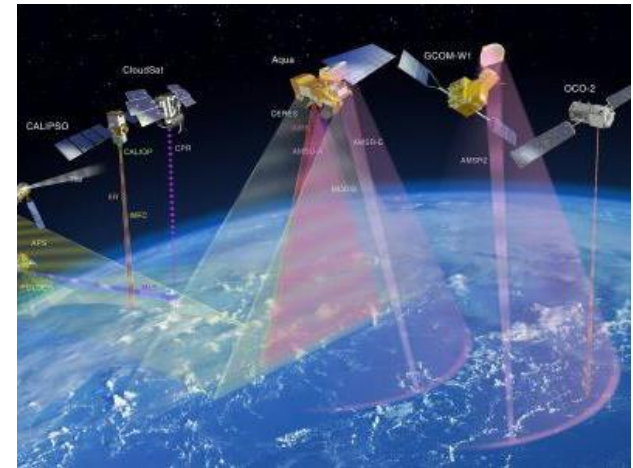


Towards Evidence-Based and Data-Informed Policies and Practice:

The case of the Index-Based Livestock Insurance (IBLI) in Kenya and Ethiopia

*Andrew Mude, IBLI Program Lead,
International Livestock Research Institute*



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 \$1billion 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



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.

WHY IBLI

INDEX-BASED LIVESTOCK INSURANCE

- ❑ Insurance and independent “index” measure strongly correlated with individual loss
- ❑ Better suited to the pastoral production system and risk profile
- ❑ Lower transaction costs, moral hazard issues than conventional insurance

Sustainable insurance can:

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



IBLI Program Summary

- IBLI R&D agenda, supported by a range of donors, has been comprehensive and contributed to catalyzing a nascent but growing industry.
- Program launched in 2008 to offer a timely, sustainable, safety net against catastrophic drought shocks on pastoralists.
- 2011 drought triggered contracts in all covered areas serving as an important proof-of-concept indicator.
- 2012 initial pilot launch in Southern Ethiopia. 2013 IBLI began to scale in Kenya beyond pilot site in Marsabit
- Rigorous IBLI impact assessments have revealed considerable socioeconomic and behavioral benefits drawing policy and development partner support.
- Government of Kenya has committed to scaling up IBLI under the Kenya Livestock Insurance Program (KLIP).
- March 2017, KLIP/IBLI paid out over Ksh225 million to 12,500 households representing close to 90% of insured households. 25% of these received the maximum payment possible for short rains failure.
- Work remains to ensure efficient and sustainable large scale coverage

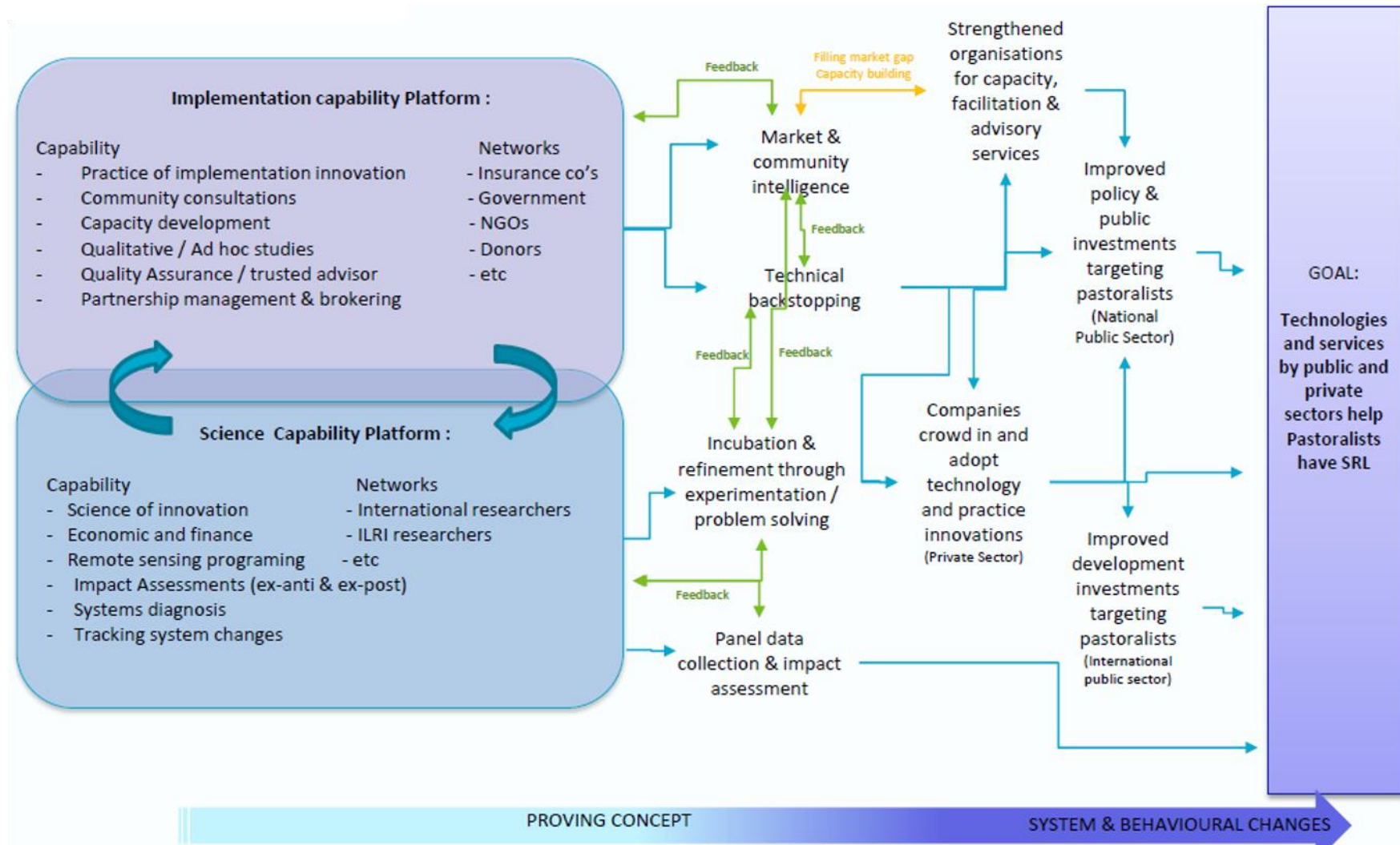


Components of a Sustainable Index-Insurance Program

- 1. Precise contract design;**
- 2. Evidence of value and impact;**
- 3. Establishing informed effective demand;**
- 4. Low cost, efficient supply chain;**
- 5. Policy and institutional infrastructure.**



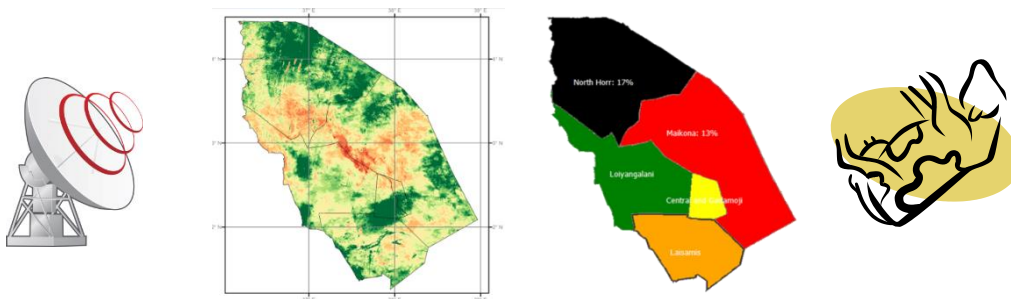
IBLI Theory of Change



Precise Contract Design – Constructing the IBLI Index

Initial Pilot Contract: Based on actual risk data.

