CATHOLIC RELIEF SERVICES

Measuring Indicators for Resilience Analysis (MIRA)

Helping Communities Identify Risk and Plan for It

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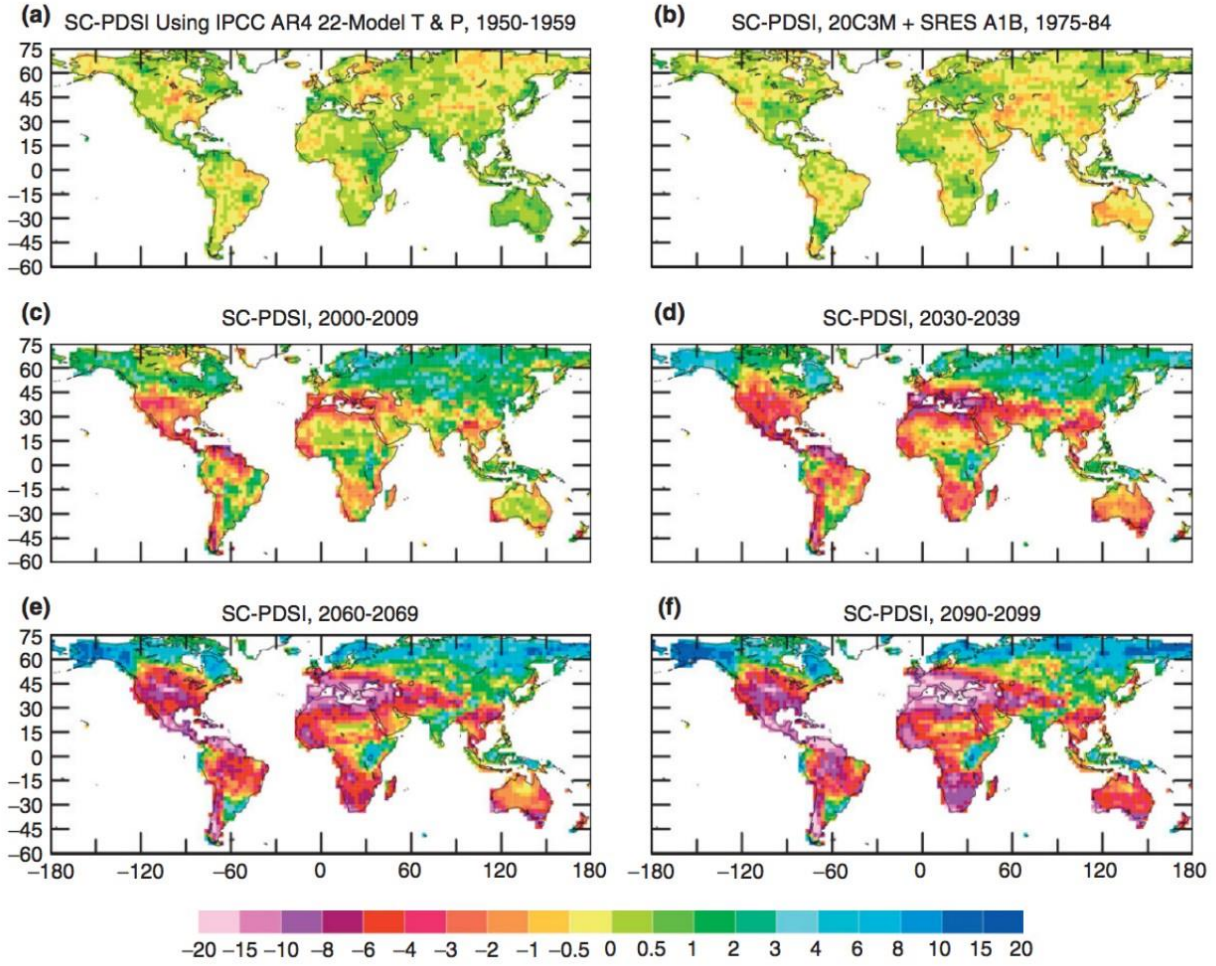
Why do we need to measure resilience?

