime Stable:** Here, the division in question is within a good regime and is characterized as stable. This means that the forage conditions are above normal and are either improving or at least have not worsened over two consecutive months. Index readings do not relate to livestock mortality due to forage scarcity.
Yellow	**Good Regime Worsening:** While the division in question is characterized by better than average forage cover over the past year, the situation has been consistently worsening within the past two months (that is to say that the past two months the forage situation has been lower than the long run average). Index readings do not relate to livestock mortality due to forage scarcity.
Orange	**Bad Regime Moderate:** The sum of forage available over the past year has dropped below the long-run average. However, while the division in question is under considerable stress, the model **predicts less than 10% average livestock mortality**. At these levels the model is not as accurate in predicting losses as they are not yet widespread.
Red	**Bad Regime Accute:** Average livestock deaths predicted to be **between 10 and 15%**. At this level, model predictions become more precise. The situation is quite serious but not yet classified as severe. Indemnity payout will not be triggered and individuals are expected to cater to this level of losses.
Black	**Bad Regime Severe:** The drought is now severe. Forage scarcity has been pronounced over a long period and greater than 15% of livestock in the area are predicted to have died. Indemnity payout will be triggered if conditions persist throughout the season up to the potential payout period.

Impact Evaluation Under Way

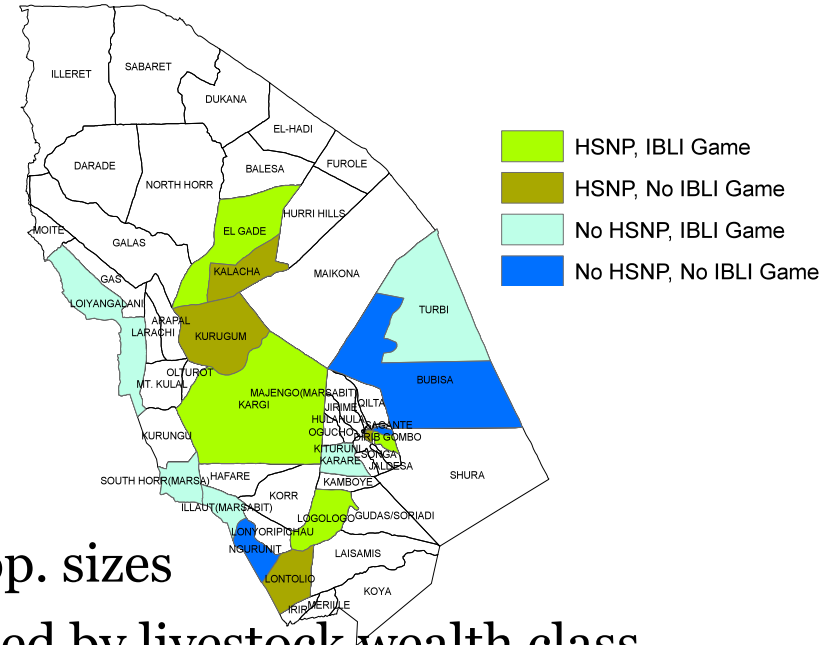
Confounding factor: ongoing implementation of cash transfer (HSNP)

Encouragement design

•Insurance education game: played among 50% sample in game site

•Discount coupon on the first 15 TLU insured: (no subsidy for 40% of sample, 10%-60% subsidies for the rest). 255/924 bought IBLI 1st year.

	IBLI Game	No IBLI Game
HSNP	4 sites	4 sites
No HSNP	5 sites	3 control sites



- **Sample selection: 924 households**
  - Sample/site proportional to relative pop. sizes
  - For each site, random sampling stratified by livestock wealth class
  - Annual repeat survey: 2009, 2010, 2011 round about to go into field.

Core impact evaluation questions

1) For whom is IBLI most attractive and effective?

- simulation-based answer: IBLI most valuable among the vulnerable non-poor

- simulation-based and WTP survey based answer: Highly price elastic demand for IBLI

2) Does IBLI induce increased asset accumulation and escapes from poverty? Does it reduce asset loss and falls into poverty? How does it perform relative to cash transfers? Are there spillover effects on the stockless poor?

- simulation-based answers: Yes on first two points. Don't know on latter two questions.

Use survey data to test these hypotheses in quasi-experimental setting with real insurance in a survey designed to test IBLI versus/with cash transfers under Kenya's new Hunger Safety Nets Program.

What we are learning

- A considerable lack of understanding amongst a good portion of those who purchased (e.g., 33-48% of policy holders don't know or are incorrect about basic contract terms).
  - So why do they purchase?
  - What are the implications of this misinformed demand?
- Nevertheless, those who purchase are significantly more likely to understand key features of the product.
  - Improve on extension messaging and targeting?
  - Need further analysis on relationship between understanding and other key covariates.
- Relative to more costly games, VIPs doing well.
- Communication needs to be about index variable (predicted mortality rates), not input (range conditions).

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

BASIS
AMA Collaborative Research Support Program

Cornell University

Maxwell School of Syracuse University

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