- **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.



Product performance

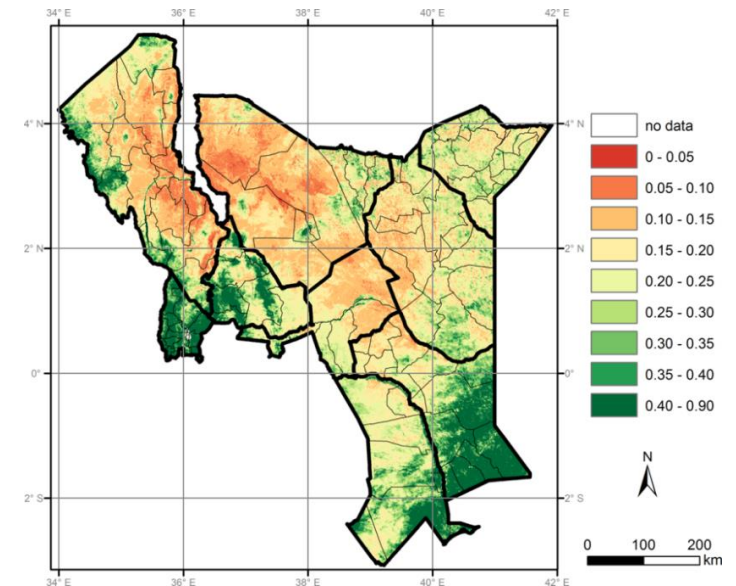
- Quality of prediction is highest for more catastrophic drought events
- 85-88% accuracy for average herd losses of at least 20%,
- Even with this, subsequent study calls contract precision into question, “basis risk”

Chantararat, Mude, Barrett and Carter (2013, *JRI*)

Precise Contract Design – Constructing the IBLI Index

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

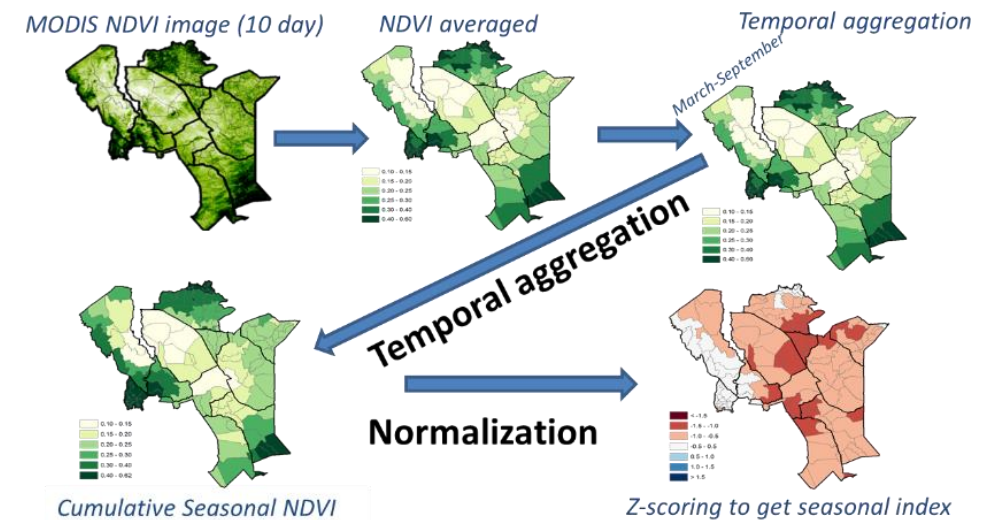


Woodard, Shee, and Mude (2016, *GPRI*)

Precise Contract Design – Constructing the IBLI Index

NDVI-based Forage Scarcity index: Leveraging remote sensing science

- 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, more precise, very easy to scale up
- Forage scarcity index allowed next generation contracts:
The Asset Protection Contract – intervention prior to mortality
 - Payout at the beginning of the dry season rather than the end. Preferred by clients and insurance companies alike.
 - Insured unit: cost to keep livestock alive during drought.
 - Launched first in Kenya through APA Insurance (Marsabit and Isiolo), Takaful Insurance of Africa (Wajir, Isiolo, Mandera, Garissa) in Jan 2015
 - All IBLI contracts in Kenya and Ethiopia now **asset protection**.



Vrieling, Meroni, Shee, Mude, Woodard, and de Bie Rambold (2014, *IJAEOG*)

Vrieling, Meroni, Mude, Chantararat, Ummenhofer and de Bie Kees(2015)

Precise Contract Design – Ensuring effective risk coverage

Parameterizing the contract is the critical next step after index construction to ensure effective risk coverage for the target population

Geographic Coverage – Delineating Index Units

- Should be representative of how the risk covered manifests itself in the production system and for the target population.
- Must take into account operational, administrative and practical considerations.

Temporal Coverage – Setting out potential payout periods

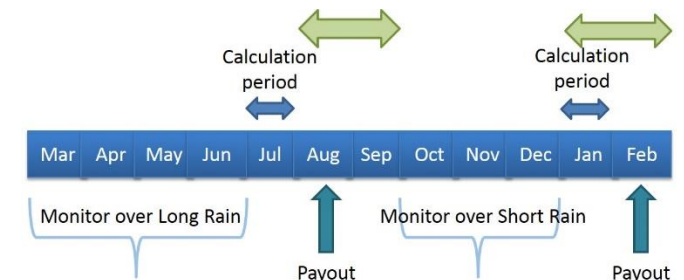
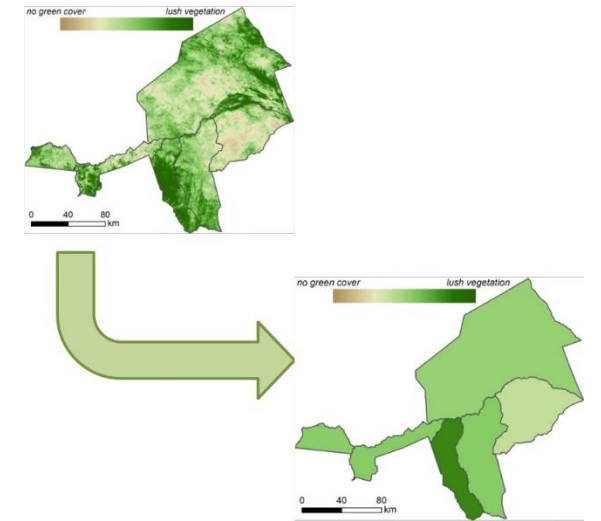
- Dependent on the seasonality, production system, timing of risk impact and need etc...

Fitting the index to the risk

- There are numerous ways to generate the index from NDVI (averaging across space, cumulating across time, standardizing, filtering,) and the various steps, and their sequencing, have a bearing on the index reading and thus risk coverage

Pricing (Payout Structure, Payout Frequency)

- Risk coverage should be sufficient; reinsurance loadings need to be brought down considerably; premium subsidy structure needs careful thought.



