"We're All in This Together": Addressing Poverty in Village Economies

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Addressing rural poverty

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Addressing poverty requires approaches that can increase the incomes of agricultural households in high-poverty areas.

- Such poverty is complex as the poor face multiple constraints, suggesting the need for multi-faceted approaches (Banerjee et al., 2015, Sedlmayr et al., 2020).
- The approach must reach many households in the community at once to reduce aggregate poverty while remaining effective.

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A universal program saves costs on identifying and verifying who's eligible, avoids exclusion errors, and may be perceived as fairer.

However, a universal program may

- be more expensive unless accompanied by cost savings
- suffer from congestion as everyone receives the same inputs and training at once
- not benefit the poorest who lack the complementary skills and inputs needed to compete with better-off households.

This study

We conducted an RCT in 335 villages in western Uganda.

- Villages in rural western Uganda have high poverty rates of 43% (UBOS, 2021), similar to the Sub-Saharan African average.
- Randomized clusters of 2-4 villages sharing services and infrastructure to either receive a universal livelihoods program (treatment) or not (control).
- Randomly sampled 4,000 households from these villages

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Universal program: provision of agricultural inputs and small livestock, training and mentorship, health support and the formation of saving groups to all households within a village over 24 months. Group training and mentorship keep costs low.

We examine the effects on household economic and social welfare 3 years after the program start.

Results: the program substantially improves household welfare for all

- Households in treatment villages have 40 USD PPP (25%) higher income, 410 USD PPP (32%) higher wealth and 60 USD PPP (10%) higher consumption.

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- No evidence of effects on prices. Some evidence of positive spillovers between treated clusters.

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The universal program has a low cost per household of only 321 USD PPP due to group trainings and mentorship, and a small asset transfers.

- Benefit-cost ratio at least 5x targeted multifaceted programs after 3 years (Banerjee et al., 2015) and large unconditional cash transfers (Orkin et al., 2023).

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   - Positive complementarities in treatment and large multipliers result in greater benefits when treating more people (Banerjee et al., 2019, Egger et al., 2022).

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2. We provide evidence on effective anti-poverty programs
   - Unconditional cash transfers are widely used, but evidence on long-term effects is mixed and few studies look beyond 2 years (Blattman et al., 2020, Crosta et al., 2024, Haushofer and Shapiro, 2018)
   - Graduation programs are effective in the short and long term, but expensive and complex to scale (Bandiera et al., 2017, Banerjee et al., 2015, 2021)

   We demonstrate large welfare gains after 3 years at low cost in a relevant setting.

Outline

Intervention details: Universal livelihoods program

Multifaceted programme providing **household inputs, training, health support and saving groups** delivered over a 6-month intensive phase (input provision and training) followed by 18 months of check-ins.

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Every household in eligible villages receives the Raising the Village (RTV) programme.

- Livestock and agricultural inputs **tailored to the village.**
- **Small livestock**, usually a pig through pass-on model.
- Training in groups at community meetings.
  - **Committees** receive additional training and provide on-going mentorship in agriculture, livestock and hygiene.

Data and timeline

Timeline

1. **Household listing:** ∼30,000 households in 335 villages.
2. **Baseline survey:** 3,852 households (June - Nov 2020).
3. **Intervention:** staggered program rolled out starting in Oct 2020; Partner data shows on average over 90% of households in a village attend each training.

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We also conducted a midline survey, a village leader survey, and a lean season consumption survey.

Randomisation

Cluster: 114 clusters of 2-4 villages sharing access to services and markets were randomized to treatment or control.

- Stratified by median splits of village means of a household assets index, a village services index and the district.

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Household: Used the household listing to randomly select 24 households per village stratified by marital status, split into 12 targets and 12 reserves.

- Enumerators first approached targets, then reserves, until they baselined 12 households.
- In expectation, our sample is representative of the village.

Household profile

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Economic profile:

- All households carry out some farming; 97% of households own their land.
- Own food production is two-thirds of food consumption.
- Crop sales make up half of income on average, with casual labour and business profits 20% of income each.
- 25% of households own a non-farm enterprise.

Empirical specification

$$Y_{ic} = \beta_0 + \beta_1 \text{Treated}_c + \delta Y_{0ic} + \alpha_s + \epsilon_{ic} \quad (1)$$

Y_{ic} is an outcome of interest for a household i in cluster c,
Y_{0ic} is the equivalent measure in the baseline survey,
Treated_c is an indicator for the household being in a cluster that was randomly assigned to receive RTV's programme,
α_s are stratification fixed effects,
ϵ_{ic} is a random error term clustered at the cluster level.

Outcomes were pre-specified in a pre-analysis plan.
Values shown in 2023 USD PPP 1:1315, adjusted for inflation and winsorized at 1%..

