Catalyzing Energy Access Among the Ultra-Poor in Malawi

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March 2022

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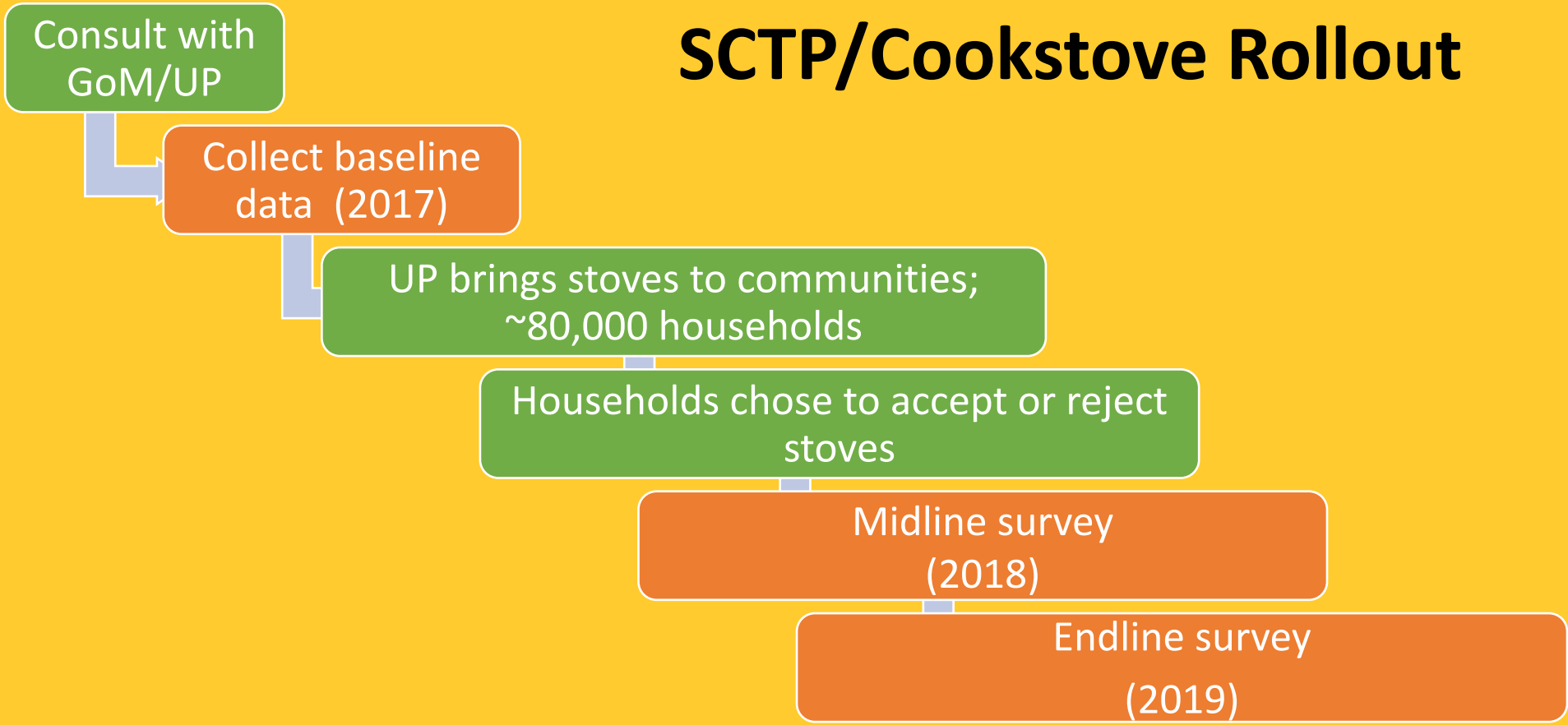
The challenge…

- Poverty and energy poverty move together
- How to solve the problem of energy access for the ultra-poor has received limited research attention and limited policy innovation
- Malawi has had progressive and innovative social cash transfer and cleaner cooking programs for more than a decade

- From 2016 to 2020 the research team was supported by a US National Science Foundation to undertake:
  - **A study of energy access among the ultra-poor**
  - **An impact evaluation of the United Purpose implemented social cash transfer/cookstove program**