Precise Contract Design – Outstanding Issues and Research Questions

- How can we improve the information content of remote sensing indicators beyond biomass availability?
- Can new technologies help supporting the collection of ground truth/validation data?
- How to guarantee long-term RS data continuity with changing Earth Observation platforms and sensors?

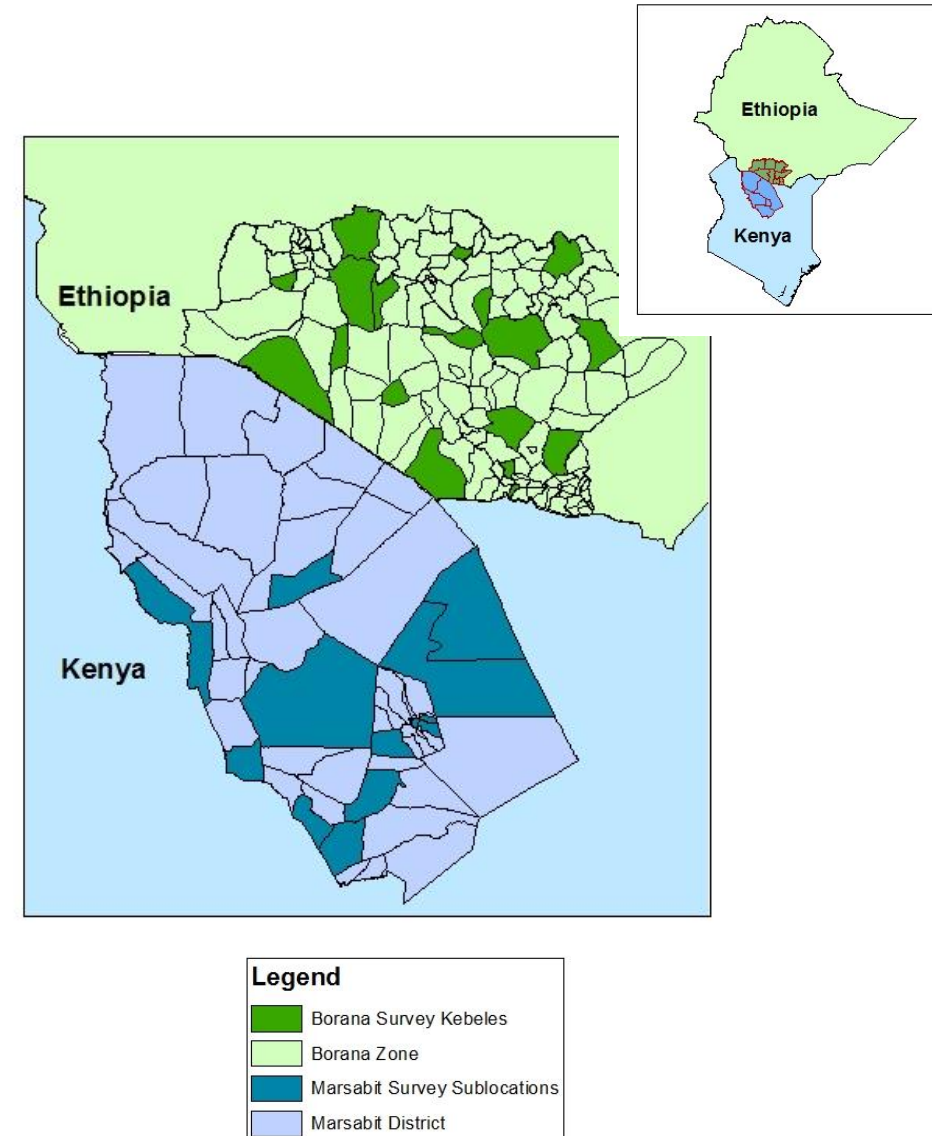
HOW TO GUARANTEE OR ASSESS THE QUALITY OF INDEX INSURANCE PRODUCTS

- Growing proliferation of Index Insurance Products/Contracts. No clear signal of product quality or risk-protection value (insurance or lottery).
- Lack of clear mechanism for distinguishing quality offers disincentive for designing high value contract

Critical need for developing standard, universally accepted metrics for identifying and signaling product quality (e.g., bond rating agency) (Jensen and Barrett, 2016 *AEPP*)

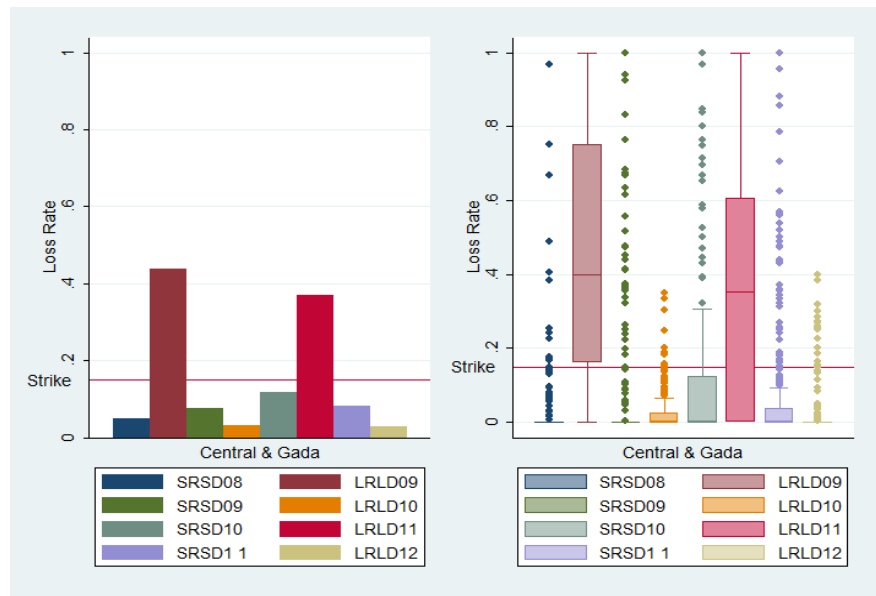
Evidence of Impact and Value

- Given the increasing interest in index-insurance for agricultural risk management want to ensure from the outset that we could rigorously measure IBLI impacts on key socioeconomic indicators
- Established a multi-year evaluation infrastructure based on panel household data.
- 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
- Research Design based on a price inducement (varying levels of discount coupons) and an information encouragement (extension games) to identify impact

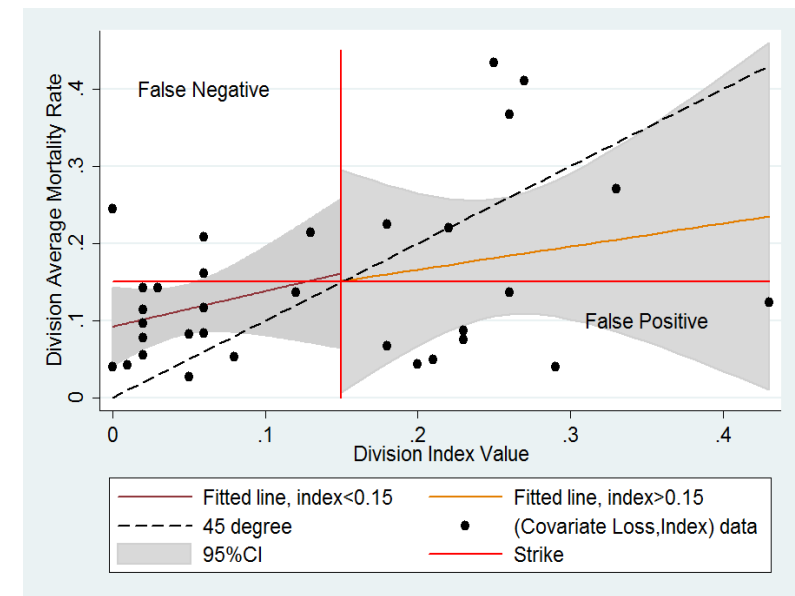


Evidence of Impact and Value – assessing “basis risk”

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.

