



GLOBAL
RESILIENCE
PARTNERSHIP



B A S I S

WEBINAR: **GENERATING RESILIENCE TO REDUCE POVERTY & SPUR AGRICULTURAL GROWTH**

3 JUNE 2020

Rules of the Game:

- Mute yourself unless speaking
- Do not show video to save bandwidth
- Type your questions in the chat box
- You may add your affiliation to your zoom name (hover over your name & click on more to rename yourself)
- Contact Ida or Sophie in the chat if you run into technical problems

Disclaimer: The webinar is being recorded, by participating you give consent for this.

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Quick Agenda



| When | What | Who |
|------------|---------------------------------|---------------------------------|
| 5 minutes | Welcome | Deon (GRP) & Jami (USAID) |
| 10 minutes | Introduction | Michael (MRR Lab) |
| 10 minutes | Results from Mali | Ghada (World Bank) |
| 10 minutes | Index-Based Livestock Insurance | Andrew (AfDB) |
| 10 minutes | Results from Bangladesh | Greg (American University) |
| 5 minutes | External perspective | Sammy (BMGF) |
| 5 minutes | Wrap-up & USAID perspective | Jami (USAID) |
| 20 minutes | Q+A | Jami (USAID) + Sophie (MRR Lab) |



Today's Contributors:

Deon Nel – CEO, Global Resilience Partnership

Jami Montgomery – Division Chief for the Resilient Communities and Systems Division, Bureau for Resilience and Food Security/Center for Resilience, USAID

Michael Carter – Professor, UC Davis; Director, Feed the Future Innovation Lab for Markets, Risk & Resilience

Andrew Mude – Lead, Scaling Technology and Market Access for Smallholder Farmers at the African Development Bank (AfDB)

Ghada Elabed – Agriculture Economist at the Global Engagement unit of the Agriculture and Food Global Practice, World Bank

Gregory Lane – Professor, Economics Department, American University

Samuel Collin Ssenyimba – Program Officer, Bill and Melinda Gates Foundation

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FOR MARKETS, RISK & RESILIENCE
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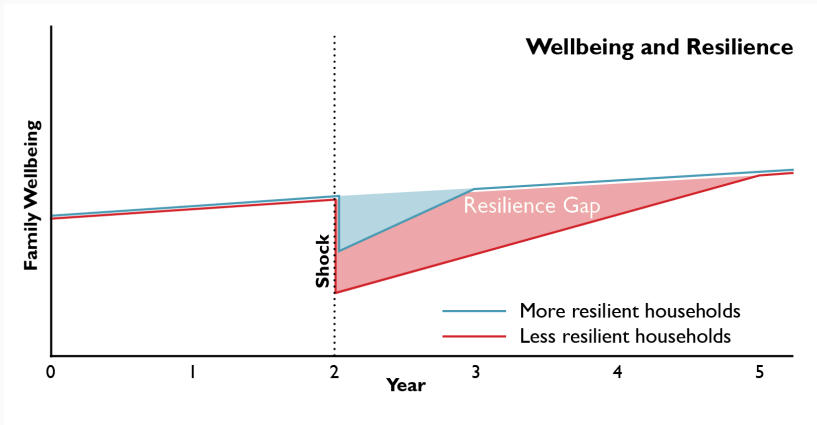
Generating Resilience⁺ to Reduce Poverty and Spur Agricultural Growth

Michael R. Carter

University of California, Davis, University of Cape Town & NBER
Director, BASIS MRR Innovation Lab
3 June 2020

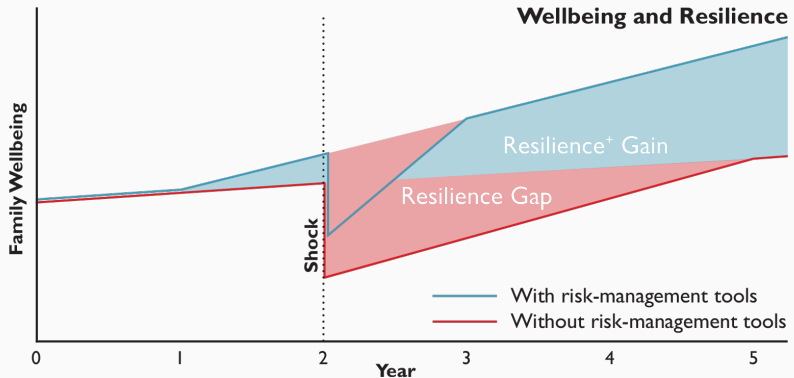
From Resilience ...