Outline

Improvements in all economic outcomes

	(1) Monthly Income	(2) Labour Supplied (Days)	(3) Non-Land Wealth	(4) Monthly Consumption
Treated	39.706	3.283	389.356	58.854
	(9.045)	(1.295)	(82.058)	(14.371)
	[0.000]***	[0.013]**	[0.000]***	[0.000]***
	{0.000}***	{0.026}**	{0.000}***	{0.000}***
Control Mean	154.713	43.918	1,274.839	583.097
N	3,560	3,560	3,560	3,560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. p-values are in square brackets and sharpened q-values controlling for the false discovery rate across outcomes are in curly brackets.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Large increase in household economic activity and in consumption

1. 26% increase in household income driven by crop sales. ▸ Income
   - Households made non-monetary investments in farming such as the use of organic fertilisers and improved seeds. Yields increased.
   - Households are more likely to run a business, have higher sales and stocks ▸ Business

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3. One-third increase in wealth, driven by an increase in all components ▸ Wealth ▸ Objective verification ▸ Livestock
   - Household wealth increases are facilitated by saving groups ▸ Groups ▸ Group Quality

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4. 10% increase in consumption ▸ Consumption
   - Increase in produced food consumption, increase in diet diversity and large declines in hunger ▸ Food Consumption
   - Consumption effects larger during the lean season ▸ Lean consumption
   - No increased expenditure on education ▸ Child-Level Education

We find positive effects of treatment throughout the distribution and no evidence of heterogeneity

Effects are seen throughout the distribution and across all quantiles for all main outcomes. ▸ Consumption QTEs ▸ Income QTEs ▸ Wealth QTEs ▸ Consumption Distribution ▸ Income Distribution ▸ Wealth Distribution

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Positive effects of the program do not depend on household or village type.

- No heterogeneity by the following pre-specified dimensions: consumption, wealth, enterprise ownership, age, education, marital status, mental health, preferences or poverty. ▸ Household
- No heterogeneity by village characteristics such as size or equality. ▸ Village
- Use of random forests following Chernozhukov et al. (2018) shows no evidence of heterogeneity in treatment effects by observables. ▸ ML

Outline

Substantial improvement in well-being

- Physical health improves including a decrease in respondent inability to work
  - Physical health index
  - Households make investments in objectively verified health and hygiene practices
    - Objective health investments
  - Child health improves and children are less likely to miss school due to illness
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- Mental health improves including a decrease in depression measured using the validated PHQ-9 scale ▸ Mental health index
- Psychological outlook improves - driven by higher aspirations and expectations for the future ▸ Psychological index ▸ Aspirations index
- Social cohesion, trust and community participation increase ▸ Social cohesion

Outline

General equilibrium effects

No impact on migration in the household. ▸ Migration

No price effects. ▸ Prices No change in the number of variety of goods sold in local markets. ▸ Variety

Little evidence of spillovers to control households but some positive spillovers on treated households. ▸ Spillovers

Outline

Cost benefit comparison

After 3 years, the benefit-cost ratio of the program is 356%.

	(1) RTV	(2)	(3) TUP	(4)	(5) Cash
Country	Uganda	Average	India	Bangladesh	Kenya
Cost-benefit Year	2023	2014	2014	2007	2018
Total cost (as if incurred yr 0)	321	3,717	1,257	1,121	2,149
(a) Inflated total cost yr3	372	4,303	1,455	1,298	2,388
(b) Y1 annual nondurable consumption ITT	281	351	344	61	564
(c) Y2 annual nondurable consumption ITT	281	351	344	106	363
(d) Y3 household asset ITT	105	18	6	40	406
(e) Y3 annual nondurable consumption ITT	656	251	251	237	202
(f) Total benefit (b)+(c)+(d)+(e)	1,321	971	945	444	1,553
Benefit-cost ratio (f)/(a)	**356%**	**23%**	**65%**	**34%**	**65%**

Notes: Cost-benefit year gives the USD PPP year for costs and benefits reported in that paper. Costs deflated at 5% annual rate to year 3 for all programs. All numbers shown are annual on a per household basis. All costs and benefits shown on a per household basis. TUP simple average and TUP India taken from Banerjee et al., 2015 of 6 RCTs examining the TUP program at 3 years, prices in 2014 USD PPP. TUP India is the country with the highest benefit-cost ratio. Banerjee et al., 2015 and Mahmud and Riley 2024 did not carry out surveys at the end of Y1, so the Y2 surveys are used. TUP Bangladesh taken from Bandiera et al., 2017 examining the TUP program at 7 years, prices are in 2007 USD PPP, assets is from Y4. Cash Kenya is taken from the cash transfer arm of Orkin et al. (2023).

Conclusion

We provide experimental evidence on a novel universal livelihood program provided to all households in rural villages.

We find large economic and social welfare gains for households in treated villages.

No evidence that the program is monopolised by the better-off.

Due to its low cost and large impact, the program has a benefit-cost ratio 5-15x other anti-poverty programs, making it a cost-effective way to alleviate rural poverty.