Evidence of Impact and Value – Production, Behavioral and Welfare Impacts

Despite incomplete coverage, strong indications that IBLI benefits most households

- Even at unsubsidized premiums (40% loading) purchasing IBLI **increase herd survival rates** by reducing risk of catastrophic loss
- IBLI covered households:
 - increase investments in maintaining livestock through procurement of veterinary and vaccination services
 - experience improved production outcomes: increases milk productivity and the value of milk produce
- IBLI shown to have a **positive impact on improvements** to mid-upper arm circumference (MUAC), a strong predictor of **child malnutrition**
- **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

Evidence of Impact and Value – Coping, Social Production, and Public Provision

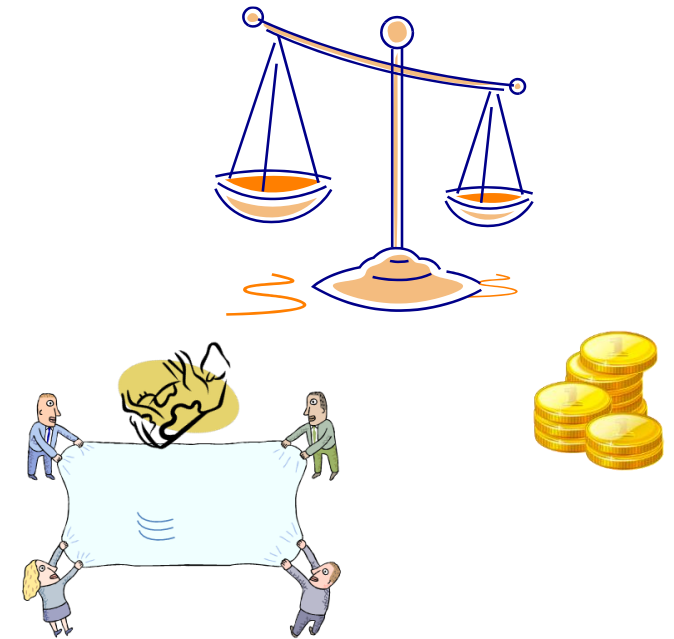
- **IBLI improves post-drought coping.** After catastrophic 2011 drought, IBLI covered households reported better expected behaviours/outcomes
 - **36% reduction in likelihood of distress livestock sales**, especially (64%) among modestly better-off HHs (>8.4 TLU)
 - **25% reduction in likelihood of reducing meals** as a coping strategy, especially (43%) among those with small or no herds
- Positive IBLI impacts do not necessary justify investing scarce development or social protection funds in IBLI. What is opportunity cost vis-à-vis comparative interventions (HSNP – Cash Transfer Program)?

Research Design in Kenya strategically overlaid with HSNP

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%



(Chantararat, Mude, Barrett & Turvey 2017, *World Development*)
(Jensen, Barrett & Mude 2016, *Cornell Working paper*)

Establishing Informed Effective Demand

TWO KEY ELEMENTS

Initial **appropriate targeting of risk and program coverage areas** are critical. Are there credible reasons for expecting sufficient and scalable demand?

Capacity Building, Training, Extension and Marketing. Need for developing learning tools and building the capacity of the range of service providers and stakeholders. Generating informed demand requires product awareness and understanding.

Establishing Informed Effective Demand

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, & 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 than 30% were willing to pay at least the fair price of IBLI; wealthier hhs willing to pay more.
- Study undertaken in 2008. Two worst drought years in past two decades in 2009, and 2011

(Chantarat, Mude, and Barrett, 2009)



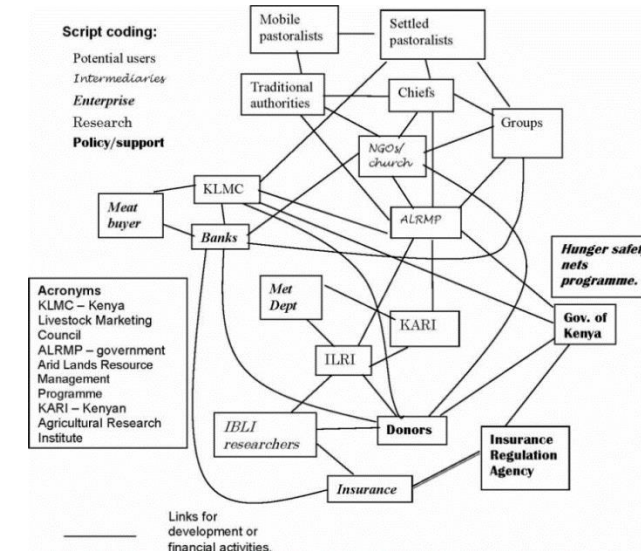
Establishing Informed Effective Demand

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, government, donors, regulators, NGOs....)
- Network of key institutions involved, regardless of configuration (commercially driven, PPP, publically funded) required for launch...and more so for scale thereafter

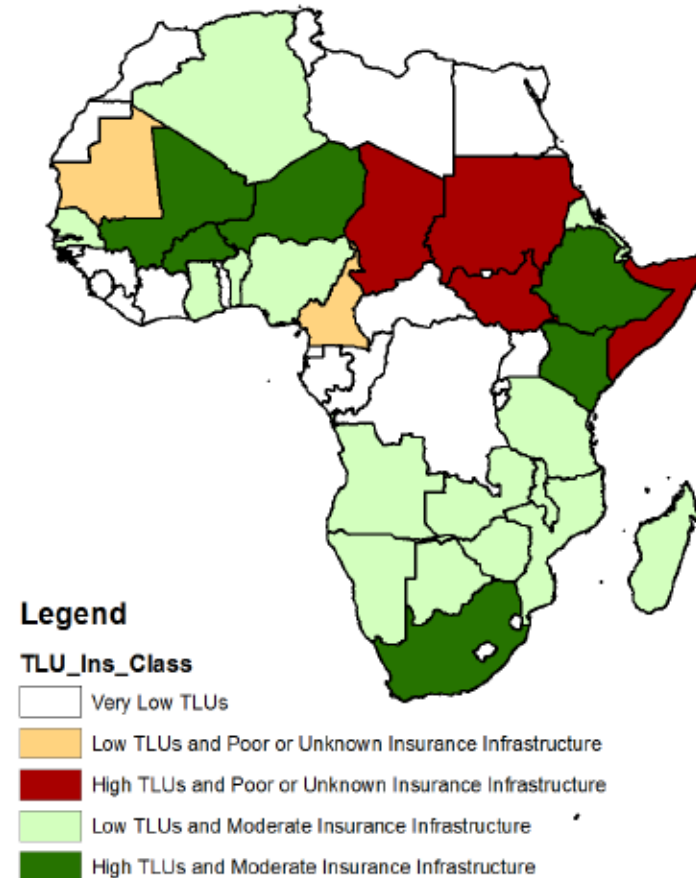


Establishing Informed Effective Demand

- To date, and increasingly so as index insurance programs proliferate, selection of program target locations has been largely opportunistic.
- As increasing resources are applied, and to increase the likelihood of sustainable scaling, it may be necessary to move toward **impacts based targeting** – strategic selection of program development to target areas with high likelihood of impact and demand.
- General prerequisites for index insurance product impact;
 - Target population vulnerable to systematic, quantifiable and covariate risk
 - Risk is spatially correlated
 - Available (or potentially available) insurance and delivery infrastructure