Our understanding of poverty has changed from static to dynamic, acknowledging the high levels of unplanned risks poor households face in response to a number of shocks

New focus on resilience in programming, looking at underlying factors that determine the return to equilibrium after a shock by households and communities

It became understood that short-term shocks could have long-term consequences and that we needed a methodology for measuring resilience to these shocks



Drought Projections by end of century (Dai 2011)

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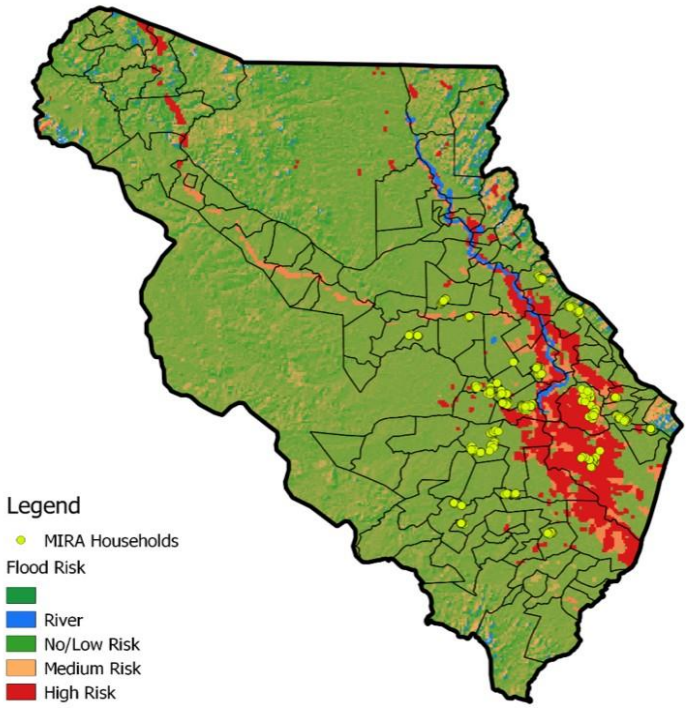
What is MIRA?



MIRA is a data collection and analysis scheme to measure and predict resilience among households prone to food insecurity one to two months ahead of time

Proof of concept by CRS and Cornell University with 580 households in Chikwawa. Expanded in 2017 to 2200 household in two adjacent districts in phase II (entire DFAP project area) in Malawi. Also rolled out in the Grand Sud in Madagascar in July 2018

Data is collected from sentinel households across the UBALE districts in Malawi and in the HAVELO districts in Madagascar on a monthly basis using a quick and simple CommCare application to enable accurate high-frequency results for analysis

MIRA Protocol

MIRA relies on embedded enumerators; who are hired from within each community and are trained on a smart-phone enabled survey application

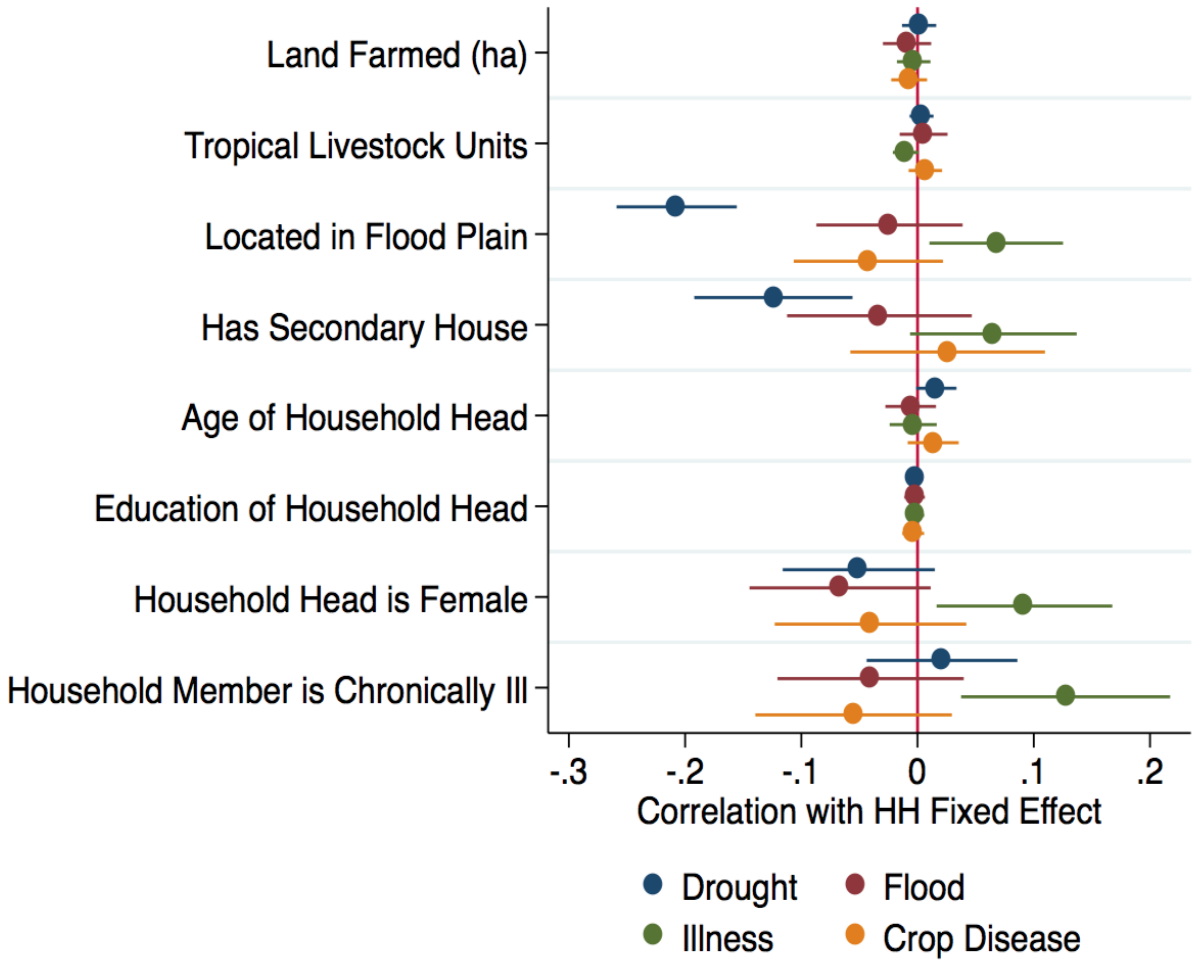
- *Qualitative research* phase, involving development and adaptation of the survey instruments and embedding data collection within existing programming and communities.
- *Data collection*, baseline followed by monthly high-frequency follow-ups on shocks and key indicators.
- *Research and analytics*, quantifying households' resilience for the purpose of impact evaluation, targeting and forecasting
- *Community Engagement* around identifying uses of the data and disseminating findings.