Government of Malawi and United Purpose SCTP/Cookstove Rollout



Study design

- Multi-year quantitative impact evaluation in Mulanje, Thyolo and Chiradzulu Districts
- The study involved:
  - 900 ultra-poor households
    - 600 receiving SCTP and cookstove (Treatment)
    - 300 SCTP eligible (Control) - Chiradzulu
  - ~5,400 better-off households
- Baseline data were collected in 2017 before United Purpose rolled out their offer of a free cookstoves to SCTP receiving households in Mulanje and Thyolo Districts

Energy for Sustainable Development 60 (2021) 102–112

Contents lists available at ScienceDirect

Energy for Sustainable Development

Energy access and the ultra-poor: Do unconditional social cash transfers close the energy access gap in Malawi?

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ARTICLE INFO

Article history:
Received 10 June 2020
Revised 1 December 2020
Accepted 9 December 2020
Available online xxxx

Keywords:
Energy poverty
Energy transitions
Household energy
Improved cookstoves
Lighting

ABSTRACT

Despite global progress towards improving energy access, major challenges remain for closing the energy access gap between ultra-poor and better off households, and for reaching ultra-poor and last mile populations. Using data from Malawi, we explore the energy access gap between ultra-poor ($N = 900$) and better-off households ($N = 2666$) from the same communities. Compared to better-off households, ultra-poor households had significantly increased odds of having no lighting (OR = 1.58), and significantly reduced odds of having improved lighting (OR = 0.89), owning an improved firewood cookstove (OR = 0.90), and owning a charcoal stove (OR = 0.86). A sub-set of ultra-poor households in our sample received unconditional social cash transfer program (SCTP) payments from the Government of Malawi. Recipients of SCTP payments had significantly reduced odds of having no source of lighting in the household (OR = 0.21) and were more than three times more likely to own an improved cookstove (OR = 3.64) compared to ultra-poor households that have not received payments. The absolute value of per capita expenditures on energy related goods and services is statistically significantly higher for ultra-poor households that receive social cash transfers. We conclude that ultra-poor households experience greater depth of energy poverty compared to better-off households in the same communities. We also find that unconditional social cash transfer payments contribute to improved energy access for the ultra-poor, suggesting that they are a potentially important strategy for catalyzing energy transitions among the ultra-poor.

Do ultra-poor households experience greater depth of energy poverty than better off households? **YES!**

- Ultra-poor households are:
  - 60% MORE likely than better-off households to have NO LIGHTING IN THE HOUSEHOLD
  - 11% LESS likely than better-off households to have an IMPROVED LIGHTING SOURCE IN THE HOUSEHOLD
  - LESS LIKELY than better-off households to have improved cooking technologies
    - 14% less likely to have an improved fuelwood stove
    - 10% less likely to have a charcoal stove

Does receiving a social cash transfer improve energy access for the ultra-poor? **YES!**

- SCTP receiving ultra-poor households were 3.6 times more likely to have an improved cooking technology in their household (improved firewood or charcoal stove)
- SCTP receiving households were 80% less likely to have no lighting in their households
- Total energy expenditures were modestly higher for SCTP receiving households – but still a small share of total expenditures

