



Cornell University

# Livestock Roles and Managing Livestock Risk In East Africa

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# Overview

- **Livestock roles in east African arid and semi-arid lands (ASAL)**
- **Livestock price risk**
- **Livestock mortality risk**
- **An innovation: IBLI**



# Livestock Roles in Rural Development

## **Production system (direct income):**

Meat, milk/blood, skins/hides, offspring:  
- Renewable and non-renewable outputs

## **Production input (indirect income):**

Manure, traction, transport:  
- boost productivity of crop/non-farm livelihoods (esp. non-ASAL areas)

## **Sociocultural system:**

Social status, bride wealth, etc.

## **Store of wealth:**

‘Walking bank’; best IRR among assets





# Managing livestock price risk



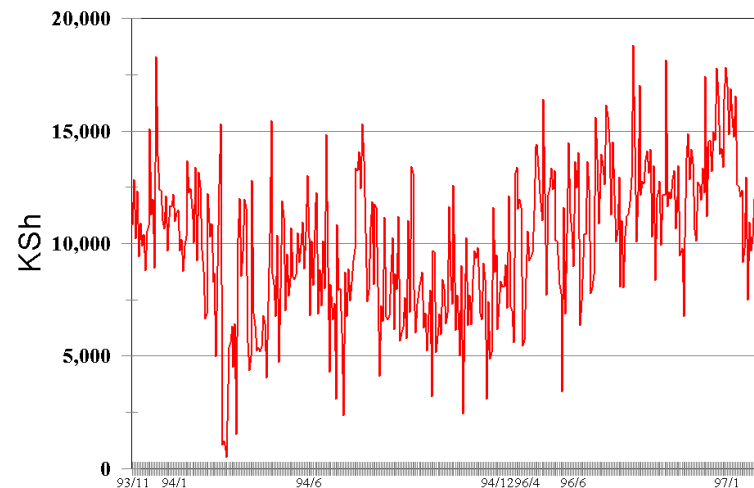
Market prices fluctuate dramatically. Few if any futures/options markets exist.

- Major price disconnects among markets ... mobile phones help.

For local trade, market conditions key:

- Auction vs. dyadic exchange
- # traders/lorries (food aid backhaul)

Adult Male Cattle, 1993-97 (broken)



Nairobi-Marsabit price differentials ("basis")



# Managing livestock price risk



Negative correlation b/n price and mortality – opposite of crops! – b/c rainfall affects animal body condition, mortality and lactation/ reproduction.

Effects vary by species, geography, sex

**Estimated Effects of Drought On Livestock Prices**

(hypothetical drop of 200 and 300 mm over 3 and 12 months, respectively)

<u>Percent Price Change</u>		Males	Females
Camels	Marsabit	-3.1	-4.6
	Moyale	-8.1	-11.9
Cattle	Marsabit	-22.1	-52.3
	Moyale	-33.4	-47.5
Goats	Marsabit	-14.6	-17.4
	Moyale	-12.2	-16.3
Sheep	Marsabit	-21.3	-34.1

Source: Barrett et al. (2003 *J. African Economies*)

# Managing livestock price risk

## Estimated Effects of Quarantine On Livestock Prices

Percent Change		Males	Females
Camels	Marsabit	-9.1	-6.4
	Moyale	-6.2	-3.7
	Nairobi	0.2	0.1
Cattle	Marsabit	-23.7	-12.2
	Moyale	-16.1	-7.4
	Nairobi	2.4	2.2
Goats	Marsabit	-2.1	-2.4
	Moyale	-1.1	-1.0
	Nairobi	0.4	-0.1
Sheep	Marsabit	-5.9	-2.7
	Nairobi	0.2	0.1