- USAID's defines resilience as *the ability to manage adversity and change without compromising current and future well-being*



... to Resilience⁺

- Resilience⁺ occurs when a farm family has risk management tools that make them resilient and they can therefore prudentially invest and improve their expected future level of well-being over what it would have been without improved risk management



Suite of Risk Management Tools to Secure Resilience⁺

- Today we will show evidence across a suite of risk management tools showing that consistently shows that the resilience gain can be quite substantial, on the order of a 20 - 30% income increase
- Not only is the rate of return high for programs facilitate the risk management instruments needed for resilience⁺, they can also be very good public finance compared to the alternative of not promoting resilience⁺
- *Index or Parametric Insurance*
 - Ghada Elabed, area yield insurance for West African Cotton Producers
 - Andrew Mude, satellite based forage insurance for livestock producers in East Africa
- *Flexible Financial Tools* (indexed savings, insurance & credit)
 - Greg Lane, Pre-approved Emergency Loans for BRAC borrowers in Bangladesh
- *Stress Tolerant Seed Varieties* in Combination with Index Insurance in Mozambique & Tanzania

Merging Seed & Insurance Technologies for Resilience⁺

- *Partial Protection through Drought Tolerant (DT) Seed Technology*
 - Protect against mid-season droughts that occur during maize flowering period
 - Does not protect against other causes of yield loss (germination failure, late season drought)
 - Also higher yielding than unimproved & most improved maize varieties
- *Fail-safe Insurance Technology*
 - Keyed to payout when yields fall below 65% of normal
 - Bundled with DT seeds
 - Satellite based with back-up on the ground area yield crop cut when the former fails
 - Cost effective as area yield crop cuts required less than 10% of the time

Merging Seed & Insurance Technologies for Resilience⁺

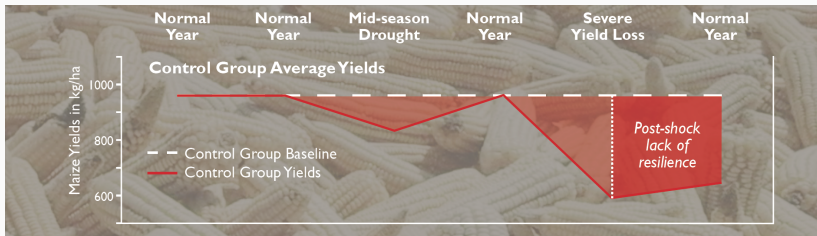
- 4-year randomized control trial across countries & zones within countries



- Use these actual events and their aftermaths to identify impact of shocks, resilience & resilience⁺

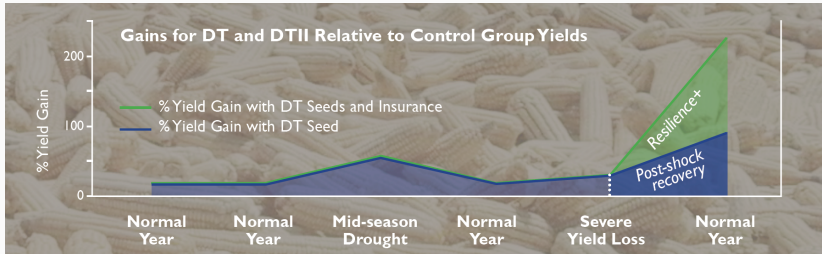
Resilience Gap Persists over Time for Households without Risk Management Tools

- Pooling our results across space and time, we can econometrically look at the trajectories of households with and without the risk management technology



- Clear evidence of de-capitalization and reduced investment in improved inputs following a severe yield loss

Seed Insurance Package Offers Resilience & Resilience⁺



- Small yield gain in normal year reflects partial adoption of DT seeds
- Note that resilience⁺ kicks in only after the technologies prove their worth in a severe yield loss event
- After such an event the resilience gain jumps to 80-200%
- See a 50% increase in use of seed and insurance technologies after a severe event
- But without a severe event, demand dwindles (beware learning about risk management technologies)



Ex-ante Impacts of Agricultural Insurance: *Evidence from a Field Experiment in Mali*

Ghada Elabed
Global Engagement Unit
Agriculture and Food Global
Practice
World Bank Group

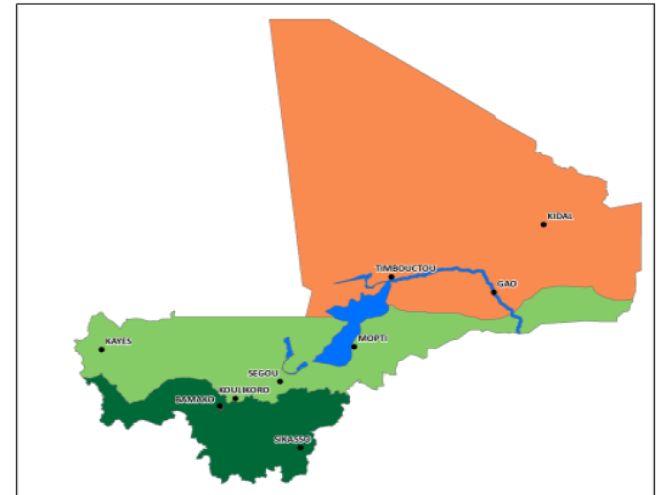
Michael Carter
University of California, Davis
University of Cape Town &
NBER