Appendix

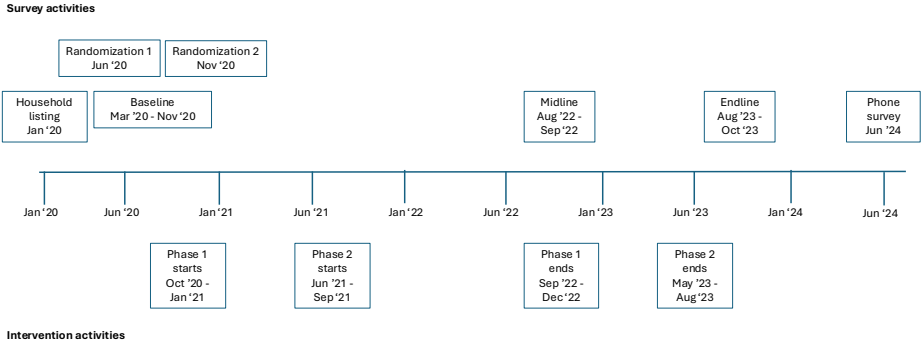
Attrition

	(1) Endline	(2) Midline	(3) Consumption Phone Survey
Treated	-0.005	-0.004	0.003
	(0.011)	(0.014)	(0.012)
Control Mean	0.08	0.14	0.03
N	3852	2618	3852

Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All regression include stratification fixed effects. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Timeline



Go back

Baseline balance and summary statistics

Variable	(1) Control Mean/(SE)	(2) Treatment Mean/(SE)	(1)-(2) Pairwise t-test Mean difference
Household head age	44.244	43.972	-0.212
	(16.176)	(15.573)	(0.635)
Female headed HH	0.254	0.257	0.006
	(0.435)	(0.437)	(0.014)
Total consumption	230.727	224.430	-4.714
	(198.225)	(188.367)	(11.184)
Total income	109.542	104.512	-3.377
	(227.238)	(184.280)	(9.615)
Total labour supply	44.065	39.713	-3.294
	(37.084)	(34.658)	(2.873)
Non-land wealth	393.128	400.753	15.403
	(564.235)	(557.686)	(20.169)
Observations	1,948	1,904	3,852

Omnibus test 21 baseline covariates F-statistic 0.52. Go back

25% increase in household income driven by crop sales

	(1) Total Income	(2) Farm Sales	(3) Livestock and Animal Product Sales	(4) Business Profits	(5) Wage Income	(6) Rental Income
Treated	39.192	20.317	4.443	12.631	1.514	0.509
	(9.040)	(4.515)	(1.501)	(4.659)	(2.856)	(0.725)
	[0.000]***	[0.000]***	[0.004]***	[0.008]***	[0.597]	[0.484]
		{0.000}***	{0.021}**	{0.030}**	{1.000}	{1.000}
Control Mean	154.151	76.862	11.765	33.208	28.322	4.057
N	3,560	3,560	3,560	3,560	3,551	3,560

Notes: Monthly total household income. Farm sales are total sales of crops in seasons one and two and annual sales of perennial crops, scaled to monthly. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. p-values are in square brackets and sharpened q-values controlling for the false discovery rate across outcomes are in curly brackets.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

▸ Go back

Households are more likely to run a business and have higher sales

	(1) Has a business	(2) No of workers	(3) Sales	(4) Expenses	(5) Stock	(6) Assets
Treated	0.052***	0.007	31.477**	2.982	43.814*	21.065
	(0.015)	(0.029)	(15.212)	(2.507)	(24.014)	(16.577)
Control Mean	0.25	0.15	121.11	19.37	206.25	132.66
N	3560	3560	3560	3560	3560	3560

Notes: Columns (3)-(6) are in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Businesses report more customers from outside the village.

Effects are driven by new businesses not the expansion of existing businesses. ▸ Enterprise level analysis

▸ Go back

Observable farming investments

	(1) Observe Compost Pit	(2) Observe Post-Harvest Handling Equipment	(3) Observe Garden
Treated	0.237***	0.036**	0.088***
	(0.018)	(0.016)	(0.016)
Control Mean	0.198	0.265	0.116
N	3,560	3,560	3,560

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Go back

Crop yields and prices

	(1) Crop Sales	(2) Beans Sales	(3) Maize Sales	(4) Beans Yields	(5) Maize Yields	(6) Beans Price	(7) Maize Price
Treated	87.212***	28.533**	27.584*	20.657**	43.561	-0.010	0.018**
	(26.007)	(11.193)	(16.662)	(9.627)	(29.273)	(0.031)	(0.008)
Control Mean	392.201	128.755	184.087	125.185	354.468	2.071	0.759
N	3,560	3,560	3,560	3,560	3,560	3,004	2,926

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Go back

Increase in household labour supply to own activities and away from casual labour outside

