DOES NUTRITION-SENSITIVE SOCIAL PROTECTION BUILD LONGER-TERM RESILIENCE? EXPERIMENTAL EVIDENCE FROM BANGLADESH

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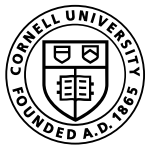

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Introduction: Resilience

- The literature on resilience in the context of low- and middle-income countries is vast, but much of it is unsatisfactory (Barrett et al, 2021).
  - Resilience is often neither clearly conceptualized nor measured in terms of the relationship between (ex-post) shocks, (ex-ante) stressors, and the dynamics of human well-being.
  - Many studies are based on cross-sectional data, whereas analysis of resilience should be dynamic.
  - There are very few studies that rigorously assess how interventions can enhance resilience.

- Three notions within "resilience" (Barrett et al, 2021).
- Resilience as capacity. A latent variable that captures the effects of some combination of observable and unobservable attributes that limit the adverse well-being effects of shocks or stressors (ex ante).
- Resilience as an outcome. Did a shock cause a welfare indicator to fall. (Were households resilient?) For how long and by how much? (ex post)
- Resilience as a normative condition. An individual's probability of achieving at least some minimal standard of living in an environment where shocks occur

Introduction: Social protection, food security and shocks

- Considerable evidence that cash and food transfer programs are effective in the short term at increasing household consumption and improving food security (Bastagli et al., 2016; Hidrobo et al., 2018).

- Evidence that these programs can protect households from poverty and food insecurity in the context of adverse shocks (Abay, Berhane, Hoddinott & Tafere, 2023; Ahmed, Bakhtiar, Gilligan, Hoddinott & Roy. 2023; Carraro & Ferrone, 2020; Premand & Stoeffler, 2020; Tranchant et al., 2019).

- There is mixed, limited evidence on whether cash or in-kind transfers on their own are enough to support sustained impacts on consumption ***after*** programs end.

- To the best of our knowledge, there is limited evidence on whether, ***after*** they end, these programs have protective effects when shocks occur

- Limited evidence on role played in terms of form of modality and whether Cash+ programming is more effective than cash alone

Introduction

- The contribution of this paper is an attempt to address these knowledge gaps

- Our study is situated in rural Bangladesh, specifically a social protection intervention implemented as a randomized control trial between 2012 and 2014

- Participants were re-interviewed in 2018 (pre-pandemic), 2021 (pandemic) and in 2022 (post-pandemic)

- This allows us to assess whether the intervention
  - Built up resilience capacity (2018 survey round)
  - Allowed households to be resilient (2021 survey round)
  - Meant that they were more likely to meet some minimal living standard after the Covid-19 shock ended (2022 survey round)

- This allows us to address the question posed in Barrett et al (2021): "Can we build reliable, replicated evidence to inform whether and how agencies can build resilience among populations vulnerable to shocks and stressors?"

Transfer Modality Research Initiative

- Data comes from randomized control trial in northern Bangladesh, the Transfer Modality Research Initiative (TMRI)

- Two year duration (June 2012 – May 2014) with the following treatment arms

- Monthly food transfer of 30 kg of rice, 2 kg of mosur (lentil) pulse and 2 liters of micronutrient fortified cooking oil
- Monthly cash transfer of Tk 1,500 (~19 USD)
- Monthly cash transfer AND Nutrition behavior change communication
- Control

- Note
  - TMRI also fielded in southern Bangladesh
  - There was an additional treatment arm that was ½ Food AND ½ cash: Tk 750 and 15 kg of rice, 1 kg of mosur (lentil) pulse and 1 liter of micronutrient fortified cooking oil
- These are excluded from this study