Resilience Analysis

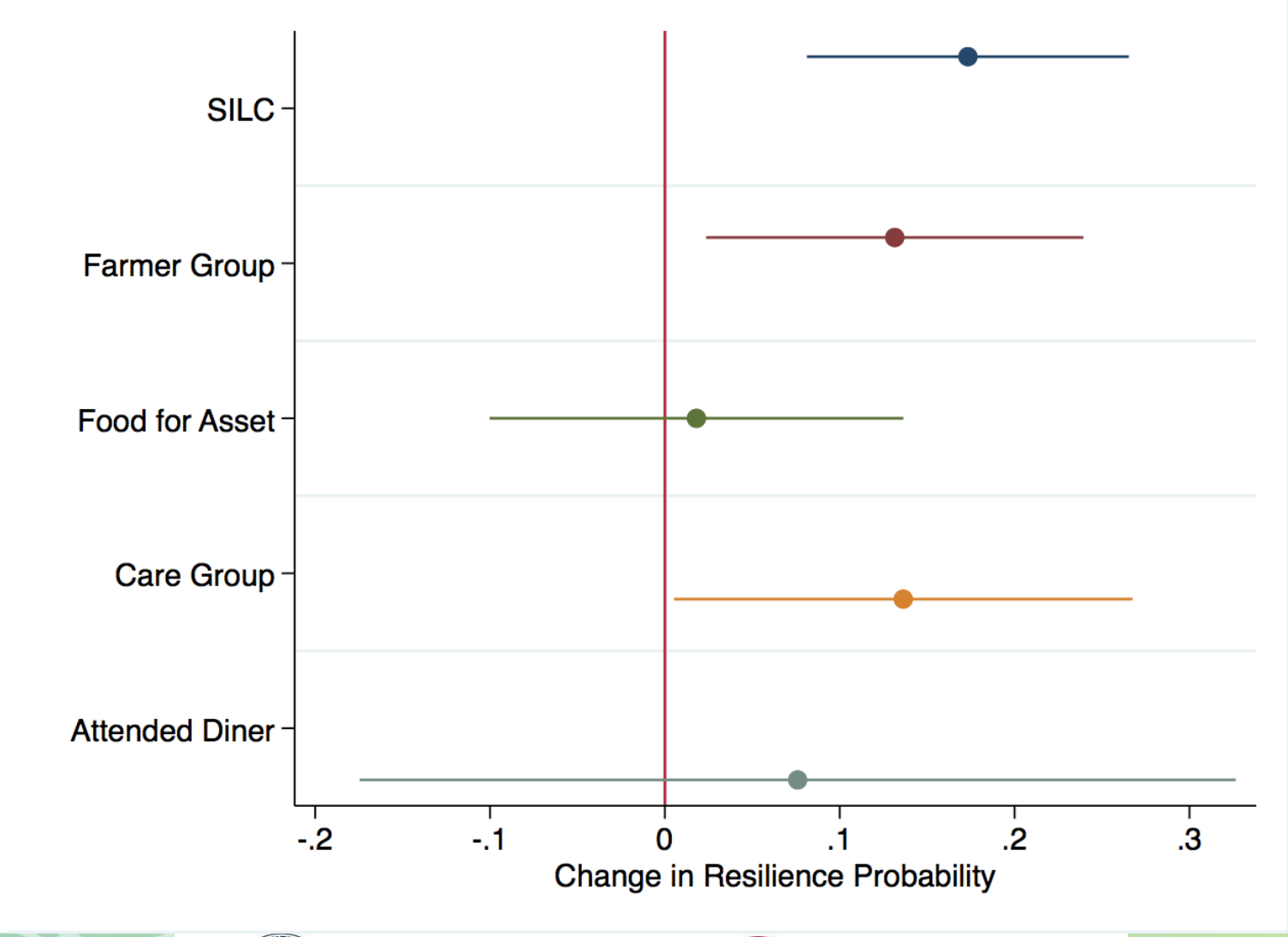
MIRA provides a real-time record of experienced shocks over time, linked to characteristics that may make them more or less resilient