	(1) Total Labour Supply	(2) Household Farm	(3) Household Livestock	(4) Household Business	(5) Salaried	(6) Casual
Treated	3.447	1.606	1.324	0.863	0.420	-0.790
	(1.225)	(0.919)	(0.404)	(0.343)	(0.264)	(0.226)
	[0.006]***	[0.083]*	[0.001]***	[0.013]**	[0.115]	[0.001]***
		{0.237}	{0.008}***	{0.050}**	{0.262}	{0.008}***
Control Mean	43.332	27.639	6.696	4.370	1.474	3.266
N	3,560	3,560	3,560	3,457	3,560	3,560

Notes: Labour supply is reported in days aggregated across all household members. Farm, livestock, and business is labour supply to household economic activities. Labour supply is measured for the last 4 weeks except for to household farm for which it is measured over the two farming seasons and then scaled to 4 weeks. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. p-values are in square brackets and sharpened q-values controlling for the false discovery rate across outcomes are in curly brackets.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Go back

Under 16 labour supply

	(1) Total Labour Supply	(2) Household Farm	(3) Household Livestock	(4) Household Business	(5) Casual	(6) Salaried
Treated	0.111	0.168	0.040	0.055	-0.130***	-0.022
	(0.496)	(0.366)	(0.216)	(0.046)	(0.042)	(0.032)
Control Mean	5.834	3.887	1.589	0.072	0.230	0.055
N	3,560	3,560	3,560	3,560	3,560	3,560

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Go back

One-third increase in wealth, driven by an increase in all components

	(1) Total Non-Land Wealth	(2) Assets	(3) Livestock Value	(4) Savings	(5) Loans Given	(6) Loans Outstanding
Treated	409.923	109.342	188.747	61.464	13.470	31.559
	(81.702)	(31.198)	(47.398)	(19.420)	(12.292)	(19.111)
	[0.000]***	[0.001]***	[0.000]***	[0.002]***	[0.275]	[0.101]
		{0.004}***	{0.001}***	{0.008}***	{0.629}	{0.290}
Control Mean	1,274.839	620.103	606.773	207.113	88.261	-246.944
N	3,560	3,560	3,560	3,543	3,558	3,558

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. p-values are in square brackets and sharpened q-values controlling for the false discovery rate across outcomes are in curly brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

▸ Objective verification ▸ Livestock

▸ Go back

Enterprise level analysis

	(1) Profits	(2) Sales	(3) Expenses	(4) Stock	(5) Assets	(6) Stock Purchases	(7) Asset Purchases
Treated	15.133	-18.444	-23.043**	-16.897	-97.225	70.519	-7.394
	(21.656)	(100.466)	(11.591)	(93.047)	(74.394)	(82.182)	(5.697)
Control Mean	148.931	613.339	83.091	843.616	576.250	459.921	26.977
N	710	710	714	714	715	716	716

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Go back

Household wealth increases are facilitated by saving groups

	(1) Any membership	(2) Num of Groups	(3) Group quality Index	(4) Asset Value	(5) Saving Share	(6) Income from Assets
Treated	0.069***	0.291***	0.244***	8.022*	45.106***	10.082**
	(0.022)	(0.054)	(0.046)	(4.739)	(12.769)	(4.937)
Control Mean	0.65	1.02	0.00	21.54	166.15	19.01
N	3560	3560	3560	3560	3560	3560

Notes: Group quality captures the size (number of members) of the group, whether it gives loans or owns assets and the average amount of the monthly contribution. Asset value is the value of assets owned by the group. Saving share is the value of savings held within the group. Income from assets is the household's share of income from renting group-owned assets on a monthly basis (excluded from total income). Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Increase in consumption except on education

	(1) Total Consumption	(2) Food	(3) Durables	(4) Non-Food Non-Durables	(5) Education Expenditure
Treated	58.943	45.333	3.604	6.422	2.474
	(14.330)	(12.652)	(1.093)	(1.924)	(2.471)
	[0.000]***	[0.001]***	[0.001]***	[0.001]***	[0.319]
		{0.004}***	{0.004}***	{0.004}***	{0.664}
Control Mean	583.097	460.223	6.413	79.231	42.407
N	3,560	3,560	3,560	3,560	3,119

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. p-values are in square brackets and sharpened q-values controlling for the false discovery rate across outcomes are in curly brackets.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

▸ Education

▸ Go back

Increase in produced food consumption, increase in diet diversity and large declines in hunger

	(1) Purchased Food	(2) Produced Food	(3) Dietary Diversity	(4) Hunger Indicator	(5) Frequency of Hunger
Treated	5.618	40.176***	0.290***	-0.105***	-0.203***
	(6.090)	(9.956)	(0.049)	(0.017)	(0.032)
Control Mean	171.32	293.60	5.03	0.31	0.55
N	3560	3517	3560	3560	3560

Notes: Purchased food is the value of expenditure on food. Produced food is the value of own produced food that was consumed, using market prices. Diet diversity is the number of food groups consumed, out of 7. Hunger at the household level if ever no food or money for food in the last 30 days. Frequency of hunger is 0 if never, 1 if rarely, 2 if sometimes and 3 if often. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Impact on pigs