TMRI: Selection Criteria

- Study is situated in northwest Bangladesh (Rangur); **poorest** region in Bangladesh
- List *upazilas* (sub-districts or counties) where, in 2010, the **proportion of households living below the lower poverty line in Bangladesh was >25 percent**. Randomly select five *upazilas* from this list
- List all villages within these five *upazilas* ; Drop those with fewer than 125 households and villages that were considered peri-urban. Randomly select 200 villages. Randomly assign villages to four groups (three treatment arms, one control)
- Census conducted in each village. Calculate poverty score for each household based on age and education of the head, housing characteristics, ownership of consumer durables, land ownership, and household livelihoods
- **Women** participants had to: be **poor**; have at least one child aged 0-24 months; and not receive benefits from other safety net interventions. In each village, ten poor households meeting these criteria were randomly selected (2,000 households in total)

TMRI Selection Criteria: Outcome

- At baseline, study participants are women living in the poorest households, in the poorest villages in the poorest region in Bangladesh

- They are small in size around 4.8 members and nearly all (94%) male headed.

- Adults had low levels of schooling (mean grade attainment was 1.4 grades for men and 2.3 grades for women).
- They own little land, 15.4 decimals or 0.154 acres.
- Approximately 64 percent of household consumption goes on food.
- For every three Taka of assets owned, they held one taka of debt.

- 76 percent had consumption levels below WB extreme poverty level

TMRI: Key design features

- Transfers given to mothers of child 0-24m
- Transfer value was around 25% of monthly income, within range of Government of Bangladesh safety net programs

- Food ration and cash transfer were of equivalent value at baseline
- Intervention takes place in localities where market access is good; neither cash or food transfers affected food prices

- Cash payments made using mix of mobile phones (sms) and hand delivery
- All participants, including food and control households, received a mobile phone

- Payments to all treatment arms were made during the second week of each month. Where pay points served more than one treatment arm, participants in the BCC arm came at different times so that they would not have contact with beneficiaries in non-BCC treatment arms.

TMRI: Key design features, Nutrition Behavior Change Communication (BCC)

- Core component was weekly group meeting of 9-15 mothers with a trained community nutrition worker (CNW). Some meetings also included mothers-in-law, husbands or other household members

- Weekly meetings followed a curriculum covering: (1) overall importance of nutrition and diet diversity for health; (2) WASH; (3) micronutrients; importance and dietary sources; (4) best breastfeeding practices (5) complementary feeding; (6) maternal nutrition.
- In addition to presentations by CNW, there were discussions, role playing and songs
- Women attended ~48 sessions per year

- CNWs visited beneficiaries in their homes to observe household level practice and encourage the adoption of positive behaviors.
- They also met with influential community leaders to discuss the messages they were conveying to mothers.

- BCC added approximately 20% to cost of intervention

Outcome measure: Food Insecurity Experience Scale (FIES)

- The FIES consists of eight questions that progress from milder forms of food insecurity, such as whether the household had concerns about not having sufficient food, to more acute forms, such as experiencing hunger without eating, or not eating for an entire day.
- It is used by the Food and Agriculture Organization (FAO) to assess and monitor food insecurity at various levels, including progress towards Sustainable Development Goal 2.
- The FIES has been validated for use across the world (Ballard, Kepple, & Cafiero, 2019; Cafiero, Viviani, & Nord, 2018; Smith, Rabbitt, & Coleman-Jensen, 2017).
- The FIES captures both the breadth and severity of food insecurity experiences.

