Pre-analysis plan

"The Economic and Social Impacts of Electrification: Evidence from Kenya"[1]

AEA RCT Title: "Evaluation of Mass Electricity Connections in Kenya"

RCT ID: AEARCTR-0000350

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Summary: This document outlines the plan for analyzing a dataset consisting of information on the living standards of roughly 2,500 households in Western Kenya, including nearly 500 households that previously benefited from a randomized household electrification program. The goal of this study is to estimate the economic and social impacts of household electricity connections. This document lays out the main regression specifications and outcome variable definitions that we intend to follow. We anticipate that we will carry out additional analyses beyond those included in this document, thus this document is not meant to be comprehensive or to preclude additional analyses.

Appendices:

A. Living Standards Kenya (LSK) Survey – Follow-up Round 3 (2019-20)

B. Note on data management/access and pre-analysis plan (uploaded December 2019)

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1. Introduction

1.1 Summary

     Universal access to modern energy has become a top priority for policymakers, nongovernmental organizations, and international donors across Sub-Saharan Africa. In Kenya, nearly US$600 million has been invested in extending the grid to rural areas since 2008. While there is now widespread grid coverage, the national household electrification rate remains relatively low. Kenya is currently pursuing a strategy of last-mile connections for "under grid" households in order to reach universal access to electricity by 2020. Given the high cost of subsidizing mass connections, however, there is a need to better understand the impacts of rural electrification. *In this study, we will provide experimental evidence on the impacts of household electrification across a range of economic and social outcomes in Western Kenya.*

     Between 2013 and 2015, we implemented a field experiment in which electricity connection vouchers (worth varying amounts) were randomly assigned to clusters of rural households in Western Kenya. Households accepting these vouchers were then connected to the national grid, in cooperation with Kenya's Rural Electrification Authority (REA) and Kenya Power, the main electricity distribution company. With this experiment, we can perform a randomized evaluation of the impact of household grid connections. The data collection includes household data from a baseline survey and three follow-up surveys of roughly 2,294 households that were observed to be unconnected at baseline.

     This follow-up study builds on the main findings reported in Lee, Miguel, and Wolfram (2019a, 2019b), which found that electrification did not have significant average socio-economic impacts outside of life satisfaction. However, we did find some evidence of heterogeneous impacts for households that were willing to pay more at baseline.

     Using a new round of survey data that is currently being collected, we aim to uncover evidence about the effects and uses of electricity in three ways. First, by surveying households five years after our initial experimental treatment (the distribution of electricity connection subsidies), we will estimate longer-term impacts of electrification, which remain under-explored in existing research. Second, given this longer time horizon, we will place greater emphasis on the effects of electrification on the educational outcomes of those who were adolescent children at baseline, including a newly measured outcome (schooling attainment). Finally, we will study

how electrification interacts with the use of complementary energy sources like solar lanterns and solar home systems, products that appear to have increased in popularity in the region over the past six years since the baseline survey. There is considerable interest in understanding the extent to which grid and home solar electricity are substitutes or complements (Burgess, et al., 2019).

1.2 Experimental design and steps

In this section, we describe the experimental design; for further details, see Lee et al. (2016) at http://dx.doi.org/10.1016/j.deveng.2015.12.001, Lee, Miguel, and Wolfram (2016) at http://dx.doi.org/10.1257/aer.p20161097, and Lee, Miguel, and Wolfram (2019b) at https://doi.org/10.1086/705417.

Step 1: In July 2013, we collaborated with REA to identify a list of 150 rural "transformer communities" that would form a largely representative sample of communities recently connected to the electrical grid in Busia and Siaya, two counties in Western Kenya. Each community is defined as all of the structures that were located within 600 meters of a central transformer.

Step 2: Between September 2013 and December 2013, we visited each community and geo-tagged over 13,000 structures, capturing the universe of un-electrified households that could potentially be connected to the national grid.