By measuring how persistent the experience of a shock is, we can calculate how resilient a household is

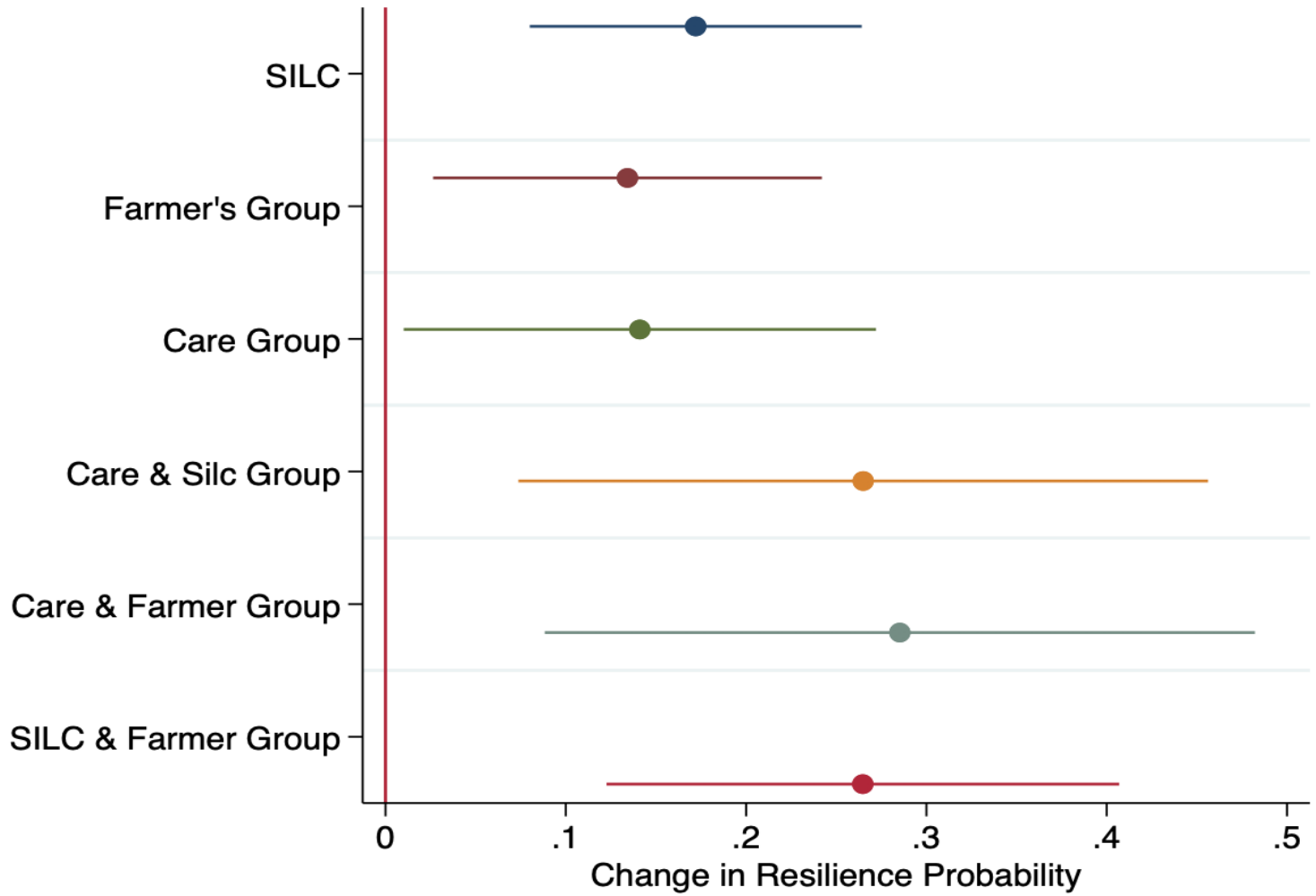
For instance, households in the flood plain are more resilient to drought but less resilient to illness.