	(1) Value	(2) Quantity	(3) Pigs Dummy	(4) Observe Pigs	(5) Observe Number Pigs	(6) Observe Pig Shelter
Treated	47.399***	0.373***	0.112***	0.080***	0.201***	0.077***
	(8.628)	(0.066)	(0.020)	(0.019)	(0.047)	(0.019)
Control Mean	93.78	0.80	0.33	0.21	0.41	0.21
N	3560	3560	3560	3560	3560	3560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

▸ Wealth ▸ Verification

Number and value of livestock

	(1) Value of Goats	(2) Qty of Goats	(3) Value of Chicken	(4) Qty of Chicken	(5) Value of Sheep	(6) Qty of Sheep	(7) Value of Cows	(8) Qty of Cows
Treated	69.508***	0.539***	13.488***	1.089***	-0.201	-0.009	46.390	0.072*
	(18.869)	(0.139)	(2.862)	(0.277)	(3.858)	(0.034)	(33.348)	(0.038)
Control Mean	217.01	1.70	45.46	4.55	19.19	0.17	208.15	0.23
N	3560	3560	3560	3560	3560	3560	3560	3560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

▸ Go back

We see no changes in school expenditure at the child level or the likelihood of being enrolled in school

	(1) School expenditure	(2) Enrolled in school
Treated	5.609	0.009
	(9.585)	(0.012)
Control Mean	167.93	0.76
N	9831	9831

Notes: Child (aged 6-21) level education outcomes for households containing a child of this age. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Annual school expenditure per child. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Group quality index components

	(1) Average size	(2) Gives loan/own assets	(3) Monthly contribution
Treated	3.073***	0.100***	3.417***
	(0.592)	(0.023)	(0.976)
Control Mean	7.45	0.53	12.20
N	3560	3560	3560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

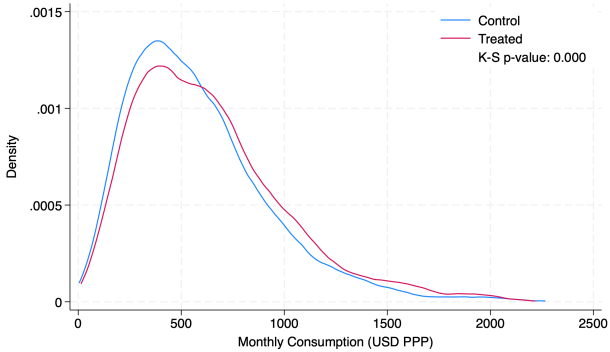
▸ Go back

Villages in the second phase of the intervention rollout have smaller treatment effects

	(1) Monthly Income	(2) Labour Supplied (Days)	(3) Non-Land Wealth	(4) Monthly Consumption
Treated	58.682***	5.947***	594.469***	64.545***
	(13.740)	(1.618)	(116.848)	(23.137)
Round 2	3.503	2.906*	-1.816	3.894
	(10.401)	(1.691)	(105.938)	(18.097)
Treated × Round 2	-35.299**	-4.568*	-333.536**	-10.208
	(17.513)	(2.458)	(155.289)	(29.329)
Control Mean	154.151	43.332	1,274.839	583.097
N	3,560	3,560	3,560	3,560

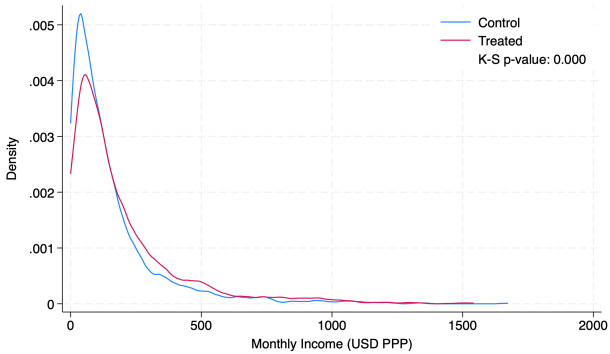
Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in

Treatment effects are seen throughout the distribution



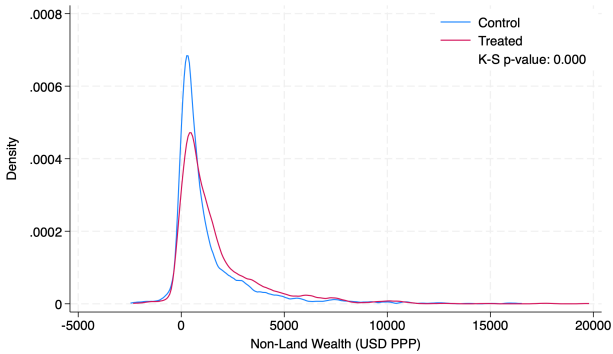
▸ Go back

Distributions: Income



▸ Go back

Distributions: Non-land Wealth



▸ Go back

Treatment effects are seen across quantiles

Monthly household consumption

	(1) OLS	(2) Q(10)	(3) Q(25)	(4) Q(50)	(5) Q(75)	(6) Q(90)
Treated	59.141***	33.431***	34.105***	53.271***	68.776***	111.873***
	(14.325)	(10.714)	(12.417)	(16.346)	(21.003)	(33.600)
Control Mean	583.10	212.33	326.72	515.12	759.20	1027.63
N	3560	3560	3560	3560	3560	3560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