THE WORLD BANK
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Risk Rationing and Cotton Production in Sikasso, Mali

- Most farmers are smallholders and grow a mix of subsistence crops and cotton
- Credit via group loans, but consequences of default are substantial (informal collateral)
- Joint liability itself discourages investment as the more a farmer produces, the more likely that some of his output will be 'taxed' away to pay for others in the group
- Collateral risk of default appears to discourage farmers from growing as much cotton as they otherwise might
- Result is that risk keeps these farmers poorer than they need to be given the available economic opportunities



Dual Scale Area-yield Index Contract

- To address these issues, developed an area-yield insurance contract
- Insured unit is the cooperative
- Payouts based on the average yield of the cooperative and an agglomeration of 10-15 village cooperatives
- This dual scale area-yield contract has a low level of basis risk:
 - Conditional on a loss, the probability of getting a payment is 80%, and the probability that net proceeds are less than the value of 750 kg of cotton per-hectare drops to 2%

The Mali Pilot Project

- Can a high quality area yield insurance contract reduce risk rationing and increase resilience of cotton farmers?
- In cooperation with PlaNet Guarantee, implemented a randomized control trial for the 2011/12 year
- 87 cooperatives: 59 were randomly selected for treatment (offered insurance), 28 served as control
- Decisions to buy the insurance made in May 2011 (planting season)

Descriptive statistics

| | N | Control | Treatment |
|--------------------------------------|-----|--------------------|---------------------|
| <i>Pre-intervention outcomes</i> | | | |
| Cotton area 2010 (hectares) | 586 | 2.19 [1.33] | 2.44 [1.77] |
| Cotton harvest 2010 (kg) | 584 | 2316.6 [1741.3] | 2291.2 [1939.4] |
| Cotton yield 2010 (kg/ha) | 584 | 1053.1 [422.9] | 914.6*** [342.7] |
| Area in foodgrains (hectares) | 970 | 4.02 [5.10] | 3.09 [2.89] |
| <i>Household characteristics</i> | | | |
| Household head age | 962 | 54.9 [14.23] | 55.1 [14.19] |
| Household head years of schooling | 916 | 0.87 [2.06] | 0.76 [1.54] |
| Household head is ethnically Bambara | 981 | 0.61 [0.49] | 0.65 [0.48] |

Results

- Standard Instrumental Variable LATE Identification strategy
- 30% of the treated cooperatives purchased the insurance contract
- Impacts of insurance are substantial at the extensive margin:
 - Area in cotton rose by 25-40 percent
 - Matching increases in loans and inputs
 - No impacts on input intensity, nor any impact on reduction in other ag activity
- The cost/benefit ratio is 6.25

Scaling up the Pilot in Burkina Faso

- Coup d'état in Mali in 2012 forced the project to halt
- Similar pilot was implemented in Burkina Faso and continued through the 2014-2015 cotton season
 - A drought in the 2014-15 season caused significant losses. While the insurance payouts arrived late, farmers reported positive impacts
 - The pilot in Burkina Faso is being scaled up country wide

Conclusions

- Index insurance can be a safety net and income builder (Resilience+)
- Subsidies to speed adoption can generate high returns if goal is increase the level and stability of cotton families' income
- Importance of the quality of the insurance contract

Thank you!





Scaling Climate Risk Insurance: Index-Based Livestock Insurance (IBLI) to protect pastoralists from drought shocks

Andrew Mude

African Development Bank,

LIVESTOCK & PASTORALISM IN E. AFRICA

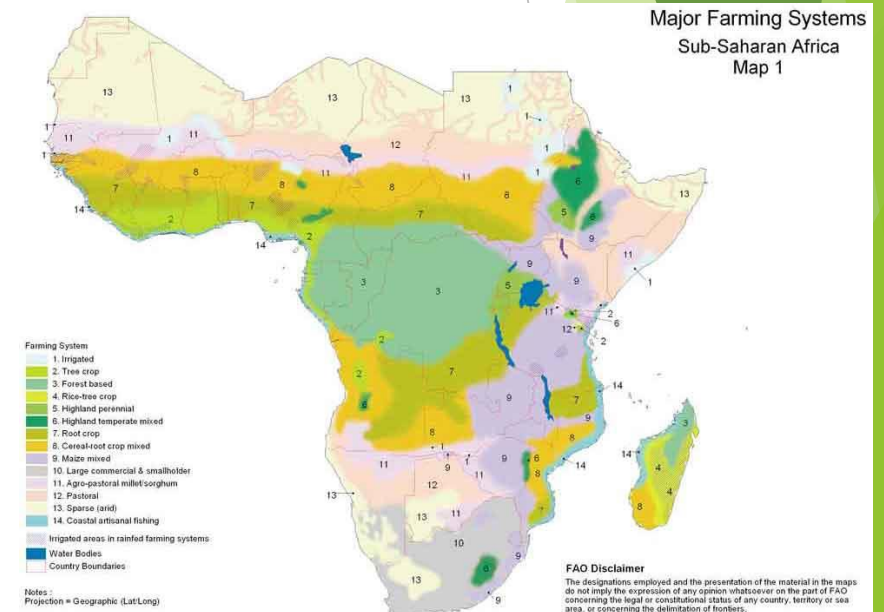
LIVESTOCK & LIVELIHOODS

- ▶ In East Africa and the Sahel **pastoralism is the principal livelihood for over 40 million people**;
- ▶ In the Horn of Africa, exports of livestock and livestock products exceed \$1billion annually.
- ▶ In the region, estimated contribution of the livestock economy represents up to 60 percent of agricultural GDP