Step 3: Using these data as a sampling frame, we randomly sampled 2,504 households, consisting of 2,294 households that were unconnected at baseline and 210 households that were connected to the grid at baseline. Between February and August 2014, we administered a detailed survey of each household, capturing baseline measures of living standards. See Lee, Miguel, and Wolfram (2019b) for further details.

Step 4: In April 2014, we randomly assigned the 150 communities into four groups: (1) "High-subsidy" (or 100% discount) arm with 25 communities, resulting in an effective price of $0; (2) "Medium-subsidy" (or 57% discount) arm with 25 communities, resulting in an effective price of $171; (3) "Low-subsidy" (or 29% discount) arm with 25 communities, resulting in an effective price of $284, and (4) "No subsidy" or control group (effective status quo price of $398 plus wiring) with 75 communities.

Step 5: After distributing the electricity connection subsidies, we facilitated the construction of grid infrastructure to connect the 478 unconnected households that accepted the randomized offer. The first household was metered in September 2014, the average connection time was seven months, and the final household was metered over a year later, in October 2015.

Step 6: Between May and September 2016, we administered a follow-up survey ("Follow-up Round 1") and successfully surveyed 2,217 study households, or 96.6 percent of baseline sample. We surveyed an additional 1,345 households—or six to eleven households per community—as part of a "spillover sample" or "secondary sample," randomly sampling households that were observed to be unconnected at the time of the census but were not enrolled during the baseline survey. We used this secondary data sample to study within-village externality impacts on local households. We also collected follow-up survey data from 208 of the 210 households that had already been connected at the time of the baseline census. As part of the Follow-up Round 1 survey, we administered short English and Math tests to all 12 to 15 year olds in the sample households, or 2,317 children in total.

Step 7: In October 2017, we launched a second follow-up survey ("Follow-up Round 2") to capture various measures of living standards and other outcomes targeting the 2,504 households sampled during the baseline round. The Follow-up Round 2 survey was carried out between October and December 2017.

Step 8: In October 2019, we launched a third follow-up survey ("Follow-up Round 3") to capture various measures of living standards and other outcomes targeting the 2,504 households sampled during the baseline round. See "Living Standards Kenya (LSK) Survey – Follow-up Round 3 (2018)" in Appendix A. As of this writing, data collection for Follow-up Round 3 is currently ongoing in Kenya, and will be completed in February 2020.

1.3 Sample

Our current study sample consists of the 2,294 households that were unconnected to electricity at the time of the baseline survey. The analyses described in this pre-analysis plan focus only on main sample households, and the Follow-up Round 3 survey data.

1.4 Analysis and data examined to date

At the time of registering this pre-analysis plan, data collection for the Follow-up Round 3 surveys was still ongoing. Note that we have not examined the data or performed any data analysis before registering this plan. As described in the document titled, "Note on data management/access and pre-analysis plan," which was uploaded to the AEA RCT Registry in December 2019 and is included in Appendix B of this document, the authors of this pre-analysis plan were provided with access to de-identified survey data that were stripped of any indicators that could expose the treatment status of households. These data were provided in order to (1) allow the authors to identify and correct any coding errors in the survey instrument, (2) make improvements to the choice sets for multiple-choice questions, (3) identify and amend questions that were taking excessive time to administer, (4) address any other technical issues with the survey instrument (for instance, with the SurveyCTO data entry software coding), and (5) make any final additions to the survey instrument to address minor questions that came up in the field. Each member of the research team agreed to follow the data management/access plan.

The remainder of this pre-analysis plan is organized as follows. Section 2 describes the main regression specifications, heterogeneity analysis, and planned methods of multiple hypothesis correction, in addition to other analysis topics. Section 3 describes the major outcomes of interest. This document captures our current plan to analyze these data. However, we anticipate carrying out additional tests. In other words, this plan is not meant to be an exhaustive set of all analyses, but rather a core set of important initial estimates that will hopefully inspire further analyses.