UBALE Program Effect



UBALE Program Effect



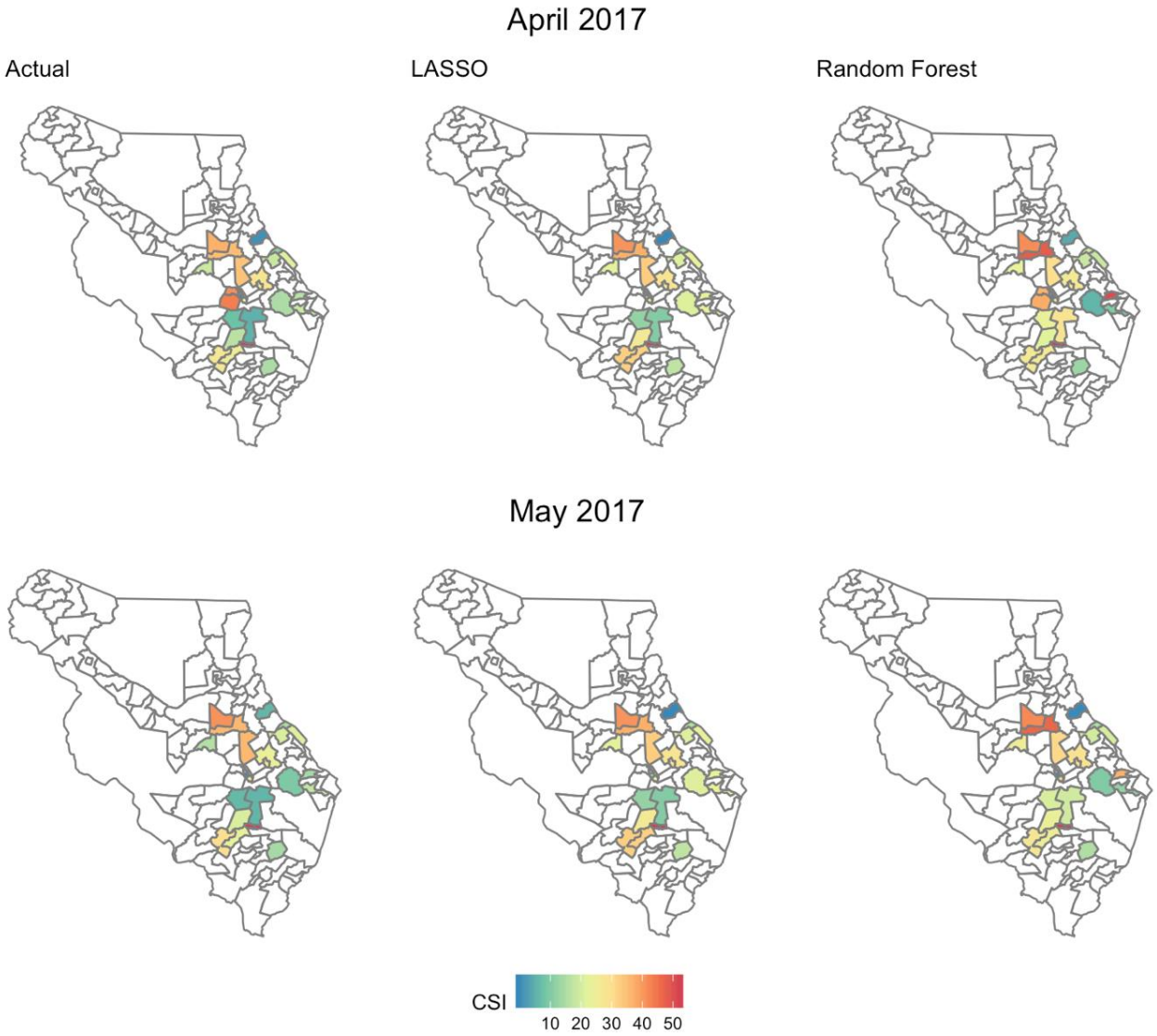
Predictive capacity

MIRA data also allows us to develop a predictive model using machine learning algorithms, one predicting the future incidence of food insecurity

Good predictors include

- location of fields
- proximity to flood plains
- sex of household head
- previous shocks experienced