DROUGHT - A MAJOR RISK

- ▶ Catastrophic herd loss due to drought identified as the major source of vulnerability and cause of poverty. 75% of livestock losses, among pastoralists, due to drought.
- ▶ Strong evidence of asset-based poverty trap dynamics.



INDEX-BASED LIVESTOCK INSURANCE

Objective: Offer a timely, sustainable, safety net against catastrophic drought shocks on pastoralists.

IBLI Program was launched in 2008 by ILRI and partners to design an index-insurance product protecting pastoralists from asset losses during drought shocks.

ILRI
INTERNATIONAL
LIVESTOCK RESEARCH
INSTITUTE

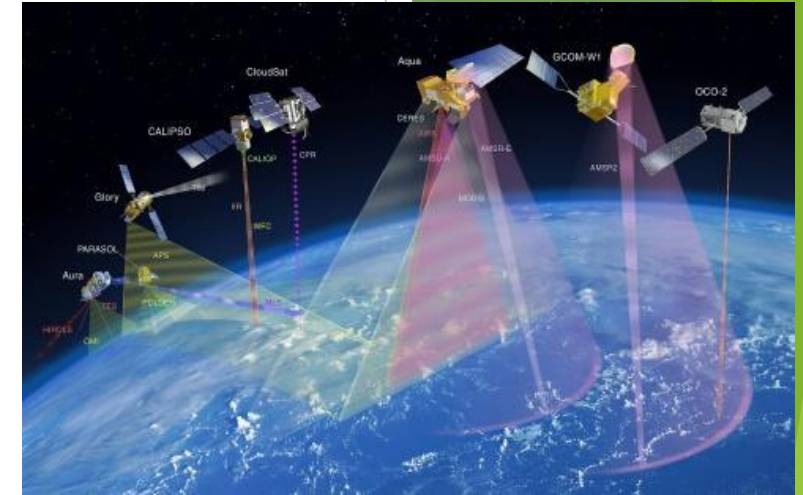


RESEARCH into DEVELOPMENT and SCALE

HOW A GOOD SCIENTIFIC IDEA CAN BECOME AN EFFECTIVE (SCALABLE?) OPERATIONAL 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.

RESEARCH - DEVELOPMENT FEEDBACK LOOP



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EVIDENCE OF IMPACT AND VALUE

IMPACT ON PRODUCTION AND WELFARE

- **Increase herd survival rates** by reducing risk of catastrophic loss
- **Increase investments in maintaining livestock** through procurement of veterinary and services
- **Improved production outcomes:** increases milk productivity
- **Positive impact on nutrition** (i.e. child mid-upper arm circumference)

Hirfrot , Barrett, Lentz and Taddesse2014;
Janzen and Carter 2019 AJAE

IMPACT ON COPING STRATEGIES

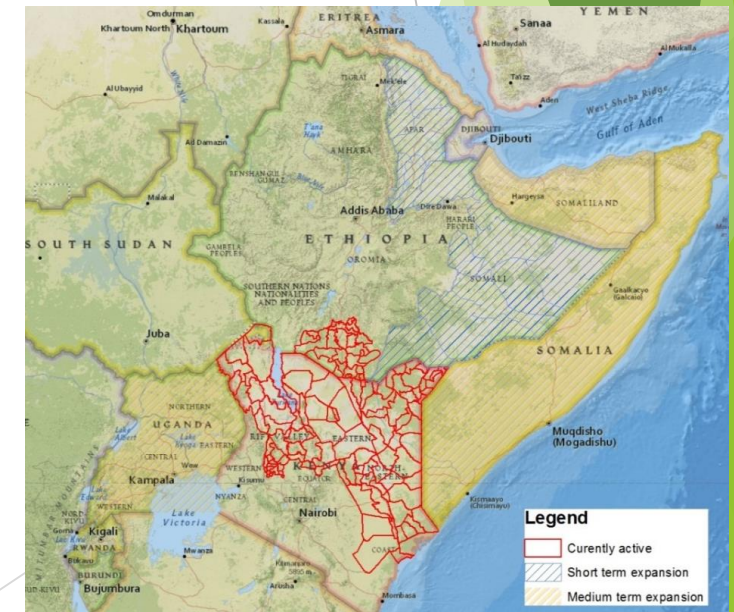
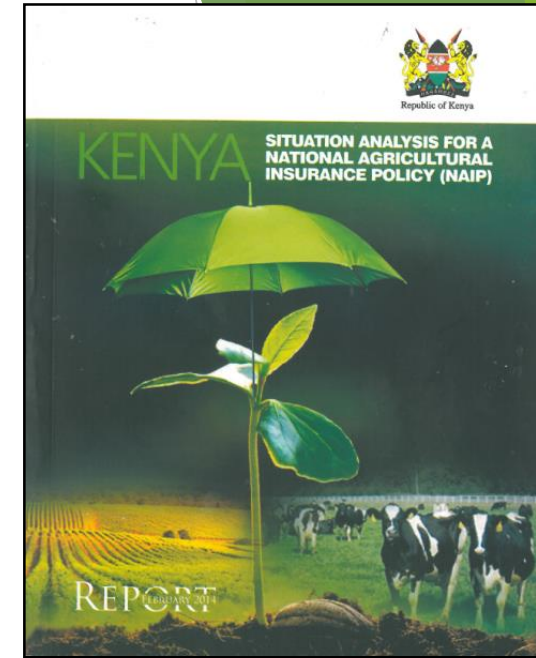
IBLI improves post-drought coping. After catastrophic 2011 drought:

- **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

Chantarat, Mude, Barrett & Turvey 2017, *World Dev.*)
(Jensen, Barrett & Mude 2016, *Cornell Working paper*)

SCALING UP IBLI

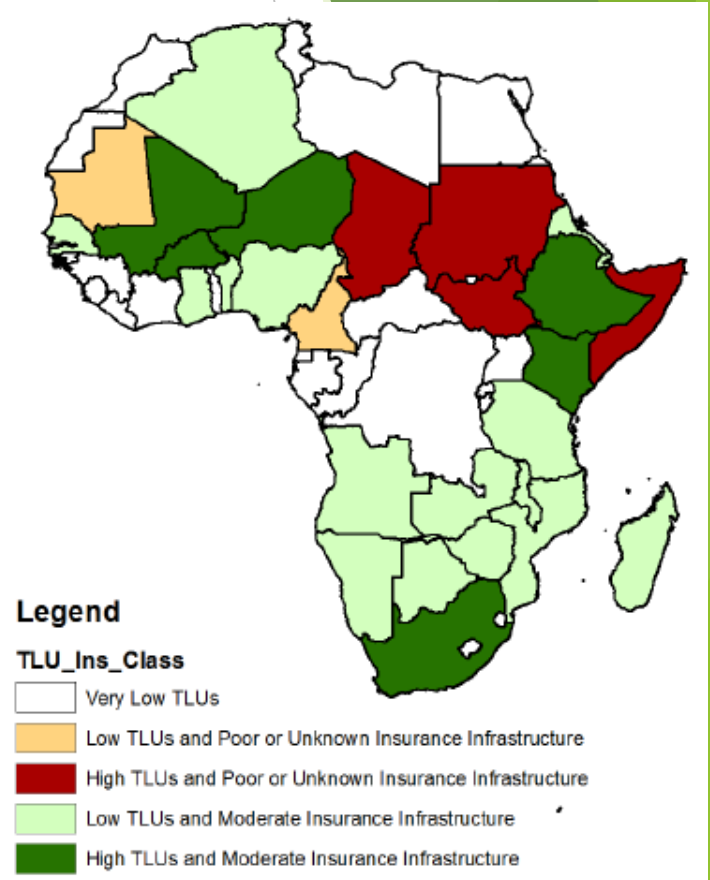
- Since 2010 IBLI has been scaled-up commercially in Kenyan and Ethiopian drylands through various programs
- Since 2015, fully subsidized IBLI coverage is also provided to thousands of vulnerable pastoralists in Kenya under the KLIP (Kenyan Livestock Insurance Program), as part as Kenyan social protection policies.
- Under KLIP, over 10 million USD of payouts have been distributed since 2016 to over 18000 pastoral households.
- Several countries are evaluating to implement IBLI like contracts in East and West Africa
- IBLI has been implemented in multiple modalities (micro-insurance, macro-insurance social protection, sovereign level insurance)



TOWARD WIDESPREAD SUSTAINABLE SCALE

- Growing body of evidence continues to highlight the socioeconomic and risk-management value of index insurance programs, and the logic of public support.
- Going to scale will require careful institutional design and targeted PPP investments
- **INVESTMENTS NEEDED IN:**
 - Improvements in contract design and validation and alignment with other related index-based products/programs (ARC, scalable HSNP etc)
 - Development of internationally recognized product quality metrics
 - Development of digital platforms and data infrastructure for cost-efficient product and information delivery, capacity development, impact assessment and product design

Africa Classification for IBLI
“Relevance Zones”



(Mills et al., 2017 ILRI Brief)