2. Analysis

2.1 General notes

Randomly lowering the price of an electricity connection at the community-level by 29, 57, and 100 percent, resulted in increases in take-up of 6%, 22%, and 95%, over the baseline, respectively.[2] Take up in the low and medium subsidy treatment arms was relatively low. In our analysis, we will estimate both treatment-on-treated (TOT) and intention-to-treat (ITT) impacts of electrification. ITT estimates will be obtained from specifications in which various outcomes

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[2] See Lee, Miguel, and Wolfram (2019a) for details.

of interest are regressed on a set of binary variables indicating the treatment status of the community. TOT estimates will be obtained from two-stage least squares specifications in which the household's electrification status is instrumented with the set of treatment indicators.

Throughout this document, we refer to our subject population as "households." In our setting, residential structures are typically located in compounds that can sometimes consist of multiple households. Our subject population consists of households that were considered to be the "main household" in the residential compound at the time of the baseline survey. To construct our sample, we randomly sampled compounds from each transformer community and enrolled the primary household in the compound. All other households in each compound are referred to as "minor households."

In Follow-up Round 3, we will focus on the family of the respondent that was interviewed at baseline. If the family has moved from the residential structure they were living in during prior survey rounds, we will note this as an outcome. In practice, residential out-migration rates were very low during the study period.

In Sections 2.2 to 2.4, we describe three analytical approaches. First, focusing on Follow-up Round 3 cross-sectional data, we will estimate the impacts of grid electrification. Second, pooling together Follow-up Round 1, 2, and 3 data, we will perform largely the same analyses; using all three rounds of follow-up data (where possible) leads to improved statistical power. Finally, wherever we have equivalent outcome measures collected across at least some of the Baseline, Follow-up Round 1, Follow-up Round 2, and Follow-up Round 3 datasets, we will estimate the panel regressions described below.

2.2 Cross-sectional results

Using only the most recent Follow-up Round 3 survey data, we will test the hypothesis that households connected to the electricity grid enjoy higher levels of living standards. Specifically, we will estimate ITT results using the following equation:

$$y_{ic} = \beta_0 + \beta_1 T_{Lc} + \beta_2 T_{Mc} + \beta_3 T_{Hc} + X'_c \Lambda + Z'_{ic} \Gamma + \epsilon_{ic} \tag{1}$$

where y_{ic} represents the outcome of interest for main sample household i in community c, and T_{Lc}, T_{Mc}, and T_{Hc} are binary variables indicating whether community c was randomly assigned into the low-value, medium-value, and high-value subsidy treatment arms, respectively.

Following Bruhn and McKenzie (2009), we include a vector of community-level characteristics, X_c, containing the variables used for stratification during randomization. In addition, we include Z_{ic}, a vector of household-level characteristics. Further details on the components of the covariate vectors are presented in Section 2.6. The variables in Z_{ic} will sometimes be used in analyses of treatment effect heterogeneity, which is discussed in further detail in Section 2.7. In Section 2.10, we discuss the possibility of ANCOVA specifications for certain outcome variables. In all cases, standard errors will be clustered at the community level.

The issue of limited statistical power may be more severe in ITT specifications due to the relatively low take-up rates in the low and medium subsidy treatment groups. To address this issue, we will focus attention on the coefficient on the high subsidy treatment indicator (as the take-up rate was very high in that treatment arm). We will run this regression on the control group and the high subsidy treatment group. This test will not only shed light on the impacts of near universal electrification (compared to the control group, where very few households become connected), but also is likely to have greater statistical power.

We will also estimate TOT results using the following equations:

$$E_{ic} = \delta_0 + \delta_1 T_{Lc} + \delta_2 T_{Mc} + \delta_3 T_{Hc} + X_c' \Lambda_1 + Z_{ic}' \Gamma_1 + \eta_{ic} \tag{2}$$

$$y_{ic} = \beta_0 + \beta_1 E_{ic} + X_c' \Lambda_2 + Z_{ic}' \Gamma_2 + \epsilon_{ic} \tag{3}$$

where the first-stage equation 2 estimates the effects of the treatment indicators on household electrification status, E_{ic}, and the second-stage equation 3 estimates the effect of household electrification status on the various outcomes of interest. As in equation 1, errors will be clustered at the community level.