Energy expenditures by SCTP status

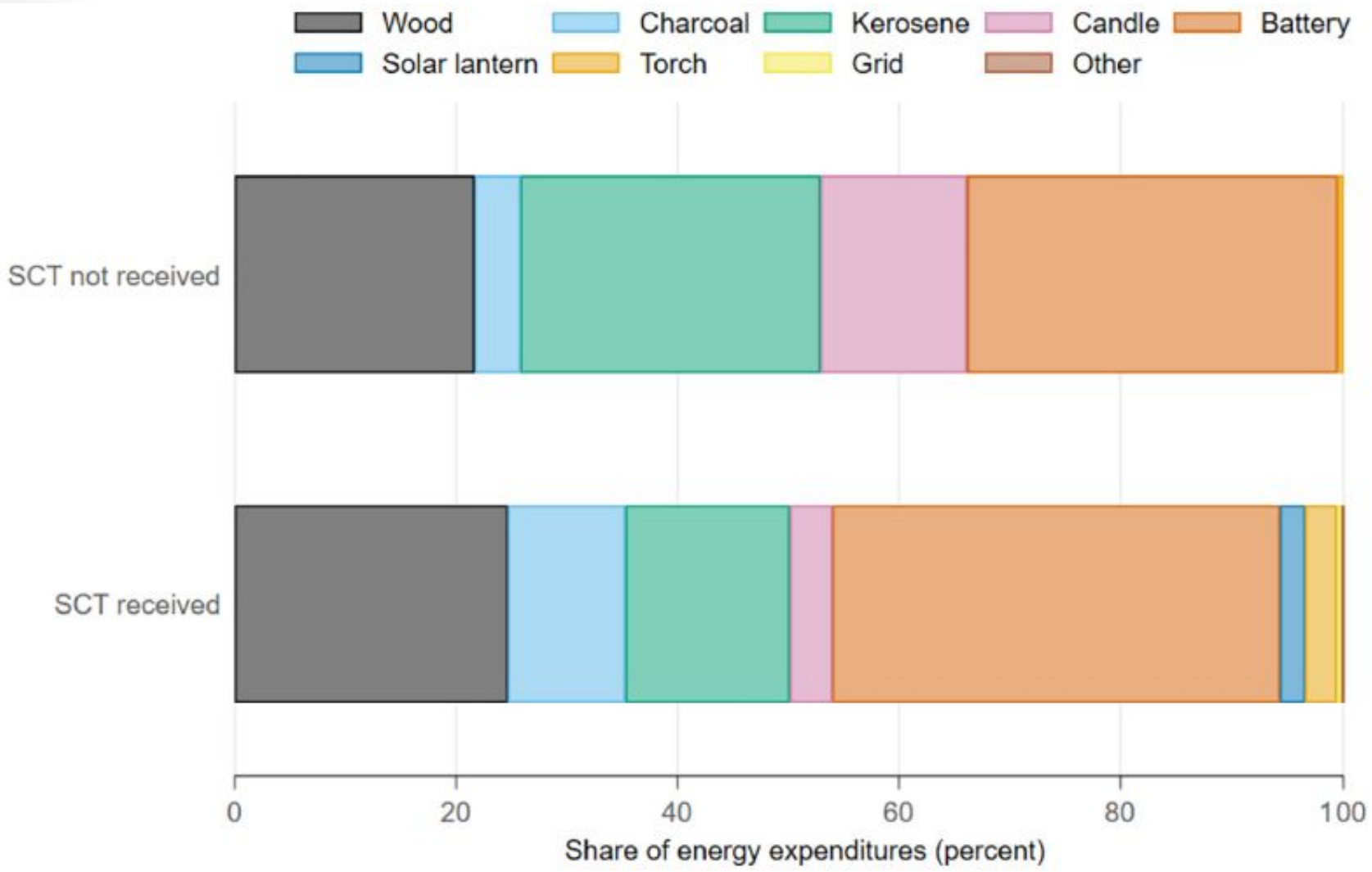


Fig. 5. Relative share of energy expenditures in the past 30 days by social cash transfer (SCT) received status.

Main findings (Aung et al. 2021)

- Ultra-poor households have **greater depth of energy poverty** than better-off households – we confirm that poverty and energy poverty are highly correlated in rural Malawi
- Ultra-poor **households who receive SCTPs are more likely to have better energy access** (lighting in homes (vs. none) and stoves other than 3-stone fire)
- SCTP receiving households have **larger and different average energy expenditures** than ultra-poor households that had not received SCTPs

What is the impact of giving a free improved cookstove to SCTP households?

- What share of ultra-poor households accept free stoves?
  - And how much to they use the improved stove?
- What is the impact of improved stove use on?
  - Time spent collecting fuelwood
  - Time spent cooking
  - Quantity of fuelwood used
  - Meals cooked in the household
- Do better-off households in the community adopt improved stoves at a higher rate than in communities without the program (spillover or diffusion effect)?