(Jensen and Barrett, 2016 *AEPP*)

Africa Classification for IBLI “Demand Domain”



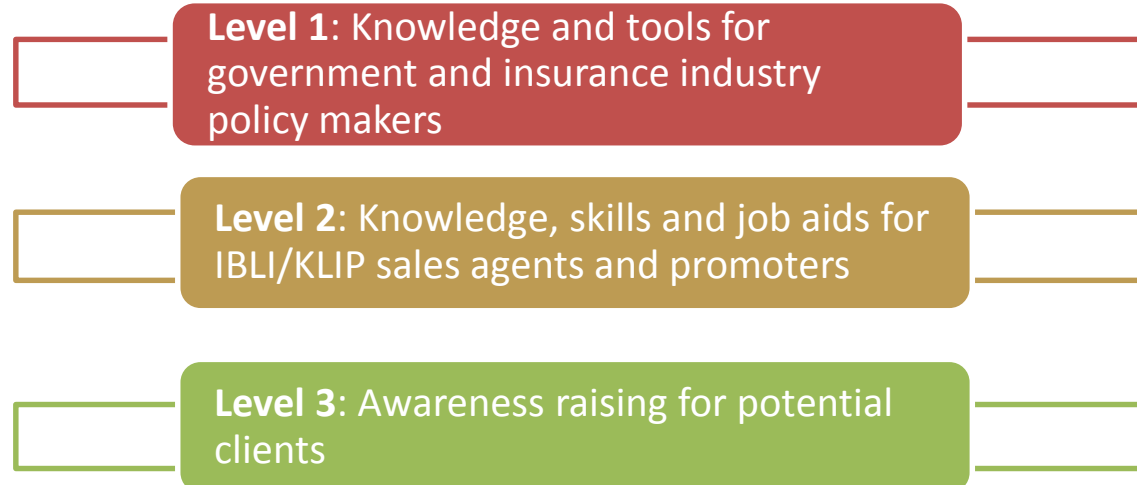
(Mills et al., 2015 Cornell Working Paper)

Establishing Informed Effective Demand

CAPACITY DEVELOPMENT, TRAINING, EXTENSION, MARKETING

- Across the delivery chain – insurance underwriters, implementing partners, government agencies, regulators, extension and sales agents, - need to have a clear understanding of their roles, and to develop the capacities to execute them effectively
- Fundamentally, for sustainable scale, the client needs to understand the product and trust the delivery mechanism.

IBLIs CAPACITY DEVELOPMENT STRATEGY



Establishing Informed Effective Demand

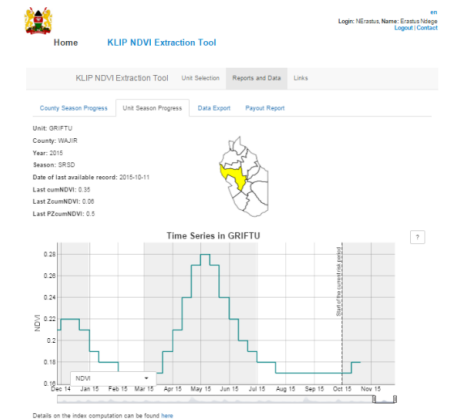
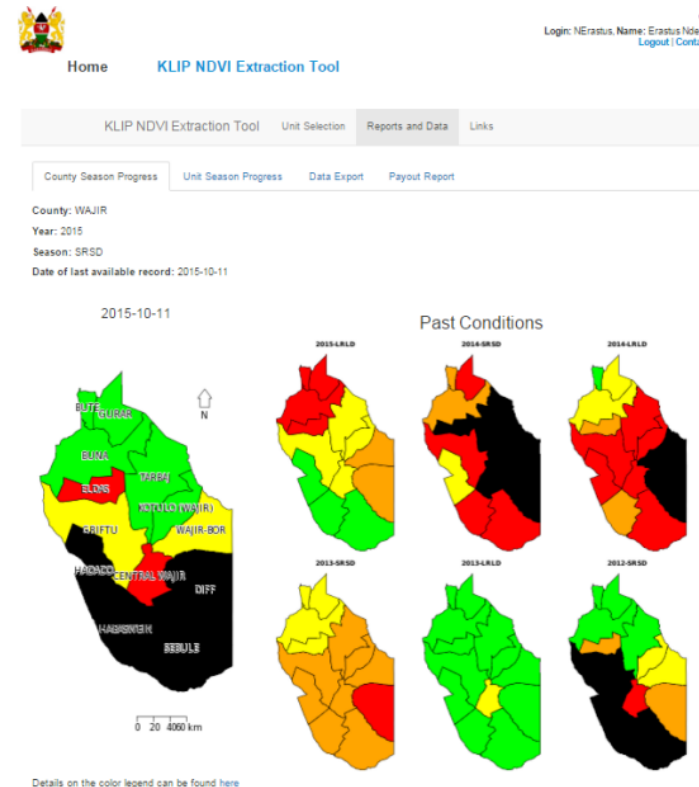
Level 1: Knowledge and tools for government and insurance industry policy makers

Automated IBLI Contract Design Tool

- Facilitates ease of contract design parameterization and historical assessment, enabling faster capacity uptake of insurers, regulators etc.
- Automation and integration with other contract development processes (index calculation, information dissemination...) would increase efficiencies and facilitate cost effective scale.