Lee, Miguel, and Wolfram (2019b) document systematic differences in the baseline living conditions of households taking up the experimental offers in the low and medium subsidy groups, compared to the high subsidy group. Households that paid more for an electricity connection (i.e., lower subsidy arm households) were wealthier and more educated on average than those who paid nothing (i.e., high subsidy arm households). This suggests that the average treatment effect may vary across treatment arms. For example, electrification may be more impactful for the relatively wealthier households that are able to invest in complementary assets such as electrical appliances. In order to assess these types of heterogeneous treatment effects, we will follow the approach in Lee, Miguel, and Wolfram (2019b) to examine treatment effects

based on willingness to pay for an electricity connection. Due to relatively low take-up rates in the low and medium subsidy groups, however, some of these analyses may be relatively underpowered statistically.

In our analyses of Follow-up Round 1 data, some of which are described in Lee, Miguel, and Wolfram (2019b), we find little to no evidence of spillovers accruing to local households. We can therefore interpret the TOT results largely without concern about violations of the stable unit treatment value assumption (SUTVA).

2.3 Pooled results

In order to improve statistical power, and to assess effects over the full follow-up period, we will pool together Follow-up Round 1, 2 and 3 data, and estimate ITT results using the following equation:

$$y_{ict} = \beta_0 + \beta_1 T_{Lc} + \beta_2 T_{Mc} + \beta_3 T_{Hc} + X_c' \Lambda + Z_{ict}' \Gamma + \mu_{R2} + \mu_{R3} + \epsilon_{ict} \quad (4)$$

In addition, we will estimate TOT results using the following equations:

$$E_{ict} = \delta_0 + \delta_1 T_{Lc} + \delta_2 T_{Mc} + \delta_3 T_{Hc} + X_c' \Lambda_1 + Z_{ict}' \Gamma_1 + \mu_{R2} + \mu_{R3} + \eta_{ict} \quad (5)$$

$$y_{ict} = \beta_0 + \beta_1 E_{ict} + X_c' \Lambda_2 + Z_{ict}' \Gamma_2 + \mu_{R2} + \mu_{R3} + \epsilon_{ict} \quad (6)$$

In the above equations, μ_{R2} and μ_{R3} denote Follow-up Round 2 and Round 3 data, respectively. Equation 5 will effectively estimate the average take-up effects over all follow-up rounds, and Equation 4 and Equation 6 will similarly estimate the average electrification treatment effects on the outcomes of interest over all rounds, for those outcome measures that were collected in Follow-up Rounds 1, 2, and 3. For outcomes only collected in some but not all Follow-up survey rounds, we will carry out pooled analysis using all available data.

2.4 Panel results

Finally, we will create indicators that equal 1 for Follow-up Round 1, Follow-up Round 2, and Follow-up Round 3, respectively, and include them in the regression. By examining the coefficients on the interaction with treatment status, we can determine how effects change over time.

Specifically, we will estimate ITT results using the following equation:

$$y_{ict} = \beta_{01}D_t^{R1} + \beta_{02}D_t^{R2} + \beta_{03}D_t^{R3} + \beta_{11}T_{Lct}D_t^{R1} + \beta_{21}T_{Mct}D_t^{R1} +$$
$$\beta_{31}T_{Hct}D_t^{R1} + \beta_{12}T_{Lct}D_t^{R2} + \beta_{22}T_{Mct}D_t^{R2} + \beta_{32}T_{Hct}D_t^{R2} +$$
$$\beta_{13}T_{Lct}D_t^{R3} + \beta_{23}T_{Mct}D_t^{R3} + \beta_{33}T_{Hct}D_t^{R3} + D_t^{R1}X_c'\Lambda_1 +$$
$$D_t^{R1}Z_{ict}'\Gamma_1 + D_t^{R2}X_c'\Lambda_2 + D_t^{R2}Z_{ict}'\Gamma_2 + D_t^{R3}X_c'\Lambda_3 + D_t^{R3}Z_{ict}'\Gamma_3 +$$
$$\epsilon_{ict} \qquad\qquad (7)$$