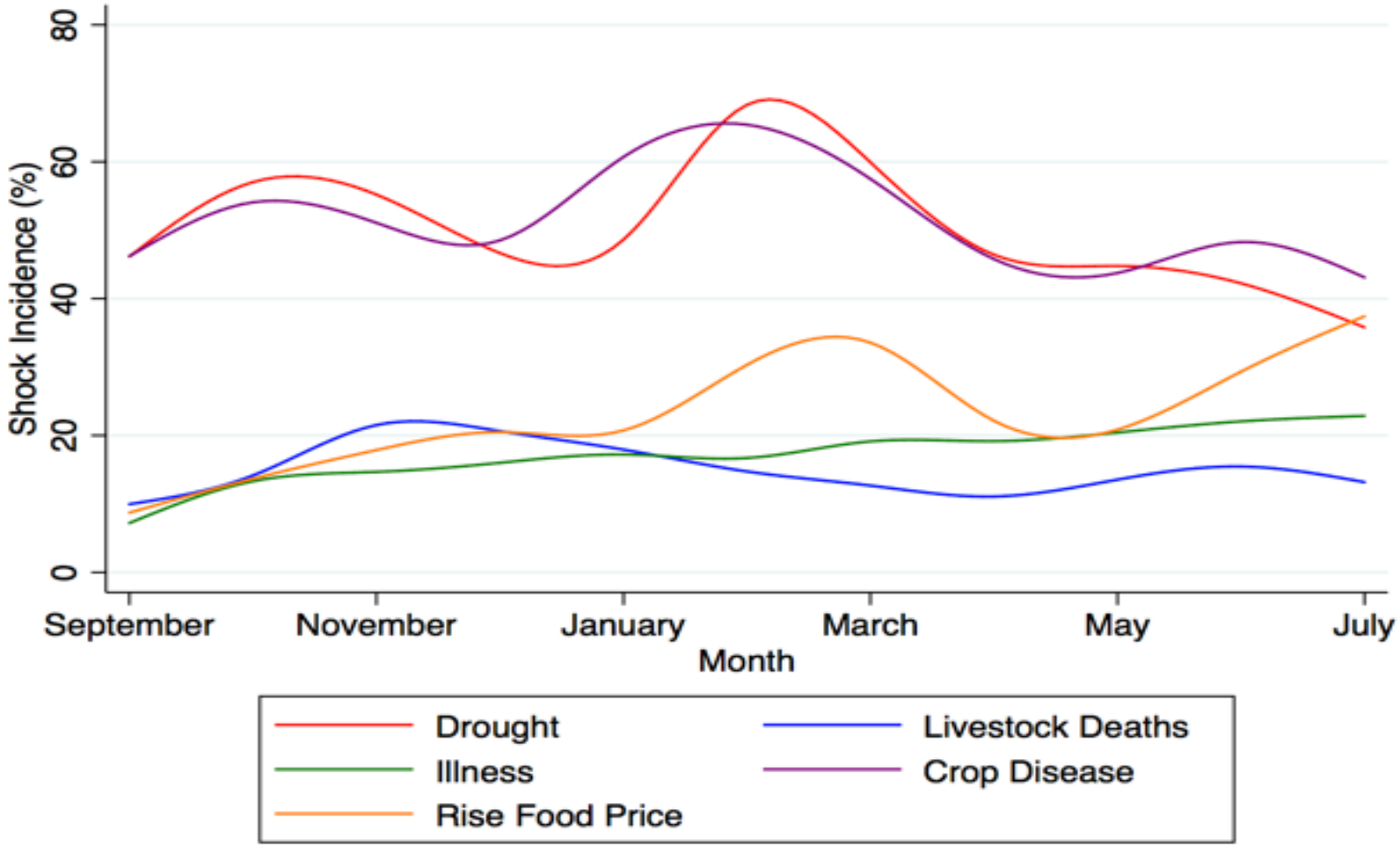
Tested two different modelling approaches (LASSO and Random Forest) to predict shocks