Outcome measure: Food Insecurity Experience Scale

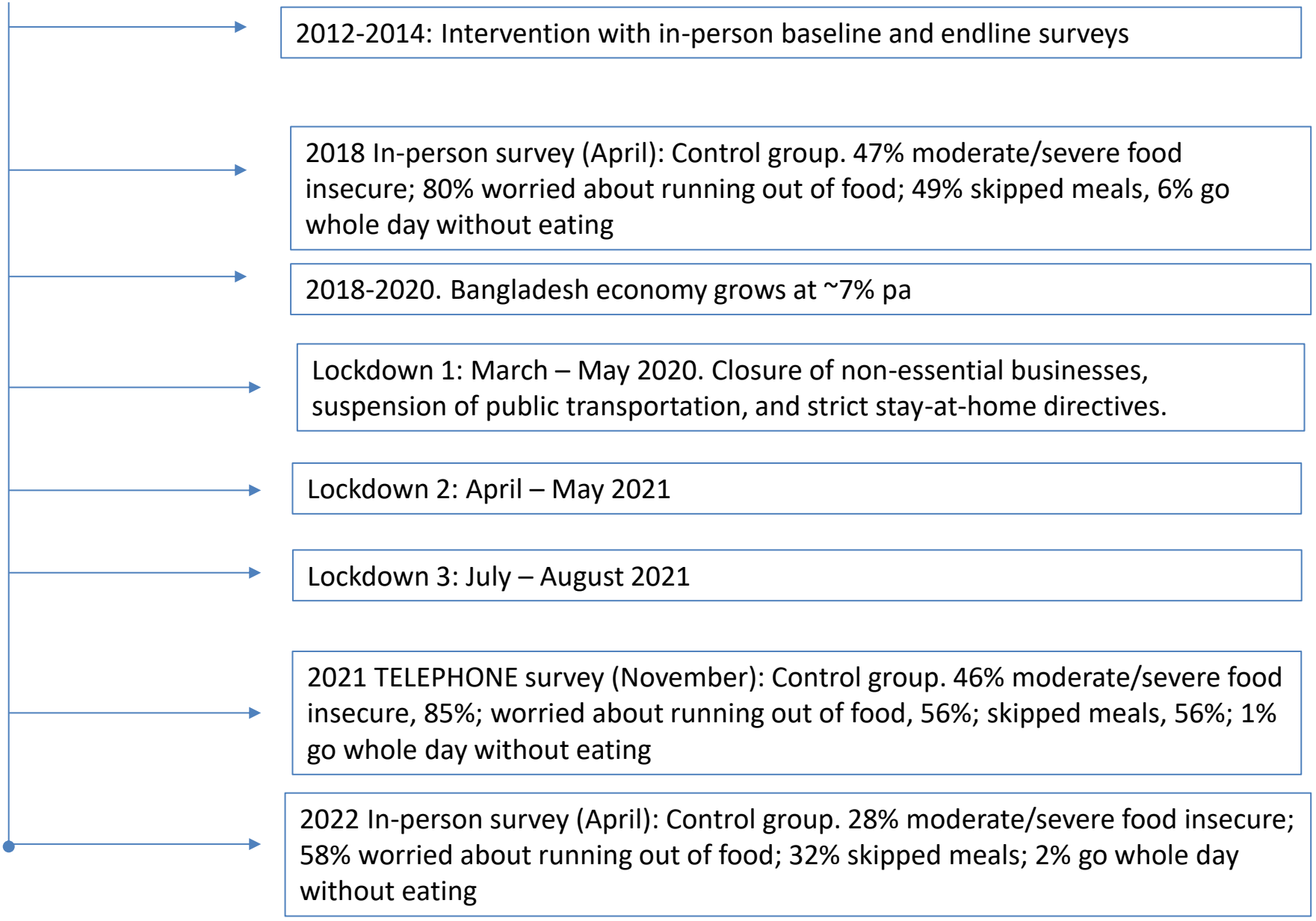
- The questions are, “In the last four weeks:

  (1) Did you worry that your household would not have enough food to eat?
  (2) Did you or any household member eat less than you thought you should because there was not enough food?
  (3) Were you or any household member not able to eat healthy and nutritious foods because of a lack of resources?
  (4) Did you or any household member only eat a few kinds of foods due to a lack of resources?
  (5) Were you or any household member hungry but did not eat because there was not enough food?
  (6) Did your household run out of food?
  (7) Did you or any household member skip a meal because of a lack of resources?
  (8) Did you or any household member go a whole day and night without eating anything at all because there was not enough food?”