Digital Platforms

- For a range of learning, tracking, regulating, and capacity development processes



Establishing Informed Effective Demand

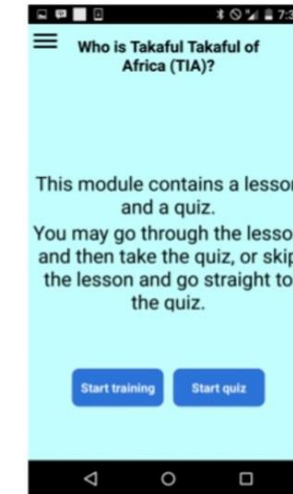
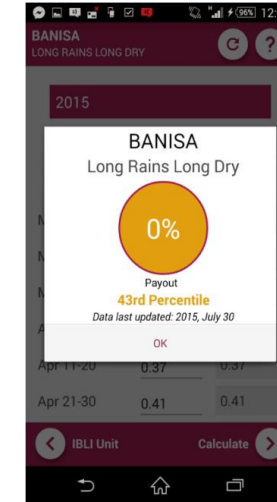
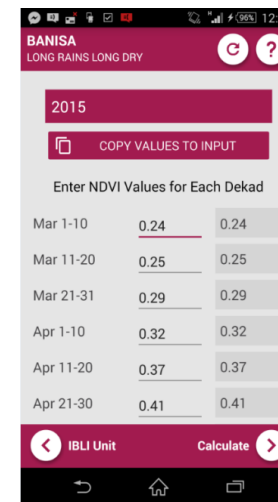
Level 2: Knowledge, skills and job aids for IBLI sales agents and KLIP promoters

Whole range of learning tools

- Training of trainers manuals, quick reference guides, sales and marketing tools

For effectively reaching scale, require standardized, cost-effective tools...leverage developments in ICT based instructional design

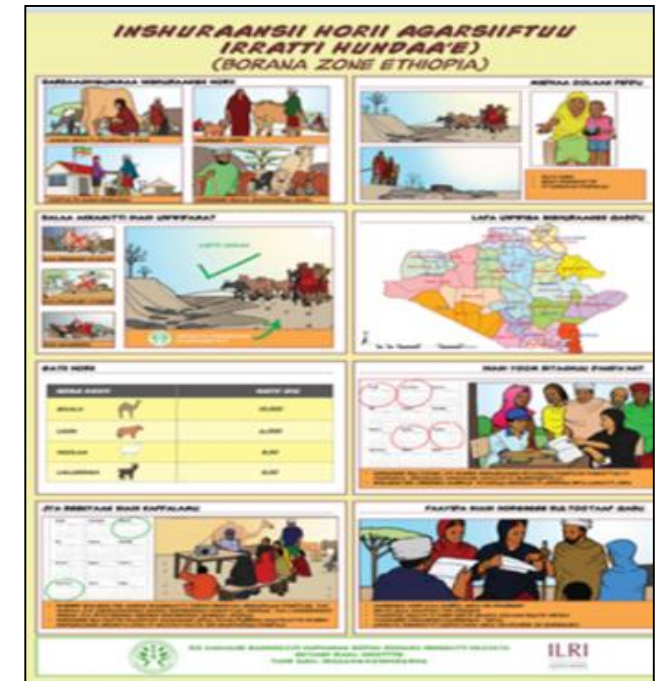
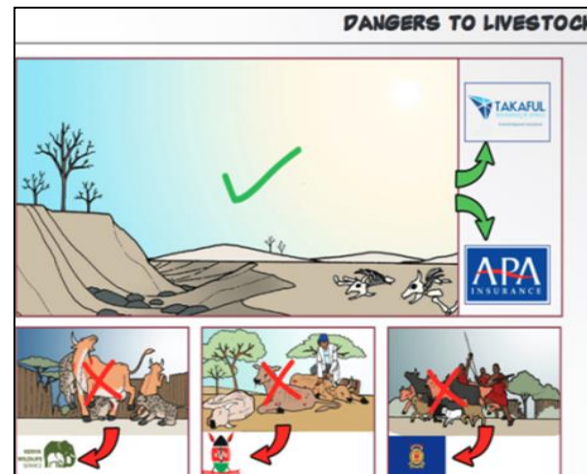
- IBLI e-Learning curriculum
- IBLI Digital learning aids
- IBLI mobile learning applications
- Etc...
 - Allows for wide accessibility with customizable features.
 - Learning assessments, performance tracking, impact testing, incentive delivery (gamification)



Establishing Informed Effective Demand

Level 3: Awareness training for potential clients

- Radio talkback shows
- Extension videos
- Cartoons
- Posters
- Village *barazas*
- Village credit and savings groups
- Communications strategy review being undertaken



Low Cost, Efficient, Delivery Mechanisms

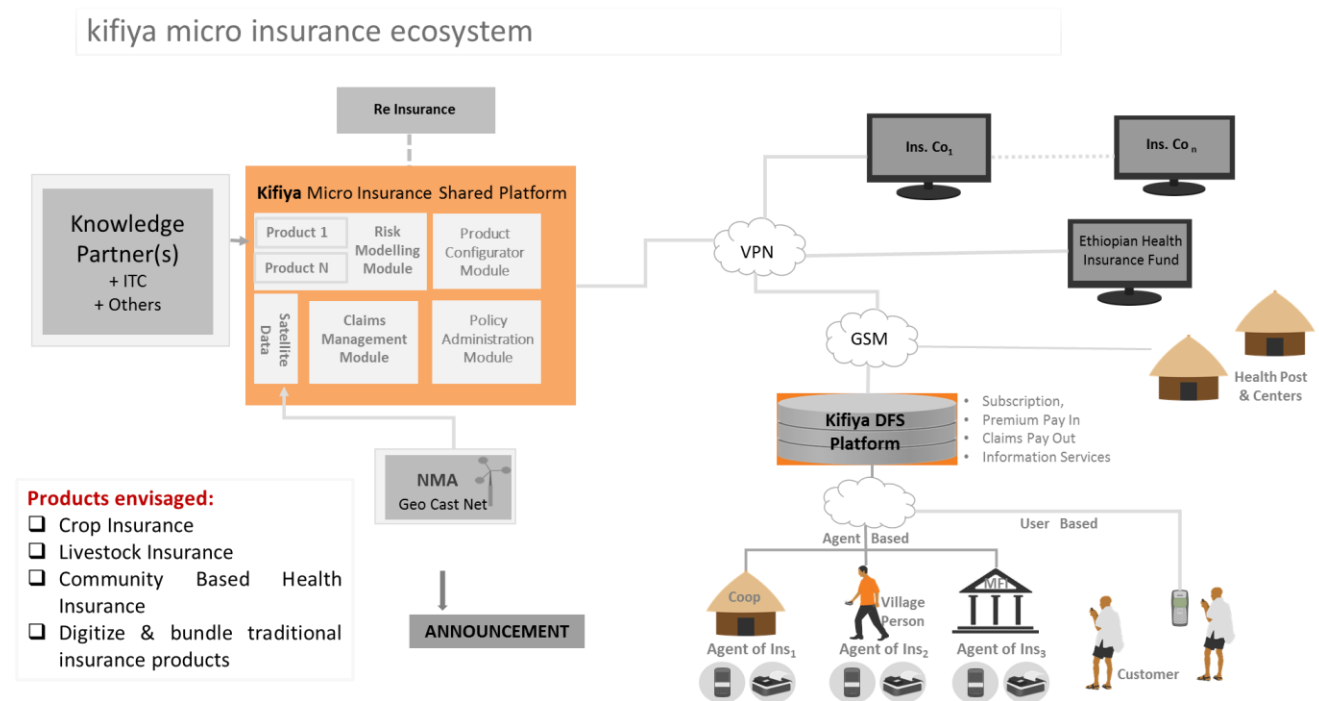
- Pastoralist rangelands offer quite a challenge for delivery of the IBLI product
- Delivering related services (sales, indemnities, information), very costly
- Mobile and digital solutions could potential solve may of the delivery challenges
- Developed mobile sales transactions applications with back end MIS for insurance companies.
- KLIP program leveraging provision of bank accounts through HSNP program in Northern Kenya.