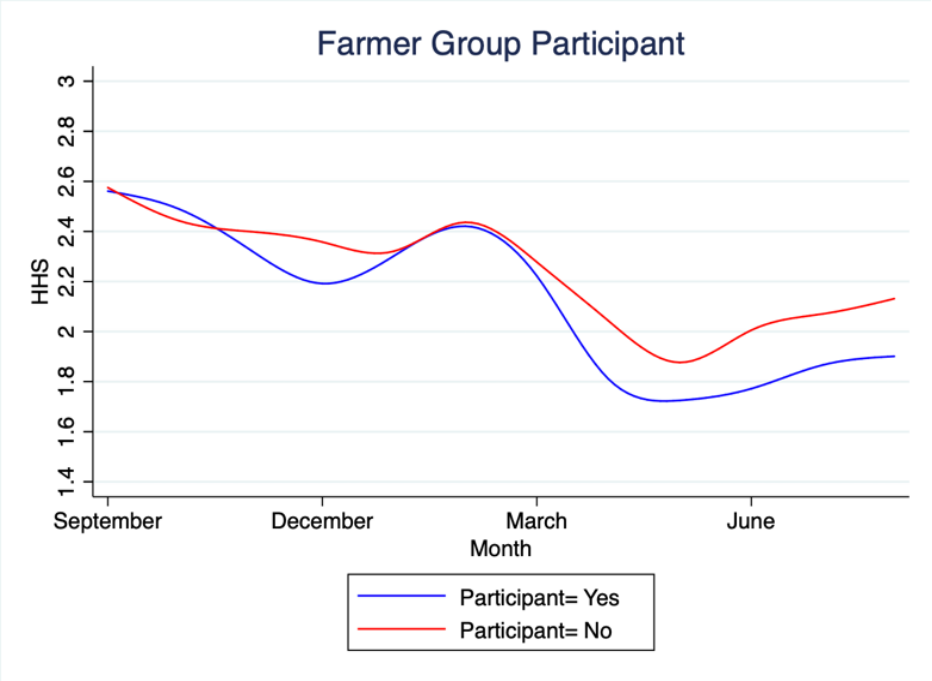
Real-time record of shocks

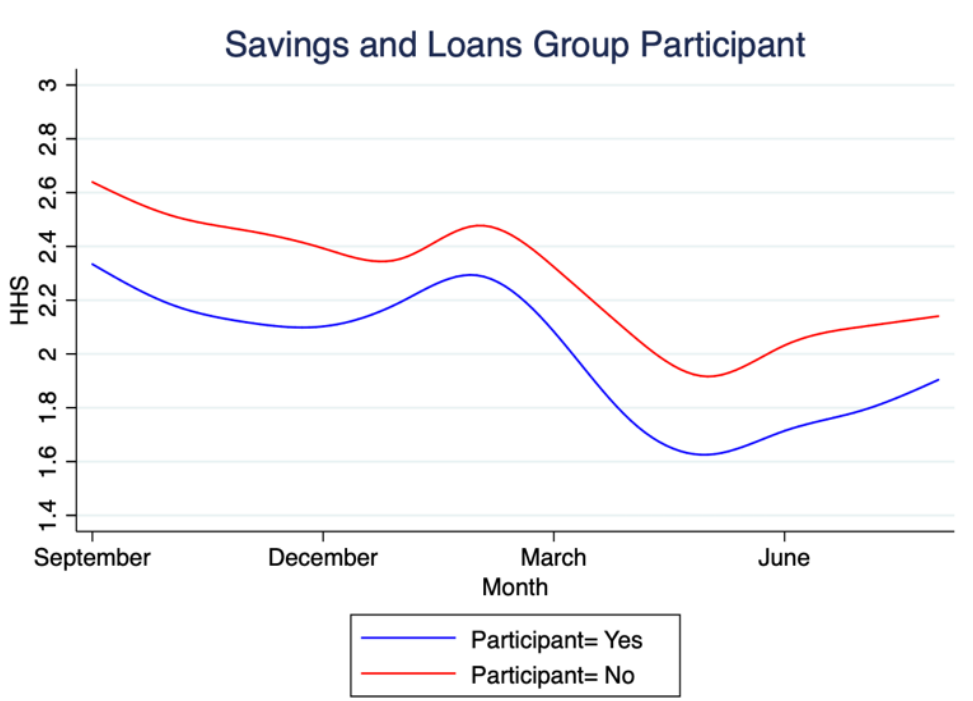
		Business Failure	Crop Disease/Pests	Drought/Dryspells	End of Assistance	Falling Crop Prices	Fire Damage	Flood	HH Break-up	HH Death	Illness	Livestock Disease and Death	Loss of Job/No Income	Rising Food Prices	Strong Winds	Theft
District	Blantyre Rural	21%	38%	27%	19%	7%	1%	1%	5%	6%	20%	11%	4%	38%	10%	5%
Traditional Authority Area	Kunthembwe	24%	54%	46%	14%	7%	0%	0%	6%	6%	18%	18%	4%	42%	8%	2%
	Somba	18%	21%	3%	25%	11%	1%	2%	5%	9%	23%	6%	4%	30%	14%	9%
	Chigalu	18%	28%	30%	22%	1%	0%	0%	1%	3%	24%	0%	2%	47%	6%	3%
GVH	Chikumbu	11%	91%	91%	6%	14%	0%	0%	0%	6%	6%	23%	0%	89%	0%	0%
	Gwadani	20%	3%	3%	3%	0%	0%	0%	0%	3%	20%	13%	0%	0%	0%	0%
	Kadikira	31%	71%	51%	23%	3%	0%	0%	3%	3%	51%	6%	3%	69%	0%	3%
	Kantimbanya	3%	40%	0%	86%	0%	0%	0%	3%	0%	43%	0%	0%	86%	26%	0%
	Kantukule	17%	17%	0%	6%	9%	0%	6%	3%	14%	6%	9%	3%	17%	3%	11%
	Kaphikantama	18%	85%	91%	47%	3%	0%	0%	3%	3%	9%	0%	0%	24%	18%	9%
	Kunthembwe	23%	91%	0%	6%	0%	0%	0%	3%	0%	0%	46%	3%	86%	0%	0%
	Mabala	11%	0%	0%	0%	9%	0%	0%	9%	0%	3%	11%	3%	0%	0%	9%
	Majola	23%	77%	100%	9%	0%	0%	0%	11%	9%	0%	14%	3%	3%	3%	0%
	Makanjira	17%	6%	20%	0%	0%	0%	0%	3%	3%	37%	11%	3%	63%	6%	3%
	Makunje	20%	6%	6%	6%	6%	3%	0%	3%	3%	17%	6%	3%	9%	0%	0%
	Mbanda	60%	89%	80%	77%	37%	0%	0%	34%	23%	3%	51%	17%	91%	63%	11%
	Mbvundula	6%	83%	97%	0%	3%	0%	0%	3%	0%	14%	3%	6%	3%	6%	0%
	Mdala	23%	0%	0%	17%	0%	0%	0%	0%	3%	46%	0%	3%	66%	0%	0%
	Mpagaja	9%	11%	0%	0%	0%	0%	3%	6%	6%	0%	3%	9%	0%	0%	6%
	Mwambula	3%	6%	0%	11%	6%	11%	0%	6%	6%	34%	14%	3%	23%	0%	26%
	Mwangata	83%	80%	0%	83%	57%	0%	0%	9%	34%	60%	14%	9%	86%	83%	17%
	Nthache	14%	0%	0%	3%	0%	0%	0%	0%	3%	17%	0%	3%	51%	0%	0%
	Somba 1	6%	11%	17%	6%	6%	0%	3%	3%	9%	29%	0%	9%	17%	0%	6%
	Somba 2	9%	3%	6%	9%	0%	0%	3%	3%	0%	6%	0%	0%	11%	3%	0%
	Stande	26%	17%	0%	11%	3%	0%	0%	0%	9%	29%	3%	3%	0%	0%	0%