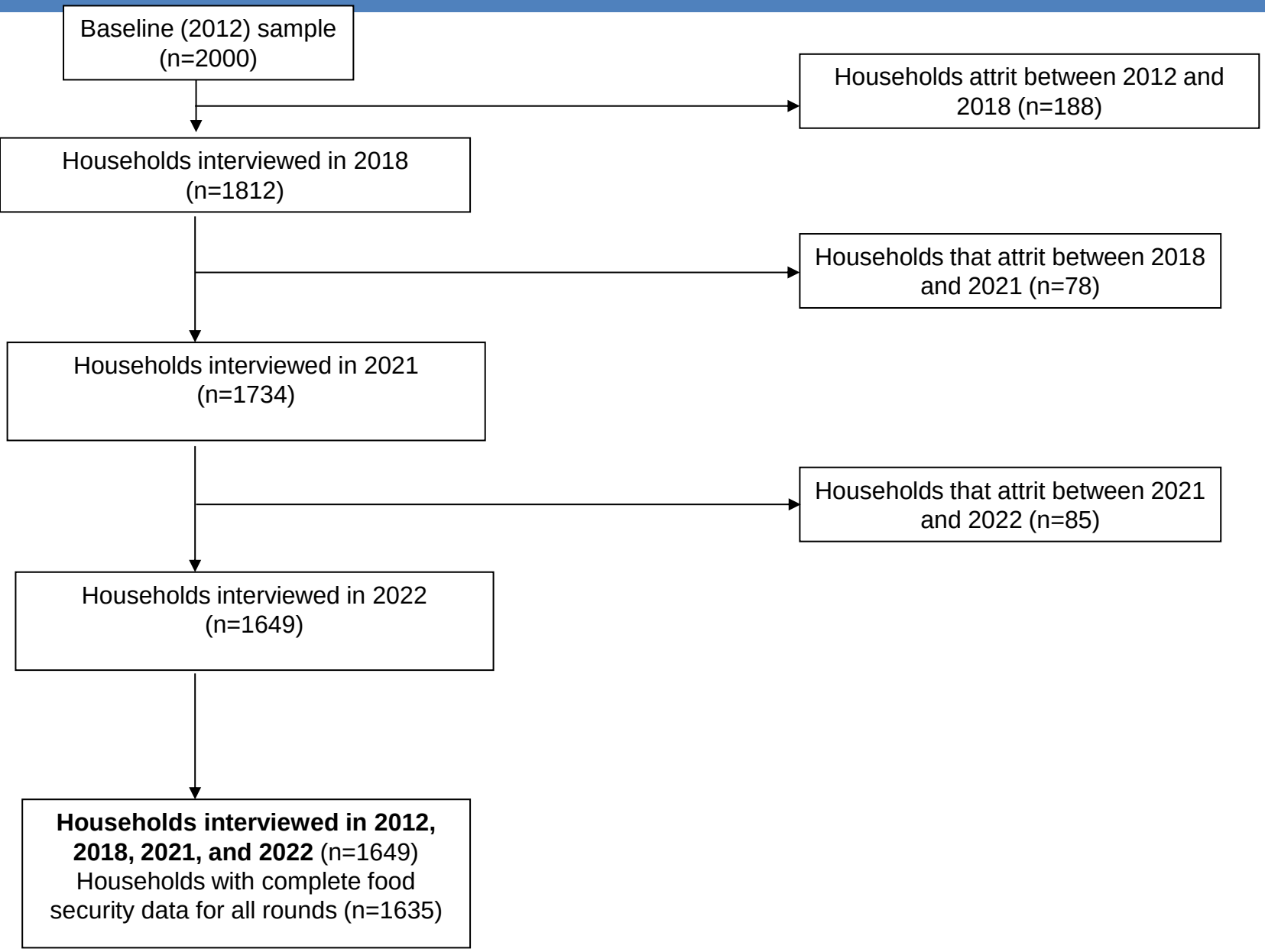
- Responses are coded to generate an index score ranging from 0 (if respondent answered no to all eight questions) to 8 (if respondent answered yes to all eight questions), with higher scores indicating more severe levels of food insecurity.

- Scores between 4 and 8 indicate experiences of severe constraints on food access and such households are classified as having experienced "moderate-to-severe food insecurity."