▸ Go back

QTE: Income

	(1) OLS	(2) Q(10)	(3) Q(25)	(4) Q(50)	(5) Q(75)	(6) Q(90)
Treated	39.179***	3.450	15.173***	24.034***	58.506***	119.687***
	(9.039)	(2.218)	(3.566)	(5.799)	(11.416)	(25.126)
Control Mean	154.15	13.27	38.95	95.00	187.78	362.58
N	3560	3560	3560	3560	3560	3560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

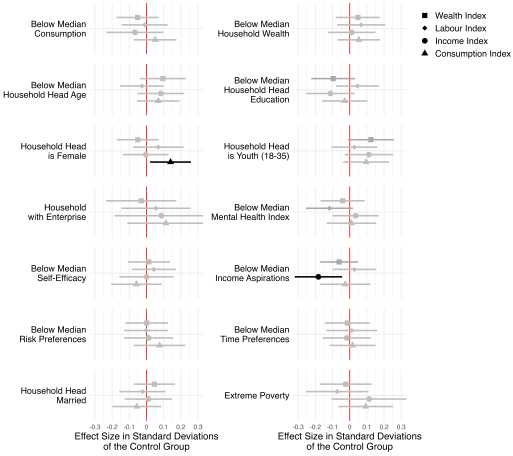
QTE: Wealth

	(1) OLS	(2) Q(10)	(3) Q(25)	(4) Q(50)	(5) Q(75)	(6) Q(90)
Treated	456.213***	98.066***	145.213***	331.964***	560.343***	992.953***
	(83.282)	(22.000)	(22.880)	(44.750)	(97.646)	(219.709)
Control Mean	1257.01	28.12	204.44	573.23	1448.18	3275.60
Baseline Mean	772.11	43.02	155.07	365.64	872.15	1987.77
N	3560	3560	3560	3560	3560	3560

Notes: All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

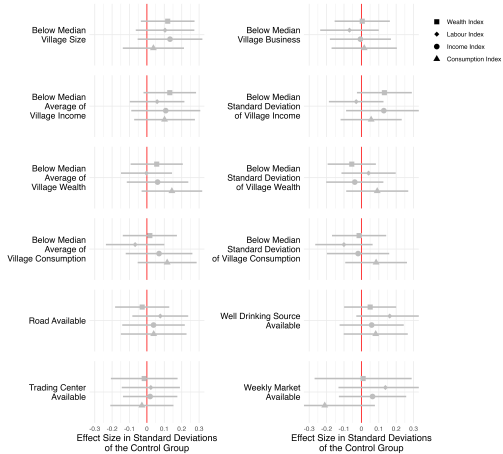
Go back

There is no heterogeneity by household characteristics



Go back

There is no heterogeneity by village characteristics



▸ Go back

Heterogeneous Treatment Effects using Random Forest Algorithms

	(1) Most Affected Group	(2) Least Affected Group	(3) Difference
Monthly Income	44.41***	32.96**	10.05
	(17.84,71.23)	(6.349,59.51)	(-24.51,44.74)
	[0.002]	[0.030]	[1.000]
Labour Supplied (Days)	4.124*	1.413	2.564
	(0.072,8.227)	(-2.613,5.501)	(-2.755,7.930)
	[0.092]	[0.969]	[0.691]
Non-Land Wealth	456.5***	345.1**	102.10
	(203.1,718.1)	(89.19,602.2)	(-233.3,440.1)
	[0.001]	[0.017]	[1.000]
Monthly Consumption	66.39***	46.20*	17.35
	(20.99,111.7)	(1.574,91.07)	(-41.91,77.23)
	[0.008]	[0.084]	[1.000]

Notes: This table presents sorted group average treatment effects following chernozhukov2018. Households are divided into 2 groups, based on households being above or below the median of the machine learning proxy predictor for their conditional average treatment effects. Strata fixed effects and clustering at the cluster level are included in the estimation. Random forest algorithms with two-fold cross-validation is used. Columns (1) and (2) present medians of treatment effects over 1,000 splits for the most and least affected groups respectively. Column (3) presents the differences in treatment effects. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. 90% confidence intervals are presented in parentheses, and p-values are in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