Using Credit for Resilience+

Gregory Lane
American University

June, 2020

Intervention: Guaranteed Credit for Use After Shocks

- **Problem 1:** Results from insurance are promising, but insurance isn't always workable
 - Demand for insurance is often low
 - Lack of willing insurance providers in some locations
- **Potential Solution 1:** Design a credit product as an alternative risk management tool
- **Problem 2:** Credit is scarce after income shocks as banks are reluctant to lend
 - If access to credit is uncertain, will lose "resilience gain" from higher investment
- **Potential Solution 2:** Pre-approve households pre-shock based on their credit history
 - Study new BRAC product that offers guaranteed credit access after a flood

Bangladesh is highly susceptible to floods

- Delta for three major rivers
- 60% rural employment in agriculture

BRAC has large microfinance (and other) operations:

- 2,000 branch offices reaching upwards of 4 million households

Emergency Loan product developed to address flooding risk:

- **Pre-approval:** Before the flood season, borrowers are told they are pre-approved for a loan should they want it (pre-approval based on past loan repayment and debt levels)
- Conducted two year Randomized Control Trial (RCT) offering new product to sample of 300,000 rural households

Impact on Land Cultivation

Being in the treatment group changed decisions at planting before the flood season:

- Increase **total cultivated rice land** by 20%
- Increased the **probability of growing any crops at all** by 9%

Impact on Productivity and Household Outcomes

Being in the treatment group improved outcomes for households both in areas with and without flooding

- **Areas with No Flooding**

- Harvest 33% more crops - consistent with increase in farm land cultivated

- **Areas with Flooding**

- Affected households maintained 10% higher food consumption relative to non-treatment households that were also flooded
- Higher ownership of livestock

Research Conclusions

- **This Project:** Guaranteed credit achieved similar benefits as traditional insurance products
- **Overall:** Multiple types of risk mitigation tools (insurance, credit, savings) can be used to generate Resilience+ impacts
 - What mix to use likely depends on local context (e.g. the specific risks facing households, availability of local partners, etc.)

Next Steps

Future research could examine:

- Are results consistent in other settings?
 - BRAC is an exceptional partner with strong client relations in Bangladesh
 - Flooding may be unusual in that households can often immediately replant their fields and salvage the season
 - BRAC Uganda is interested in pursuing idea in their setting
- Is providing credit for shock relief sustainable over a longer time horizon?
- How do households reached by credit compare to those reached by other financial tools?

A woman stands in a cornfield, holding a harvested ear of corn. She wears a vibrant headwrap with red, yellow, and blue sections, and a long-sleeved shirt with a colorful geometric pattern in red, blue, and yellow. The background shows rows of corn plants under a bright sky with scattered clouds.

BILL & MELINDA
GATES *foundation*

Agricultural Development

OVERVIEW: MAY 2020.

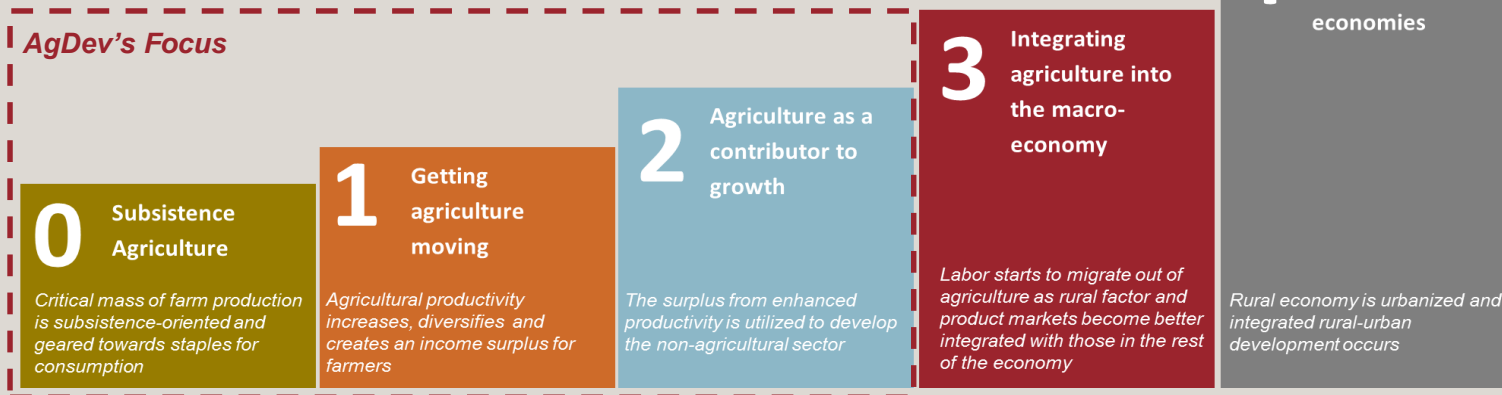
Our Ambition

We aim to support **country-led inclusive agricultural transformation** across sub-Saharan Africa and South Asia, by developing and scaling products, services, policies, and system-wide innovations that **benefit smallholder farmers, empower women, and improve nutrition.**

We want farmers to be empowered with the knowledge, tools and technologies to improve their livelihoods and lift themselves and their families out of poverty.