Low Cost, Efficient, Delivery Mechanisms

To reach scale:

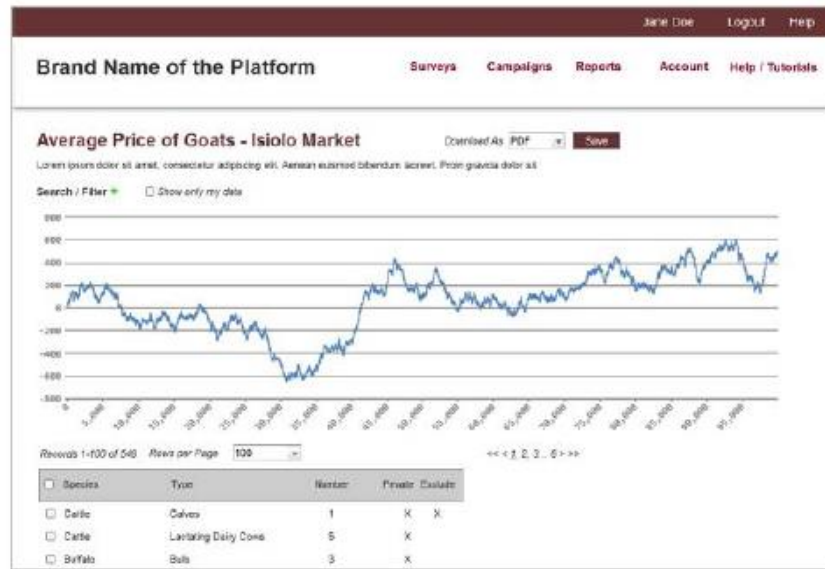
- will need to leverage technology to reduce the cost of product administration and delivery
- Will need sufficient number of physical agents to effect sales, deliver information and extension, and build product salience.
- Effective institutional mechanism for coordinating and regulating the contract development and insurance provision system.



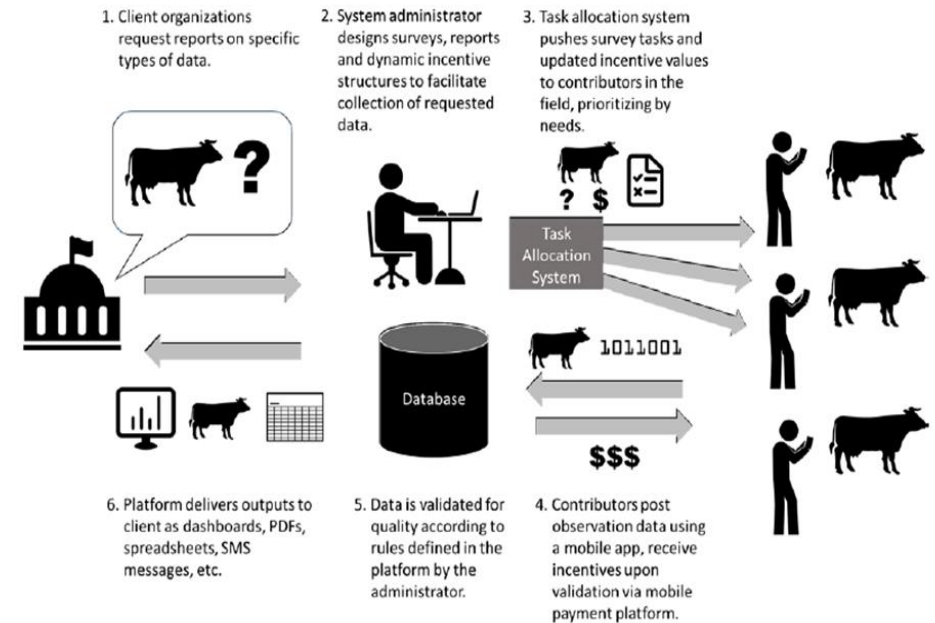
Low Cost, Efficient, Delivery Mechanisms

Sales, even on the back of digital platforms will require some agency. How to make required agent structure sustainable?

Crowdsourcing Livestock Market Information Systems

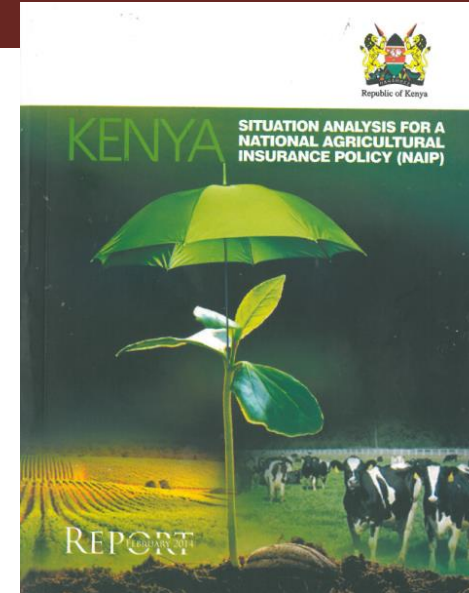


System Schematic



POLICY AND INSTITUTIONAL INFRASTRUCTURE

- Sustainable, large-scale index insurance program requires a clear and well articulated policy structure
- No example of unsubsidized private market for index insurance in developing countries. Globally only 7% of transaction volume is purely private.
- Experience and evidence suggests that for programs to go to scale they need to build on strong, well-coordinated public and private sectors
- What are the key roles for each sector?