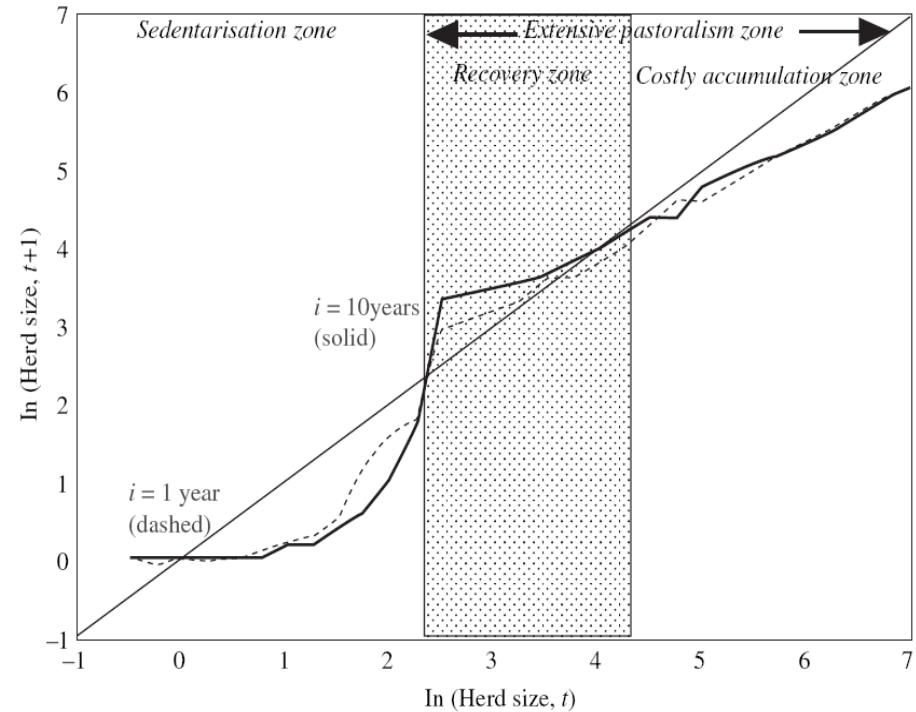


Animal disease control measures matter to prices (Barrett et al., 2003 *J. African Economies*)

# Managing Livestock Mortality Risk

There is strong evidence of poverty traps in the arid and semi-arid lands (ASAL) of northern Kenya and southern Ethiopia. Mortality risk mgmt therefore key.

**Catastrophic herd loss risk due to major droughts identified as the major cause of these dynamics.**



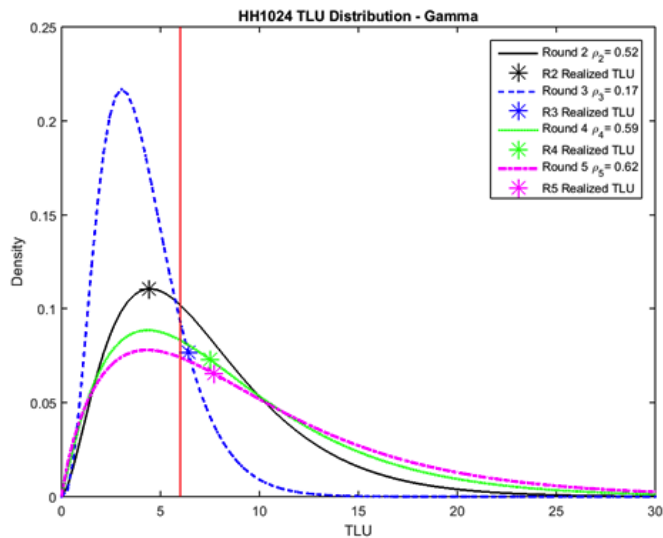
Nadaraya-Watson estimates using Epanechnikov kernel with bandwidth ( $h = 1.5$ )

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*, 2018 UCP book chapter) on s. Ethiopia.

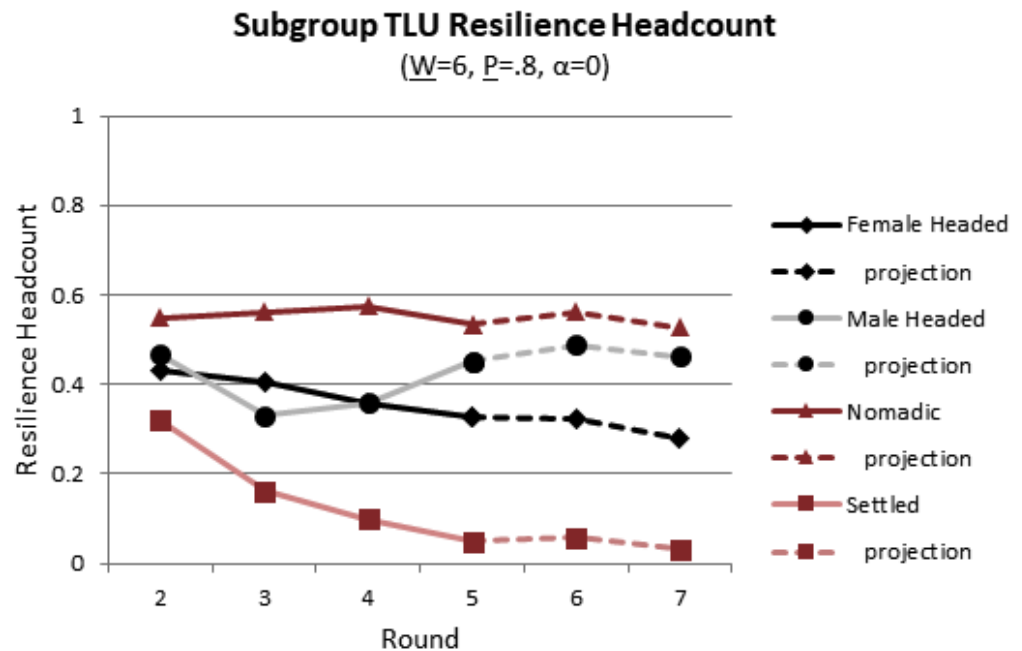


# Resilience To Droughts

(Semi-nomadic) pastoralist systems are adapted to climate regime. But when droughts strike, what happens to herd size and which sub-groups lose resilience?