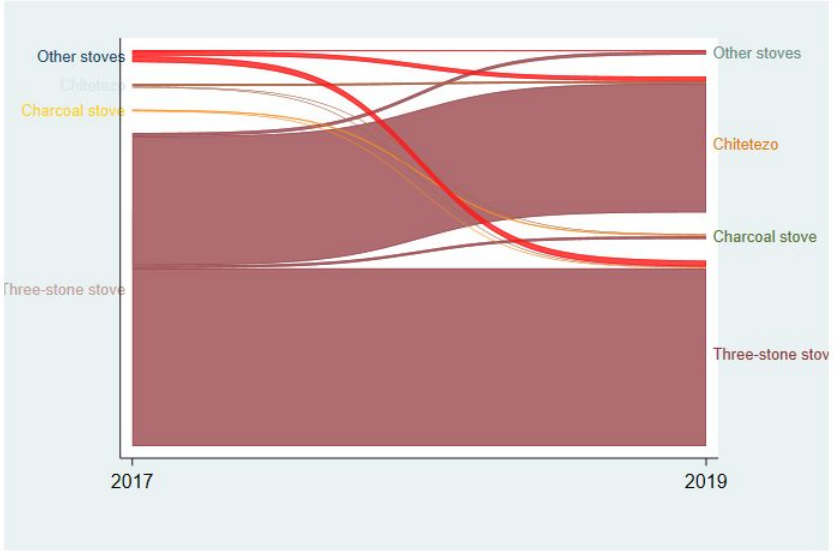
Social protection and stoves in Malawi

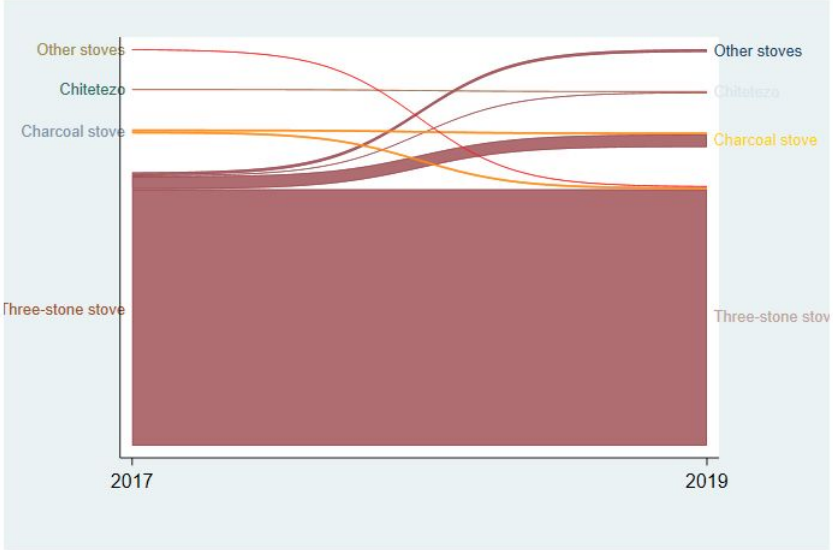
- Over **40 countries** in SSA have social cash transfer programs
- The coupling of cookstoves with Malawi's SCTP is **novel**
- The SCTP/Stove project represents a chance for **rapid scale-up**
- Stoves may have a **bigger marginal impact** for ultra-poor households
- The intervention rolled out in 8 districts in Southern Malawi in 2017/18 reaching ~80,000 households

Did the SCTP/Cookstove Program lead to considerable take-up and use of stoves?

YES!

- Initially yes, 89% of households accepted the stove (93% in Mulanje; 79% in Thyolo)
- Stove use declined considerably over time
  - At midline (2018), 70% were using CM as their primary or secondary stove
  - At endline (2019), 51% were using the CM as their primary or secondary stove