▸ Go back

Physical Health

	(1) Physical health index	(2) Diff bathing	(3) Diff lifting	(4) Diff walking	(5) Unable to work	(6) No of days unable to work
Treated	0.122***	0.001	-0.096**	-0.125***	-0.077***	-0.880***
	(0.039)	(0.019)	(0.044)	(0.043)	(0.020)	(0.246)
Control Mean	-0.00	1.16	1.83	1.78	0.53	4.68
N	3560	3560	3560	3560	3560	3560

Notes: Physical health is an index of reverse-coded measures in Columns (2)-(6) for the respondent so higher values are better. Columns (2)-(4) are on a scale of 1 (no difficulty) to 4 (can't complete the activity). Unable to work is an indicator for the respondent being unable to work due to sickness in the last 30 days. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Child health improves and fewer school days are missed

	(1) Any illness	(2) Missed school illness
Treated	-0.041**	-0.0611***
	(0.017)	(0.018)
Control Mean	0.843	0.434
N	2242	7497

Notes: Child illness is measured as any diarrhoea, vomiting, cough or fever in the last 30 days for all children aged 5 or below. Any missed school illness is any days of school in the last 30 missed due to illness for all currently enrolled children aged 6 to 21. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Households make investments in health and hygiene practices – objective

	(1) Improve health index	(2) Dish rack	(3) Handwashing outside toilet	(4) Hangline	(5) Imp water quality	(6) Covered pit latrine
Treated	0.389***	0.616***	0.267***	0.088***	0.034	0.000
	(0.041)	(0.033)	(0.016)	(0.019)	(0.023)	(0.013)
Control Mean	-0.00	1.50	0.09	1.66	0.63	0.13
N	3560	3560	3560	3560	3560	3560

Notes: Improve health index is an index of enumerator-observed measures in Columns (2)-(6). Disk rack is 1 if none, 2 if single layered and 3 if double layered. Hangline is 1 if none, 2 if string or metal and 3 if cloth. Columns (3), (5) and (6) are indicator variables. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Treated households are more likely to obtain water from a well. ▸ Well-being ▸ Verification

Mental Health improves substantially

	(1) Mental health index	(2) Not depressed	(3) Not stressed scale	(4) Satisfied qual of life	(5) Imp qual of life	(6) Imp qual of life 1 yr	(7) Level of Happiness
Treated	0.205***	0.056***	0.410***	0.320***	0.181***	0.086***	0.140***
	(0.040)	(0.018)	(0.079)	(0.086)	(0.032)	(0.032)	(0.044)
Control Mean	0.00	0.53	10.11	4.87	2.10	2.56	3.34
N	3560	3560	3560	3560	3560	3560	3560

Notes: Mental health index is an index of the measures in Columns (2)-(7) for the respondent. Not depressed is an indicator for respondent's score on PHQ-9 scale being less than 5. Not stressed scale is the sum of responses to 4 questions on a scale of 1 (rarely) to 4 (very often). Satisfied qual of life is on a scale of 1 to 10. Columns (5) and (6) are on a scale of 1 (improve) to 3 (same). Level of happiness is on a scale of 1 (unhappy) to 5 (very happy). Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Psychological outlook improves - driven by higher aspirations and expectations for the future

	(1) Psychological index	(2) Aspirations index	(3) Level of exp income	(4) Self efficacy score
Treated	0.124***	0.093***	169.657***	0.208
	(0.037)	(0.035)	(53.687)	(0.164)
Control Mean	0.00	0.00	749.45	24.05
N	3560	3560	3504	3560

Notes: Psychological index is an index of the measures in Columns (2)-(4) for the respondent. Aspirations index is an index of expected future income for the household in 10 years and attitudes towards the future. Self-efficacy score is the sum of responses to 7 statements from the generalised self-efficacy scale on a scale of 1 (not at all true) to 4 (completely true). Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Aspirations index components

	(1) Aspirations index	(2) Dream better future	(3) Better have aspirations	(4) Desired income
Treated	0.093***	0.115**	-0.036	352.693***
	(0.035)	(0.045)	(0.035)	(112.812)
Control Mean	0.00	2.42	4.11	1653.14
N	3560	3560	3560	3544

Notes: Column (2) and (3) are on 1-5 scales where 1 is strongly disagree and 5 is strongly agree. Desired income is aspiration for monthly household income in 10 years time. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Social cohesion increases - households participate more in the community and have higher trust and support

	(1) Community empowerment index	(2) Voice in community	(3) Trust in community	(4) Leadership position held
Treated	0.090**	0.093**	0.106***	0.030**
	(0.035)	(0.041)	(0.037)	(0.015)
Control Mean	0.00	0.00	0.00	0.31
N	3560	3560	3560	3344

Notes: Community empowerment index is an index of the components of Columns (2) - (4). Voice in the community is an index of indicator variables capturing feeling comfortable speaking up in public and approaching the village elder and participation at village meetings. Trust in community is an index of categorical variables from 4 (completely agree) to 1 (completely disagree) that people in the village can be trusted and relied on for needs and advice. Leadership position held is an indicator of if the household head has any leadership position in the village. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