Study timeline and evolution of food insecurity



Participant Flow Diagram: TMRI



Issues in Tracking Households Over Time

Household splits

- Over time, household members marry, move, die and form new households. We adopt the following rules when a household split occurred:
  - Where the household had been in one of the treatment arms, we follow the household that contained the individual(s) who had participated in TMRI
  - Where the household had been in the control group, we follow the household that contained the individual(s) who was the primary respondent during the original TMRI study.

Attrition

- Is it “large” in magnitude (with implications for statistical power)
  - 345/2000 = 17.2% or 1.7% per year

- Is it correlated with treatment status
  - No

Impact estimator
Intent-to-treat model

$$Y_{it} = \beta_0 + \beta_F * Food_i + \beta_C * Cash_i + \beta_B * Cash\_BCC_i + \delta * Y_{i1} + \varepsilon_{it}$$

- where Y_{it} denotes the outcome for household *i*, at time *t*. Y_{i1} denotes baseline outcomes, β_0 is a constant term
- $Food_i$, $Cash_i$, and $Cash\_BCC_i$ are dummy variables for a household being assigned to Food, Cash, or Cash+BCC respectively
- Corresponding coefficients, β_F , β_C and β_B, capture treatment impacts of these arms relative to the control group
- ε_{it} is a term for unobservables. Standard errors account for clustering.
- OLS estimates for continuous outcomes; linear probability models for dichotomous outcomes
- To test whether estimated coefficients are statistically different from each other, we conduct Wald tests of equality and report the p-values.

Impact on Food Security, by round

	Food Insecurity Experience Scale				Moderately or Severely Food Insecure		
	(1)	(2)	(3)		(4)	(5)	(6)
	2018	2021	2022		2018	2021	2022
Cash + BCC	**-0.685*** **	**-0.454** **	**-0.565** **		**-0.136*** **	**-0.162*** **	**-0.125*** **
	(0.243)	**(0.197)**	**(0.220)**		**(0.050)**	**(0.053)**	**(0.042)**
Cash	-0.243	0.052	-0.275		-0.047	-0.018	-0.066
	(0.207)	(0.194)	(0.231)		(0.046)	(0.056)	(0.044)
Food	-0.043	-0.102	0.067		-0.036	-0.102*	0.021
	(0.203)	(0.183)	(0.246)		(0.044)	(0.053)	(0.048)
Control mean	3.28	2.94	2.32		0.47	0.46	0.28
p: Cash=Cash+BCC	0.06	<0.01	0.16		0.06	<0.01	0.10
p: Food=Cash+BCC	<0.01	0.04	<0.01		0.03	0.21	<0.01

Impact on FIES components, Cash+BCC, by round

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Worried about not having enough food	Could not eat healthy foods	Ate few kinds of food	Skipped meals	Ate less	Ran out of food	Was hungry but did not eat	Went whole day without eating
2018								
Control mean	0.804	0.697	0.677	0.482	0.222	0.230	0.120	0.049
Cash + BCC	**-0.092***	**-0.119****	**-0.175*****	**-0.143****	**-0.071***	-0.045	-0.014	**-0.026***
	(0.038)	**(0.040)**	**(0.050)**	**(0.049)**	**(0.037)**	(0.047)	(0.027)	**(0.014)**
2021								
Control mean	0.856	0.697	0.648	0.567	0.076	0.042	0.049	0.005
Cash + BCC	-0.007	**-0.124****	**-0.102***	**-0.188****	-0.013	**-0.026***	0.009	-0.002
	(0.042)	**(0.053)**	**(0.060)**	**(0.057)**	(0.019)	**(0.015)**	(0.021)	(0.004)
2022								
Control mean	0.585	0.487	0.513	0.320	0.154	0.193	0.115	0.020
Cash + BCC	**-0.082***	**-0.090***	**-0.082***	**-0.088***	**-0.058***	**-0.097****	**-0.065****	-0.002
	(0.050)	**(0.047)**	**(0.043)**	**(0.050)**	**(0.034)**	**(0.034)**	**(0.022)**	(0.009)