Source: Cissé and Barrett (in review)



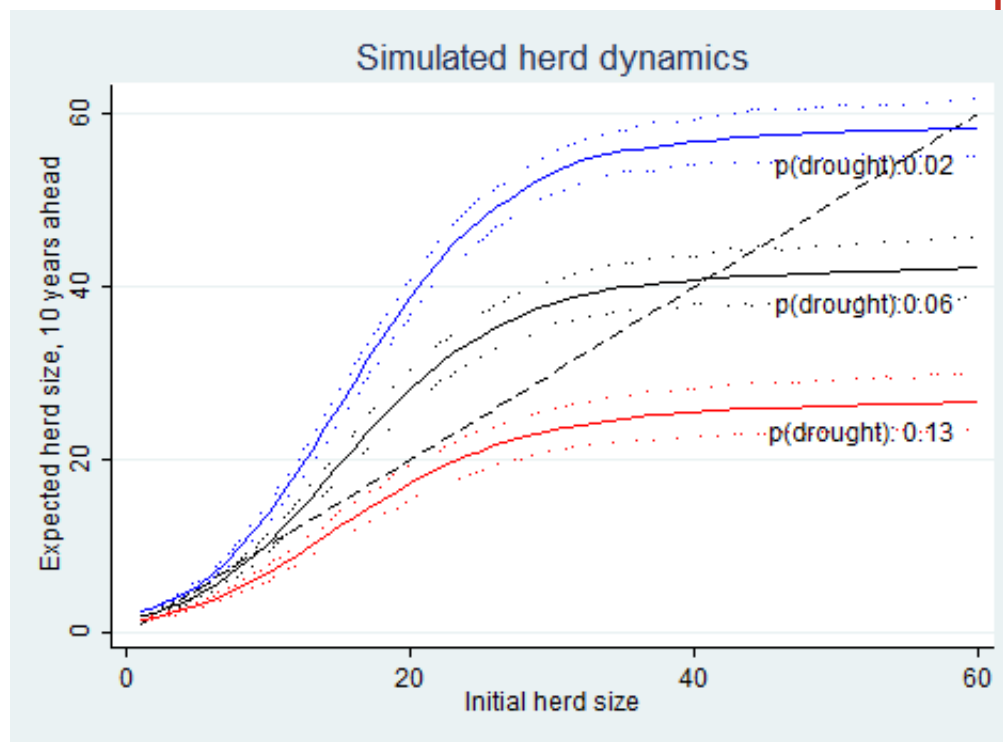
*In n. Kenya, as drought strikes, mean and variance of herd size fall. Nomadic populations' resilience barely changes, while settled populations suffer. Livelihood matters more than gender.*

# 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.*



Source: Barrett and Santos (*EcolEcon* 2014)

# Standard Responses to Drought

## Standard responses to major drought shocks:

1) Post-drought restocking                      2) Food aid

## Key Problems:

- Slow; Expensive; Reinforces sedentarization





# An Innovative Approach: IBLI

For more information visit [www.ilri.org/ibli/](http://www.ilri.org/ibli/)



## Index-based livestock insurance to protect vs. drought

- Individuals buy policies to protect their herds
- Private underwriters, global reinsurers
- Commercial pilot in Kenya in 2010; worked in 2011 drought
- Now spread to Ethiopia, and nationwide in Kenya (KLIP)
- Major, positive effects in both countries. IBLI generates comparable impact/KSh at pilot scale. But marginal cost of adding a cash transfer recipient is ~6x adding an insured, so the marginal (milk, MUAC) benefit/cost ratios average > an order of magnitude larger (Jensen, Barrett & Mude *JDE* 2017)

## IBLI's Impacts: Less adverse post-drought coping

N. Kenya HHs received IBLI indemnity payments in October 2011, near end of major drought. Survey HHs with IBLI coverage report much better expected behaviors/outcomes than the uninsured:

- **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

In so. Ethiopia, IBLI seems, if anything to crowd in more informal transfers, so reinforces informal safety net systems. IBLI appears to augment safety net, reducing reliance on the most adverse behaviors undertaken by different groups.

# IBLI's Impacts: Household subjective well-being

**Use randomized treatments to instrument for IBLI and then estimate how IBLI contracts in force and lapsed IBLI coverage affect SWB in so. Ethiopia.**

At least two ways IBLI can influence SWB:

1) Non-monetary (psychological) benefits or costs

- Insurance may give peace of mind about adverse outcomes
- Insurance could increase stress if basis risk is high
- Buyer's remorse wrt lapsed contracts

2) Monetary benefits or costs – effect on net income/wealth

- Since premium payment reduces net income/wealth, indemnity payment increases it, net indemnity payments will influence SWB.

**Even with prospective buyer's remorse, IBLI purchase significantly increases pastoralists' subjective well-being.**



Thank you for your time, interest and comments!