OUR AGRICULTURE DEVELOPMENT STRATEGY SUPPORTS COUNTRY-LED INCLUSIVE AGRICULTURAL TRANSFORMATION

Stages of Agricultural Transformation¹



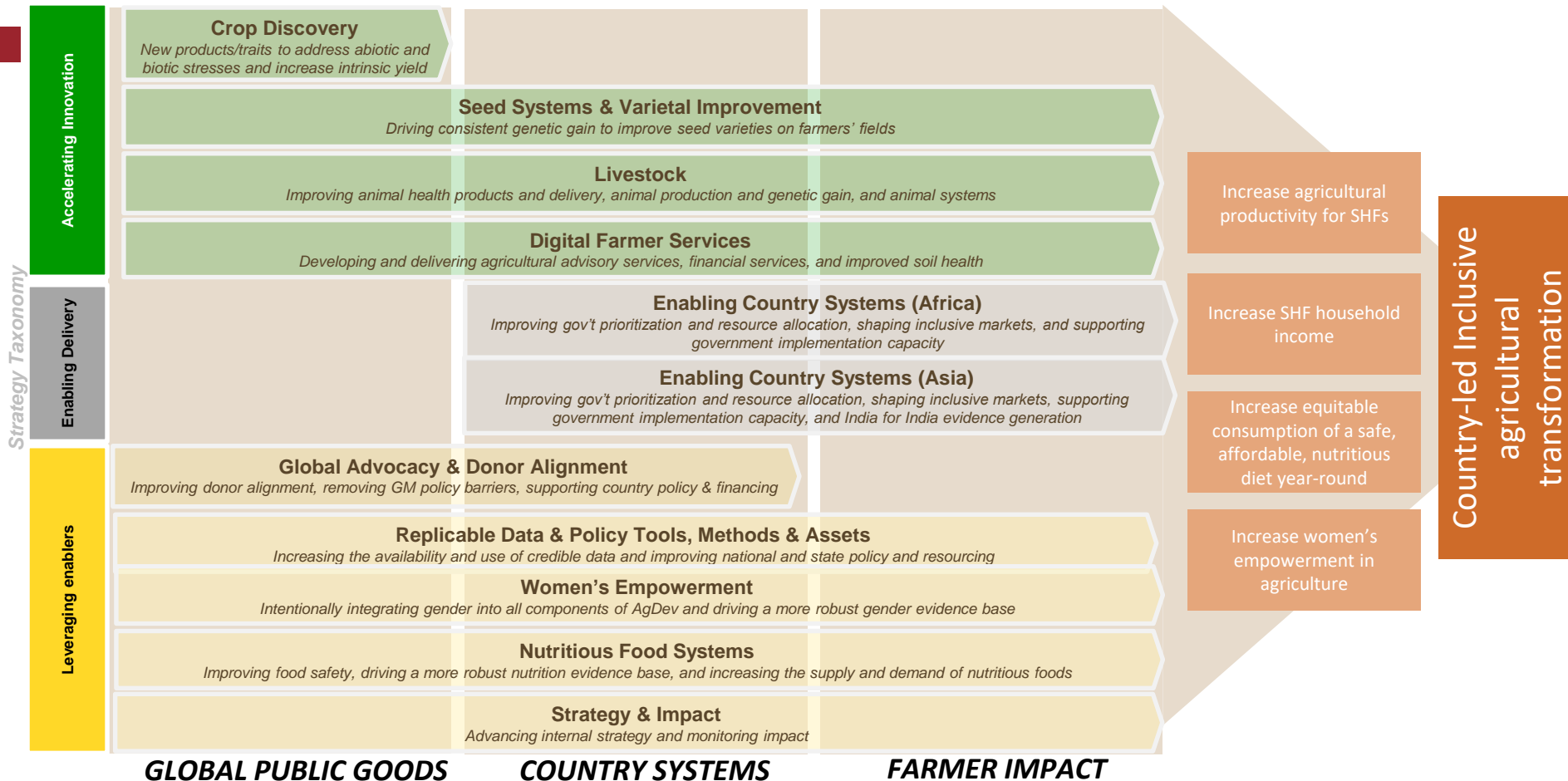
AGRICULTURAL TRANSFORMATION: Agricultural transformation is the process by which an agri-food system changes from being: (1) subsistence-oriented to more commercialized and productive; (2) farm-centered to more off-farm centered; (3) diversified at the farm-level but relatively undiversified at the system level, to more specialized at the farm-level but diversified at the system level.

COUNTRY-LED: An approach that is driven primarily by what goals, objectives, and constraints are identified by governments and partners in countries. Our means of engagement is primarily through countries as the scaling unit working with both private and public partners.