In addition, we will estimate TOT results using the following equations:

$$E_{ict} = \delta_{01}D_t^{R1} + \delta_{02}D_t^{R2} + \delta_{03}D_t^{R3} + \delta_{11}T_{Lct}D_t^{R1} + \delta_{21}T_{Mct}D_t^{R1} +$$
$$\delta_{31}T_{Hct}D_t^{R1} + \delta_{12}T_{Lct}D_t^{R2} + \delta_{22}T_{Mct}D_t^{R2} + \delta_{32}T_{Hct}D_t^{R2} +$$
$$\delta_{13}T_{Lct}D_t^{R3} + \delta_{23}T_{Mct}D_t^{R3} + \delta_{33}T_{Hct}D_t^{R3} + D_t^{R1}X_c'\Lambda_{1,1} +$$
$$D_t^{R1}Z_{ict}'\Gamma_{1,1} + D_t^{R2}X_c'\Lambda_{2,1} + D_t^{R2}Z_{ict}'\Gamma_{2,1} + D_t^{R3}X_c'\Lambda_{3,1} +$$
$$D_t^{R3}Z_{ict}'\Gamma_{3,1} + \eta_{ict} \qquad\qquad (8)$$

$$y_{ict} = \beta_{01}D_t^{R1} + \beta_{02}D_t^{R2} + \beta_{03}D_t^{R3} + \beta_1 E_{ict}D_t^{R1} + \beta_2 E_{ict}D_t^{R2} +$$
$$\beta_3 E_{ict}D_t^{R3} + D_t^{R1}X_c'\Lambda_1 + D_t^{R1}Z_{ict}'\Gamma_1 + D_t^{R2}X_c'\Lambda_2 + D_t^{R2}Z_{ict}'\Gamma_2 +$$
$$D_t^{R3}X_c'\Lambda_3 + D_t^{R3}Z_{ict}'\Gamma_3 + \epsilon_{ict} \qquad\qquad (9)$$

In the above equations, D_t^{R1} is an indicator variable that equals one for Follow-up Round 1 observations and zero otherwise, D_t^{R2} equals one for Follow-up Round 2 observations and zero otherwise, and D_t^{R3} equals one for Follow-up Round 3 observations and zero otherwise. In the ITT specification, we will focus attention on the coefficients on the high subsidy treatment indicators (β_{31}, β_{32} and β_{33}). We will test the null hypothesis that all three coefficients are equal to zero to assess whether electrification had impacts in any period. We will also test the null hypothesis that the three coefficients are equal to each other to assess whether the effects of electrification differed over time. Similarly, in the TOT specification (equation 9), we will focus on β_1, β_2, and β_3, and will both test the null hypothesis that all three coefficients are equal to zero to assess whether electrification had impacts in any period, and we will also test the hypothesis that the three coefficients are equal to each other. In addition to these estimates, we will also test for different effects between Rounds 1 and 2 (pooled) versus Round 3.

2.5 Educational impacts

A major objective of this study is to understand the extent to which household electrification impacts the educational outcomes of schoolchildren. As part of the Follow-up Round 2 and 3 surveys, we collected student scores on the Kenya Certificate of Primary Education (KCPE) exam, a standardized national exam administered at the end of primary school and required for admission to secondary school. In Follow-up Round 3, we also collected data on the highest level of educational attainment of each child. Using these data, we will estimate regressions that are similar in form to those specified in Sections 2.2 to 2.4 but will focus on individual children as the unit of observation. In these regressions, the covariate vector Z_{ic} will be complemented with the covariate vector C_{jic}, which includes additional information on child j in household i in community c (e.g., child demographic characteristics). The outcomes of interest in these specifications will therefore be denoted with the subscript *jic*. The covariate vector C_{jic} is described in more detail in Section 2.6.