▸ Voice in community ▸ Trust in community ▸ VE report ▸ Go back

Voice in community index components

	(1) Voice in comm	(2) Speak infra infra	(3) Speak dispute	(4) Approached elder	(5) Attend meetings	(6) Part meetings
Treated	0.093**	0.035	-0.001	-0.009	0.121***	0.019
	(0.041)	(0.044)	(0.041)	(0.018)	(0.036)	(0.037)
Control Mean	0.00	4.38	4.35	0.37	0.88	1.20
N	3560	3468	3468	3468	3560	2325

Notes: Columns (2) and (3) are 1 - 5 scales of comfort speaking up in that case. Approach elder and attend meetings are dummy variables for doing that action. Part meetings is the number of types of meeting that the respondent spoke during in the last 6 months, out of 3. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Trust in community index components

	(1) Trust comm Index	(2) Trust comm	(3) Help in comm	(4) Difference in comm	(5) React if disagree	(6) Help financial	(7) Borrow out of 10	(8) Advice out of 10
Treated	0.106***	0.037	0.050**	0.014	0.048	0.021	0.266***	0.144*
	(0.037)	(0.028)	(0.020)	(0.024)	(0.039)	(0.013)	(0.098)	(0.082)
Control Mean	0.00	3.01	3.23	3.25	2.37	1.85	3.59	3.95
N	3560	3560	3560	3560	3560	3560	3560	3560

Notes: Columns (2)-(6) are on 1-4 scales of the extent the respondent agrees with each statement. Columns (7) and (8) are out of 10. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

Village elder report of village social cohesion

	(1) Level of trust	(2) Agree: help from someone in village	(3) Agree: financial help from village
Treated	-0.0772	0.130*	0.197**
	(0.10)	(0.078)	(0.088)
Control mean	2.24	4.16	3.60
N	336	336	336

Notes: All outcomes are measured on a scale of 0 to 5.

Go back

Migration is low and does not change

	(1) Migration of HH member
Treated	-0.007
	(0.006)
Control Mean	0.02
N	3560

Notes: Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses.

Go back

There are no changes in prices of commonly sold goods

	(1) Food Price Index (UNPS)	(2) Food Price Index (Egger et al.)	(3) Non-Food Price Index (UNPS)	(4) Non-Food Price Index (Egger et al.)
Treated	0.000	-0.039	-0.024	-0.072
	(0.224)	(0.105)	(0.037)	(0.093)
Control Mean	1.742	1.256	0.379	0.542
N	114	114	114	114

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

▸ Go back

There are no changes in markets

	(1) Number of Markets	(2) Number of Vendors	(3) Number of Days Open Per Week	(4) Operating Time
Treated	-0.023	-1.606	0.029	-0.885
	(0.191)	(1.935)	(0.101)	(1.779)
Control Mean	2.421	9.599	6.629	14.846
N	114	114	114	114

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Go back

Some evidence of spillovers within 5km to treated households

Go back

	(1) Monthly Income	(2) Labour Supplied (Days)	(3) Non-Land Wealth	(4) Monthly Consumption
Panel A: Reduced Form				
Treated	39.706***	3.283**	389.356***	58.854***
	(9.045)	(1.295)	(82.058)	(14.371)
Panel B: Spillovers				
Treated Total Effect	48.885***	5.751	415.729	96.498**
	(16.315)	(5.434)	(285.517)	(38.546)
Control Total Effect	7.793	2.441	-1.726	34.778
	(14.740)	(4.285)	(193.788)	(36.004)
Control Mean	155	44	1,275	583
N	3,560	3,560	3,560	3,560

Notes: The Treated Total Effect accounts for the number of treated clusters within 0-5km of the cluster centroid for treated households. The Control Total Effect accounts for the number of treated clusters within 0-5km of the cluster centroid for control households. Conley standard errors in parentheses are

Farm observations

	(1) Observe Compost Pit	(2) Observe Post-Harvest Handling Equipment	(3) Observe Garden
Treated	0.237***	0.036**	0.088***
	(0.018)	(0.016)	(0.016)
Control Mean	0.198	0.265	0.116
N	3,560	3,560	3,560

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

▸ Verification

Lean season consumption

	(1) Total Consumption	(2) Food	(3) Durables	(4) Non-Food Non-Durables	(5) Education Expenditure
Treated	154.092***	113.557***	1.286***	24.281***	16.225***
	(22.198)	(18.682)	(0.293)	(3.330)	(3.337)
Control Mean	396.814	310.411	1.274	50.769	41.123
N	3,734	3,734	3,734	3,734	3,143

Notes: Treated is an indicator for the household being in a village that was randomly assigned to receive RTV's programme. All values in USD PPP at the 2023 exchange rate 1:1315, adjusted for inflation and winsorized at the 1% level. Heteroskedasticity-robust standard errors clustered at the cluster level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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