INCLUSIVE: Inclusion has three components: social, geographic, and economic. In order to be inclusive, the process must include all farmers, including women and those at all economic levels. Our focus is on ensuring the inclusion of rural SHFs making less than \$2/ day and those who are undernourished in the growth process.²

1) Adapted from P. Timmer. 2) Smallholder farmers (SHFs): Work on farms <4 ha.

STRATEGY OVERVIEW & PORTFOLIOS



Collaborative Partners

Our work is made possible by a large group of grantees in diverse organizations from government, academia, civil society, private sector. These include:

- National and local governments
- Consultative Group for International Agricultural Research (CGIAR) Centers
- Universities
- International civil society
- Local civil society
- UN Agencies
- Multinational private companies
- Local private companies
- Donor partners

For more information on specific information on specific partners, please visit our website at www.gatesfoundation.org.



Seed Systems and Varietal Improvement (SSAVI)

Our ambition: Develop and continuously deliver improved crop varieties to smallholder farmers in Africa and Asia that are higher-yielding, more nutritious, and more important to women farmers.

Portfolio rationale: Experience in countries has shown that steady, incremental yield gains result from inputs that include improved crop varieties and fertilizer.

Core priorities:

- *Modernize breeding systems*
- *Support transgenics and biofortification*
- *Develop innovative seed multiplication and distribution models*
- *Enable country and regional seed systems*

| Partner(s) | Description |
|---|---|
| Harvest Plus | Supporting the activities of the HarvestPlus Challenge Program to reduce micronutrient deficiencies in developing countries by breeding higher levels of essential micronutrients into staple crops |
| International Maize and Wheat Improvement Center (CIMMYT) | Strengthening CIMMYT-led maize breeding networks developing hybrids adapted to drought-prone and nitrogen-depleted maize systems in SSA |
| NC State University; International Potato Center (CIP) | Support accelerated breeding for high yield, drought tolerant, virus resistant, transgenic insect resistant, and high Beta carotene varieties; scaling up production and distribution of planting materials |

Digital Farmer Services (DFS)

Our ambition: Focus on innovations that can help smallholder farmers leapfrog many of the systemic constraints they face in raising their productivity and incomes, with a goal of at least half of the smallholder farm population in our focus geographies having access to and are benefitting from such digitally-enabled services within 10 years.

Portfolio rationale: digital reduces transaction costs through increased transparency, elimination of intermediaries and/or remote product delivery; supports products and services that are better designed to address farmers' specific needs; and enables increased integration between multiple services and products, allowing the end user to have seamless access to information needed to make decisions

Core priorities:

- *Accelerate innovations in soil health & agronomy*
- *Improve agricultural advisory services*
- *Unlock inclusive agricultural finance*
- *Develop and enable smart-farming*

| Partner | Description |
|---|--|
| Digital Green Foundation | Disseminating agricultural information via participatory video and mediated instruction in partnership with India's Natural Rural Livelihood Mission, in order to raise income and improve food security for 500,000 smallholder farmer households |
| Innovative Solutions for Decision Agriculture | Translating the approach of AfSIS (high resolution function soil map of Africa and African Soil Information Service) into long-lasting and wide impact while continuing to innovate |
| One Acre Fund | Innovating on existing models of delivery with a focus on sustainability and scale; serving as a learning investment in public good approaches to extension, agronomy R&D, and digital financial services |

DIGITAL FARMER SERVICES

Digitally-enabled farmer services accelerate productivity, income, resilience and growth for smallholders; contributing to IAT.



Soil Health and Agronomy

Digitally-enabled soil, land, and crop information systems, scalable from region to field, user-friendly and affordable, sourced by public and private sector partners.



Ag Advisory Services

Improve quality of content and increase delivery of content to SSPs through digital innovations.



Inclusive Ag Finance

Scale (digitally-enabled) agriculture financing models that advance inclusion, catalyze increased farm productivity, improve HH resilience and drive sustained income gains.



Smart Farming

Empower farmers with digital innovations designed for small scale producers that are inclusive, provide ROI and are supported by a robust ag-data ecosystem.

**Breeding
Systems**



**Seed
Systems**



**Soil Health
& Agronomy**



**Ag Advisory
Services**



**Inclusive
Finance**



**Smart
Farming**



**Greater Productivity
Increased Income
Better Nutrition
Women's Empowerment**

Q&A



Please type any questions that you have for the speakers in the chat box.

We will try to get to as many of your questions as possible. After the webinar, we will collect all unanswered questions and provide written responses on the MRR Innovation Lab website and the GRP website.

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Final Actions

Thank you for joining us today!

- Please do take a moment to fill out our exit poll
- If you have any further questions about this webinar, email Sophie (sejavers (at) ucdavis.edu)
- Visit the Markets, Risk and Resilience Innovation Lab website (<https://basis.ucdavis.edu>) to find all of our post-event materials, including a recording of today's event, links to resources, additional chat questions answered by our contributors, and more. While you are there, sign up for our monthly newsletter!
- Check out the Global Resilience Partnership website (<http://www.globalresiliencepartnership.org>) for more information about other upcoming events.



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