



Cornell University

# Facilitating escape from risk-based poverty traps in rural Africa

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Dyson School and Brooks School

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# Why deep, persistent, prevalent poverty?

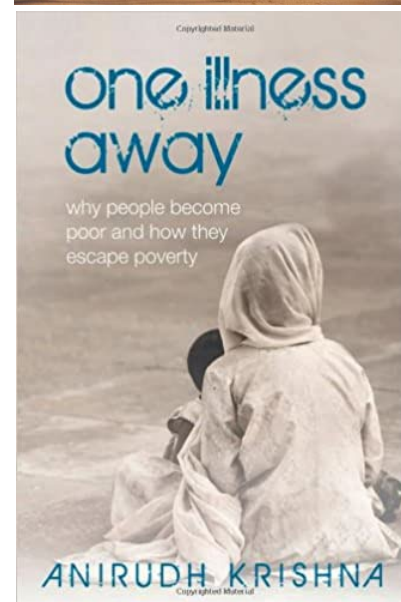
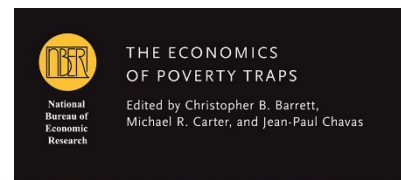
The poorest places are defined not only by the depth and prevalence of poverty but equally by poverty's persistence. A poverty trap?

An emergent view of poverty traps emphasizes uninsured risk exposure as a key cause.

## On Risk-based Poverty Traps

Christopher B. Barrett and Heather Schofield

**The possibility of risk-based poverty traps puts a premium on risk reduction and risk transfer tools.**



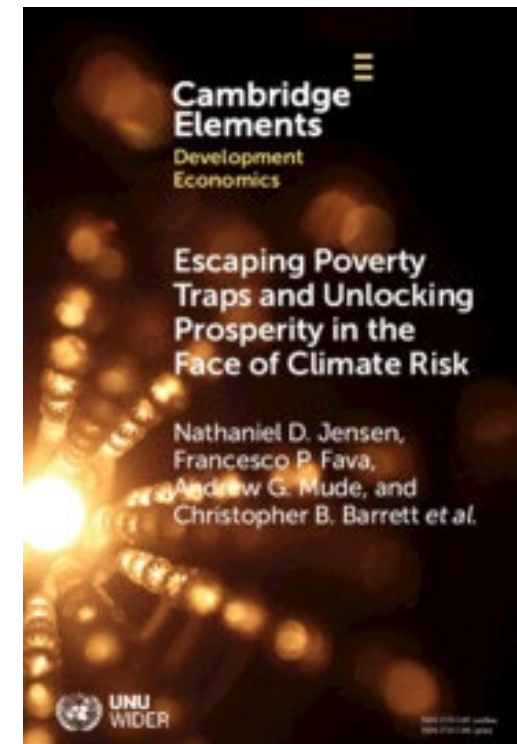
# Risk transfer among east African pastoralists

Poverty traps in the drylands of Kenya/Ethiopia arise from **catastrophic herd loss risk due to major droughts**. Launched index-based livestock insurance (**IBLI**) in 2010 (now in 4 countries). Favorable impacts across multiple metrics and time scales.

Lots of data (household panel survey, remote sensing rangelands, etc.), 2010-present

## Key remaining IBLI questions:

- How to induce informed uptake (incl. insurance agent incentives)?
- How to integrate into conflict reduction?
- How to reconcile with rangelands and wildlife conservation?
- Adaptation to other settings (Sahel, Mongolia)



# Risk transfer among east African pastoralists

Work on early warning/targeting tools to target geographically vulnerable populations

- GAM forecasting and anticipatory cash transfers in Kenya w/NDMA:

**PNAS**

RESEARCH ARTICLE

ECONOMIC SCIENCES  
SUSTAINABILITY SCIENCE

 OPEN ACCESS

**High-frequency monitoring enables machine learning-based forecasting of acute child malnutrition for early warning**

Susana Constenla-Villoslada<sup>a,b</sup>, Yanyan Liu<sup>b,c</sup>, Linden McBride<sup>d</sup>, Clinton Ouma<sup>e</sup>, Nelson Mutanda<sup>e</sup>, and Christopher B. Barrett<sup>c,f,1</sup>



- Targeting tools:

**PNAS**

INAUGURAL ARTICLE

ECONOMIC SCIENCES  
STATISTICS

 OPEN ACCESS



**Microlevel structural poverty estimates for southern and eastern Africa**

Elizabeth Tennant<sup>a,1</sup>, Yating Ru<sup>a,c</sup>, Peizan Sheng<sup>d</sup>, David S. Matteson<sup>e</sup>, and Christopher B. Barrett<sup>a,1</sup>

*Journal of Development Economics* 178 (2026) 103583

Estimating multidimensional development resilience

Seungmin Lee<sup>a</sup>, Kibrom A. Abay<sup>b</sup>, Christopher B. Barrett<sup>c</sup>, John Hoddinott<sup>c</sup>

**Potential for collaborations for those with ML/GIS skills**

# Risk reduction: Disease and ag dev't in Senegal

**Schistosomiasis/bilharzia** affects >240mn globally (>800 mn at risk) in poor areas. Suppresses immunoresponse. Especially harmful for children/women.

**Usual response:** MDA (praziquantel) but high reinfection rates. Need to tackle the environmental reservoir of the disease.

**Poverty-disease trap:** Impedes child cognitive/physical dev't via anemia, morbidity. Disrupts work/school attendance, lowers incomes, increasing reliance on contaminated water sources.

nature  
sustainability

REVIEW ARTICLE

<https://doi.org/10.1038/s41893-019-0293-3>

Emerging human infectious diseases and the links to global food production

Jason R. Rohr<sup>1,2\*</sup>, Christopher B. Barrett<sup>3</sup>, David J. Civitello<sup>4</sup>, Meggan E. Craft<sup>5</sup>, Bryan Delius<sup>2</sup>, Giulio A. DeLeo<sup>6</sup>, Peter J. Hudson<sup>7</sup>, Nicolas Jouanard<sup>8</sup>, Karena H. Nguyen<sup>9</sup>, Richard S. Ostfeld<sup>10</sup>, Justin V. Remais<sup>11</sup>, Gilles Riveau<sup>8</sup>, Susanne H. Sokolow<sup>6,11</sup> and David Tilman<sup>12</sup>

PNAS

RESEARCH ARTICLE

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SUSTAINABILITY SCIENCE

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Modeling how and why aquatic vegetation removal can free rural households from poverty-disease traps

# Risk reduction: Disease and ag dev't in Senegal

## Candidate remedies:

- (1) Article Nature | Vol 619 | 27 July 2023  
**A planetary health innovation for disease, food and water challenges in Africa**

Clear water access points of snails' preferred habitat: submerged weed *Cerato. demersum* and use as compost (B/C: 2.8 - 7.1) or low cost or livestock feed.



We launched a 104 village RCT in 2024, running through 2026.

- (2) Introduce fish to irrigated rice fields to compete with (tilapia) or prey on (African bonytongue) snails and boost crop productivity. Small-scale RCTs begin in early 2026.

**Assess ag/economic/ health/education impacts, sustainability.**



**Trying to better understand how to reduce/  
transfer risks to help people escape poverty ...**



**Thank you for your time and interest!**