Kenya

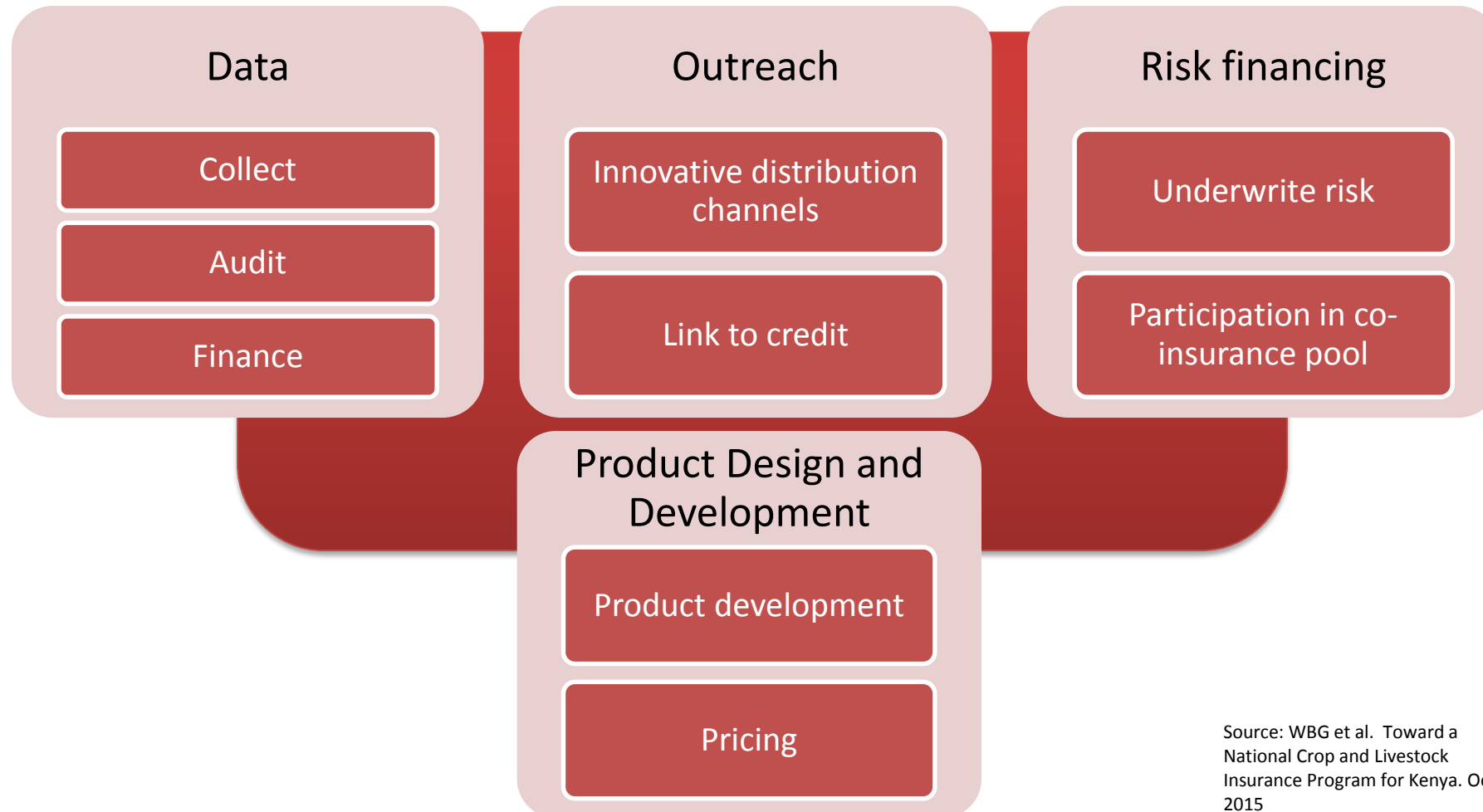


Toward a National Crop and Livestock
Insurance Program

SUMMARY OF POLICY SUGGESTIONS

POLICY AND INSTITUTIONAL INFRASTRUCTURE

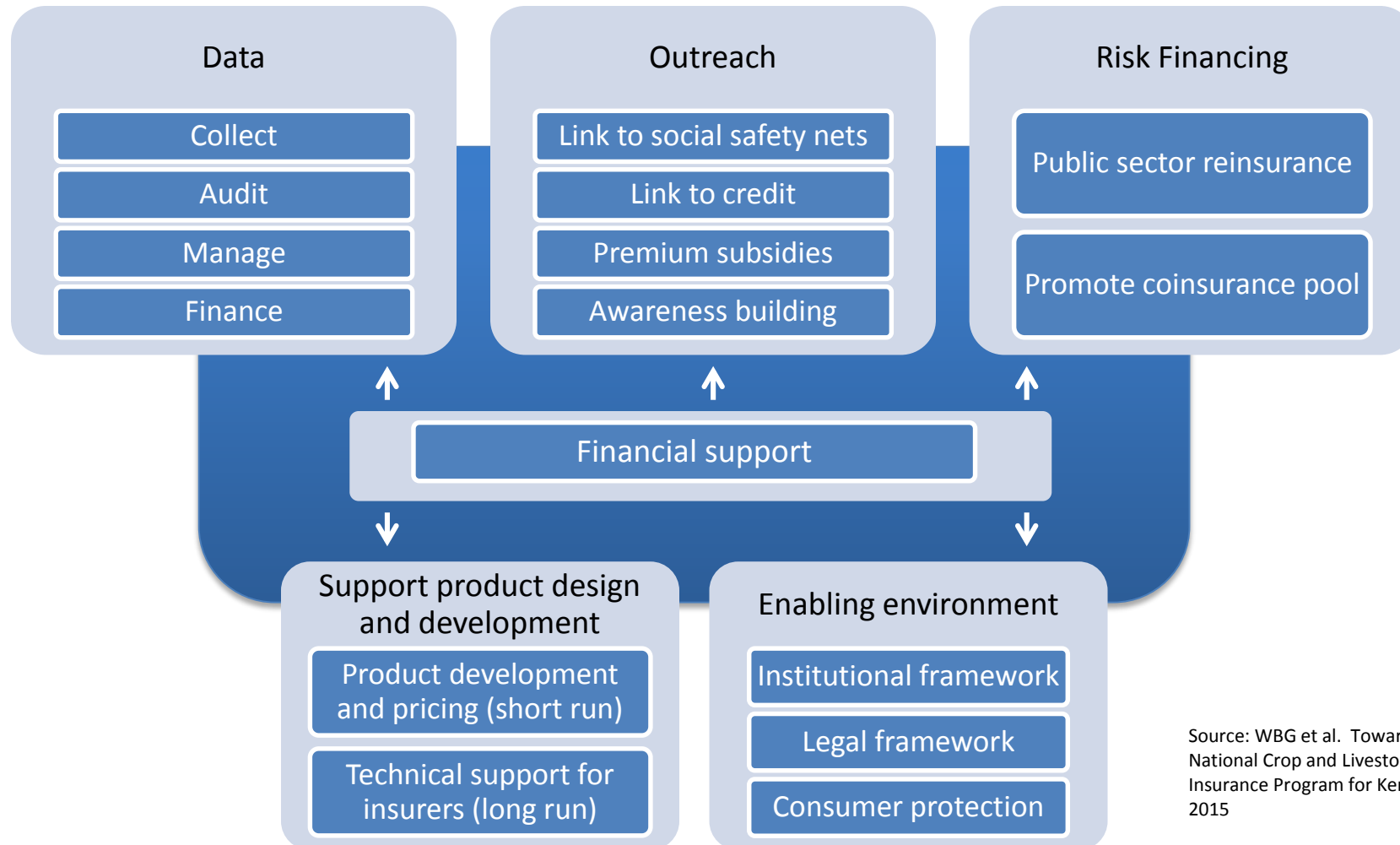
insurance is most efficient and effectively managed by the private commercial agricultural sector



Source: WBG et al. Toward a National Crop and Livestock Insurance Program for Kenya. Oct 2015

POLICY AND INSTITUTIONAL INFRASTRUCTURE

... but that successfully scaled up agricultural insurance programs typically require leadership and targeted support from government



Source: WBG et al. Toward a National Crop and Livestock Insurance Program for Kenya. Oct 2015

MOVING TOWARD SCALE

- **Growing body of evidence continues to highlight the socioeconomic and risk-management value of index insurance programs, and the logic of public support.**
- **Evidence has been channeled by a consortium of partners – government, insurance companies, NGOs, development agencies, technical collaborators – toward action.**
- **Going to scale will require careful research and development efforts to unlock the barriers, and an alignment of policy and technological forces.**
- **INVESTMENTS NEEDED IN:**
 - Development of internationally recognized product quality metrics
 - Data infrastructure for contract design, validation and impact assessments (ex-ante for strategic targeting, and ex-post for value assessment).
 - Development of digital platforms for cost-efficient product and information delivery and capacity development
 - Improve reinsurance terms by supporting public risk-layering, and improved public-private frameworks for delivery

The IBLI Program is a Collaboration of Many Players



IBLI Policy and Academic Workshop – July 2015



IBLI Program Structure

Program pillars & sustainability