Robustness: Food Consumption Score

- We might worry about social desirability bias, especially during the phone survey

- Address this by considering a second measure, the Food Consumption Score (FCS)
  - Developed by the World Food Programme (WFP) to assess and quantify household dietary diversity and food consumption patterns
  - FCS is based on the number of days in the last week different food groups were consumed, weighted by the nutrient value of those food groups
  - FCS is correlated with caloric availability at the household level (Wiesmann, Bassett, Benson, and Hoddinott, 2009) while also capturing dimensions of dietary quality
  - FCS ranges from 0 to 112. A higher score indicates better dietary diversity and food consumption, reflecting a more nutritionally balanced diet and greater food security.
  - In Bangladesh, a score of 42 out of 112 is considered the "acceptable" threshold for food consumption. Scores below this mark are seen as 'low FCS', indicating heightened food insecurity (Bangladesh Food Security Cluster, 2014; Coleman et al, 2023).

FCS results, 2021

			Number of days consumed						
	FCS	Low FCS	Staples	Vegetables	Fruit	Pulses, legumes	Milk, dairy	Meat, fish, eggs	Oils, fats
Cash + BCC	**11.042*** **	**-0.063*** **	**-**	**0.233** **	**0.805*** **	**0.766*** **	**0.958*** **	**-**	**0.228**
	(1.673)	**(0.022)**		**(0.079)**	**(0.157)**	**(0.224)**	**(0.159)**		**(0.151)**
Cash	2.478	-0.020	-	0.068	0.246	0.100	0.128	-	0.035
	(1.859)	(0.026)		(0.089)	(0.196)	(0.222)	(0.175)		(0.158)
Food	2.133	-0.033	-	0.099	0.190	0.230	0.017	-	0.014
	(1.727)	(0.024)		(0.088)	(0.172)	(0.218)	(0.173)		(0.163)
Control mean	64.7	0.10	7.0	6.6	2.9	1.7	4.9	6.95	6.0
p: Cash=Cash+BCC	<0.01	0.03	-	0.01	<0.01	<0.01	<0.01	-	0.16
p: Food=Cash+BCC	<0.01	0.07	-	0.03	<0.01	0.02	<0.01	-	0.14

Mechanisms (1): Health effects.
Impact of treatment on COVID-related outcomes, 2021

	(1)	(2)	(3)	(4)	(5)	(6)
	Tested for Covid	Confirmed Covid	Death of HH member	At least 3 Covid symptoms	At least 4 Covid symptoms	Number of Covid symptoms
Cash + BCC	-0.006	-0.002	-0.011	-0.021	-0.016	-0.097
	(0.015)	(0.002)	(0.012)	(0.025)	(0.021)	(0.124)
Cash	-0.001	-0.000	0.004	-0.020	-0.015	-0.064
	(0.017)	(0.003)	(0.013)	(0.025)	(0.021)	(0.125)
Food	0.005	0.005	0.002	-0.020	-0.022	-0.113
	(0.015)	(0.005)	(0.013)	(0.025)	(0.019)	(0.114)
Control mean	0.044	0.002	0.042	0.059	0.044	0.291
p: Cash=Cash+BCC	0.76	0.31	0.23	0.98	0.96	0.78
p: Food=Cash+BCC	0.47	0.07	0.28	0.96	0.72	0.87

Mechanisms (2): Economic mechanisms
Impact on asset holdings (IHS transform), 2014 and 2018