Trend data over time



Trends in Food Insecurity Disaggregated by Ubale Interventions





Potential for scaling to other contexts

MIRA can track the incidence of emerging shocks and threats by simply adding a question to the instrument

- An example of mapping Fall Army Worm in Nsanje is to the left
- Added a flood module to capture the recent effects of cyclone Idai

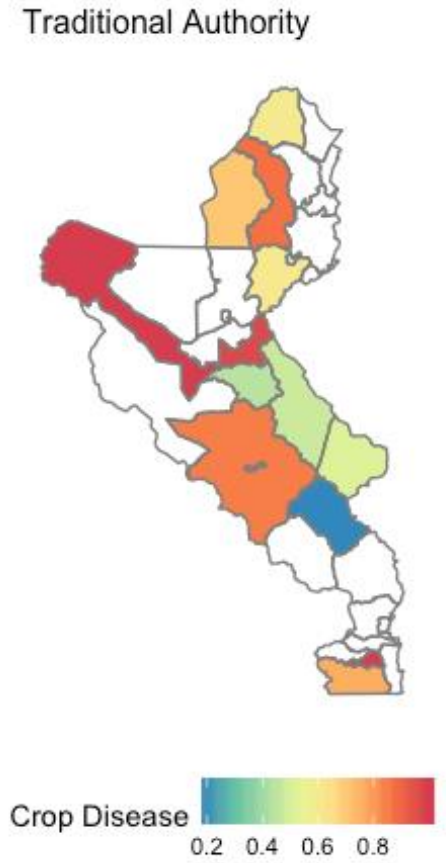
Sharing of dashboard with decentralized civil protection committees in the communities surveyed to utilize the data collected for planning and mitigation activities

Use MIRA for adaptive programming and improved early warning

Planned scale in other southern districts with PROSPER and other stakeholder

Cornell and CRS are replicating the protocol in Madagascar to expand proof of concept in different contexts

- Further expansion to other countries and projects possible and level of effort depends on data use plan



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