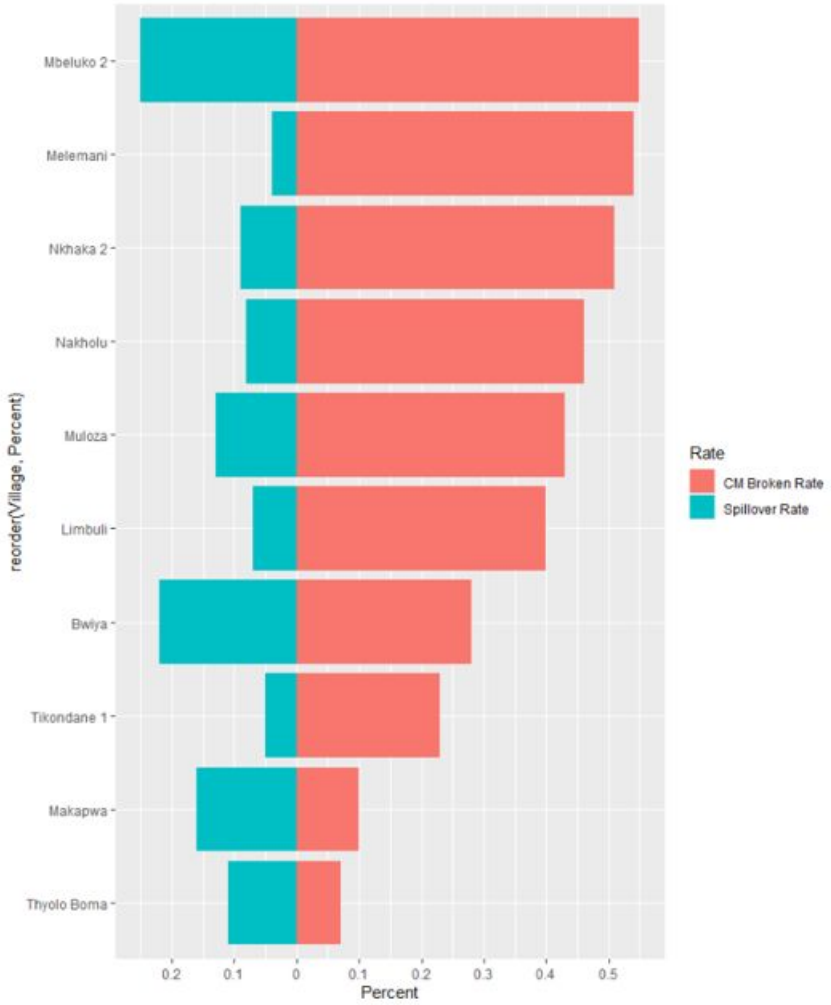
Does stove adoption change:
-fuelwood collection time
-cooking time
-quantity of fuel used
-number of cooked meals **YES!**

- Fuelwood collection time – declines –but not statistically significant
- Cooking time – increases – but not statistically significant
- Quantity of fuel used – increases – but not statistically significant
- **NUMBER OF MEALS COOKED IN HOUSEHOLD – INCREASES – HIGHLY STATISTICALLY SIGNIFICANT**

- People may be using CM more frequently and for smaller cooking events
- People may be using fuels that are easier to access in the CM

Did better-off households in intervention communities adopt cookstoves as a result of the SCTP/cookstove program? **YES!**

- Average spillover rate was ~12% in treatment villages (blue bars) with a lot of heterogeneity (4 to 23%)
- Village level spillover does not appear to be correlated in any way with breakage rates
- CM adoption in control villages was <1%



Main findings (Jagger et al.)

- The SCTP/cookstove program led to **very high take up of stoves** among the ultra-poor population (~90%) but **over time use of stoves diminished** – largely due to breakage issues
- We DID NOT find evidence of reductions in fuelwood collection/cooking time, and quantity of biomass fuels used FOR THE ULTRA POOR POPULATION
- We find **evidence of an INCREASE ON NUMBER OF MEALS COOKED FOR ULTRA-POOR HOUSEHOLDS**; having a CM might have a FOOD SECURITY BENEFIT
- We found **evidence of spillover into the broader population** – overall 12% of better off households in SCTP/cookstove receiving communities bought CMs – but hard to explain variation in spillover

Recap

- The ultra-poor are energy poor
- SCTPs improve energy access
- The SCTP/cookstove program led to high adoption of stoves
  - Stove quality was a challenge
- Ultra-poor households with stoves cooked more meals
- Better-off households in intervention communities bought more stoves than in control communities

A future vision for Malawi!

FUEL Lab in Malawi

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What can the *chitetezo mbaula* deliver?

- Relative to the three stone fire the *chitetezo* decreased fuel use 34%
- The *chitetezo* decreased CO and PM2.5 exposure ~ 45% relative to the three-stone fire
- The *chitetezo* stove offers modest improvements in fuel use and emissions at a low price point

Jagger et al. 2017. ESD.