	2014 (Endline)					2018 (4-year post program)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Total	Livest'k	Tools, equipmt	Cash Savings	Durables	Total	Livest'k	Tools, equipmt	Cash Savings	Durables
Cash + BCC	**0.74**	**1.74**	**0.33**	**2.08**	**0.31**	**0.32**	**0.84**	0.11	**0.68**	**0.15**
	(0.07)* **	**(0.24)*** **	**(0.08)*** **	**(0.23)*** **	**(0.05)*** **	**(0.08)*** **	**(0.27)*** **	(0.12)	**(0.20)*** **	**(0.07)** **
Cash	0.51	1.01	0.06	1.74	0.19	0.18	0.48	0.03	0.46	0.06
	(0.07)***	(0.26)***	(0.09)	(0.22)***	(0.05)***	(0.08)**	(0.31)	(0.12)	(0.20)**	(0.06)
Food	0.42	1.01	0.11	1.21	0.14	0.15	0.10	-0.07	0.31	0.01
	(0.07)***	(0.26)***	(0.08)	(0.25)***	(0.05)***	(0.09)*	(0.32)	(0.12)	(0.21)	(0.07)
Mean of Control	10.30	7.30	7.64	6.91	9.11	10.69	7.81	6.18	7.85	9.55
P-value: Cash=Cash+BCC	<0.01	<0.01	<0.01	0.11	0.02	0.08	0.21	0.51	0.22	0.14
P-value: Food=Cash+BCC	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.01	0.15	0.05	0.04

Mechanisms (2): Economic mechanisms
Impact on economic activity, 2021

	Main earner			Secondary earner		
	(1)	(2)	(3)	(4)	(5)	(6)
	HH has a main earner who worked last week	Main earner is self- employed	Main earner self-employed: poultry or cattle	HH has a 2nd earner who worked last week	2nd earner is self-employed	2nd earner self-employed: poultry or cattle
Cash + BCC	0.032	0.015	-0.005	**0.077****	**0.077****	**0.083****
	(0.022)	(0.041)	(0.020)	**(0.032)**	**(0.038)**	**(0.040)**
Cash	0.007	-0.075*	-0.014	0.056*	0.006	0.018
	(0.021)	(0.043)	(0.018)	(0.032)	(0.036)	(0.036)
Food	0.022	-0.017	-0.003	0.062*	0.038	0.066*
	(0.022)	(0.043)	(0.019)	(0.034)	(0.036)	(0.037)
Control mean	0.897	0.526	0.066	0.738	0.648	0.538
p: Cash=Cash+BCC	0.22	0.03	0.65	0.46	0.05	0.08
p: Food=Cash+BCC	0.64	0.42	0.89	0.62	0.29	0.63

Mechanisms (2): Economic mechanisms

Impact on reported severity of problems with accessing enough food

	First national lockdown (April – May 2020)			Most recent national lockdown (July – August 2021)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Minor/Moderate / Severe	Moderate/ Severe	Severe	Minor/Moderate / Severe	Moderate/ Severe	Severe
Cash + BCC	-0.001	-0.047	**-0.099***	-0.024	**-0.111****	**-0.117****
	(0.028)	(0.043)	**(0.057)**	(0.029)	**(0.056)**	**(0.047)**
Cash	0.048**	0.052	0.020	0.003	-0.019	0.027
	(0.023)	(0.042)	(0.057)	(0.028)	(0.055)	(0.056)
Food	0.044*	0.031	0.027	0.027	0.019	0.013
	(0.024)	(0.043)	(0.057)	(0.028)	(0.051)	(0.055)
Control mean	0.878	0.716	0.457	0.885	0.689	0.362
p: Cash=Cash+BCC	0.05	0.02	0.04	0.34	0.11	<0.01
p: Food=Cash+BCC	0.08	0.07	0.03	0.08	0.02	<0.01

Summary

- Past participation in TMRI – specifically the Cash+BCC arm – resulted in households being more ***resilient*** to the malign effects of the pandemic on household food security
  - This result is robust to how food security is measured

- A plausible mechanism for this was that Cash+BCC households built up holdings of livestock (and savings) in the post-intervention, pre-pandemic period; thus, they had higher ***resilience capacity***.
  - Higher income generating capacity
  - (Speculatively) greater ability to self-provision
  - An alternative explanation, less exposed to health shocks arising from the coronavirus, does not seem to be plausible

- Cash+BCC households were more likely to be food secure across all three rounds. Their resilience has a ***normative quality***

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