2.6 Covariate vectors X_c, Z_{ic}, and C_{jic}

In this section, we describe each of the sets of covariates that we plan to utilize in the analysis.

The vector X_c will primarily include the stratification variables that were used during randomization. These include:

- County: Binary variable indicating whether community c is in Busia county or Siaya county.
- Market status: Binary variable indicating whether the total number of businesses in community c is strictly greater than the community-level mean across the entire sample at baseline. We use this definition to define which communities could reasonably be classified as "markets" relative to others.
- Transformer funding year: Binary variable indicating whether the electricity transformer in community c was funded "early" (i.e. in either 2008-09 or 2009-10).
- Electrification rate: Residential electrification rate in community c at the time of census (roughly 2013).

- Community population: Estimated number of people living in community c at the time of census (roughly 2013).

The vector Z_{ic} will include the set of household-level variables listed below, taking advantage of the baseline survey data.

- Gender of respondent: Binary variable indicating whether the baseline respondent was female.[3]
- Age: Age of the baseline respondent in 2014.
- Education of respondent at baseline: Binary variable indicating whether the household respondent at baseline has completed secondary school.[4]
- Bank account at baseline: Binary variable indicating whether the household respondent at baseline had a bank account.
- Housing quality index at baseline: Index composed of whether the household had high-quality floors, roof, and walls at baseline.
- Asset value at baseline: Estimated value based on inventory of livestock, electrical appliances, and non-livestock assets at baseline, at current observed local prices.
- Energy spending at baseline: Estimated monthly expenditures on all energy sources at baseline.

The vector C_{jic} will include a set of individual-level characteristics that are relevant for the regression specifications estimating the impacts of electrification on educational performance.

- Gender of student: Binary variable indicating whether the student is female.
- Age: Age of student in 2017.
- Siblings: Number of children under age 18 in the household.
- Grade attained at baseline: Grade attained by the end of the 2013 academic year.[5]

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[3] As a robustness check, we will also present a specification in which we control for the demographic characteristics of the respondent (e.g., gender and age) in the follow-up surveys.

[4] The respondent during the baseline survey is not necessarily the same person as the respondent during the follow-up surveys.

[5] We will infer this data by comparing the baseline and follow-up surveys for main sample households. It is possible that this data will be missing for some individuals. If there are relatively few such instances, we will include an additional binary variable as a covariate indicating that the data are missing. Alternatively, we will likely drop this covariate altogether if this data on grade attainment in 2013 is missing for over 30% of individuals in the data.

2.7 Heterogeneous effects

In additional analyses, we will estimate heterogeneous treatment effects along a number of major dimensions, captured in the vectors X_c, Z_{ic}, and C_{jic}, by adding interaction terms between each treatment indicator and these variables. For instance, in order to assess how treatment impacts may vary for households at different wealth levels, we will estimate specifications in which the treatment indicators are interacted with the housing quality index at baseline. Furthermore, there are additional variables that are not included in the covariate vectors above but are of potential interest.

We are uncertain whether our study design will have sufficient statistical power to generate precise estimates on many of these interaction terms and hence such analyses should be considered suggestive rather than definitive. The patterns that emerge will also likely stimulate further exploratory analysis using the dataset.

2.8 Construction of indices

When constructing indices, we will normalize each component variable to have mean zero and unit variance, and thereafter we will construct the index by summing each component variable and then re-normalizing (the mean effects approach). Note that we will exclude any variables with zero (or very close to zero) variance since these do not contribute any information to the analysis. Furthermore, if a pre-specified variable is missing for more than 30% of possible observations collected in the follow-up surveys, we will drop it from inclusion in the index. We cannot anticipate why a particular variable will be missing so frequently, and believe such cases will be rare, but in such events where it warrants exclusion, we shall also explore these reasons in the analysis. Finally, in the appendix we will also report results for all individual outcomes used to create indices.

2.9 Multiple Testing Adjustment

In Section 3, we describe how the major outcomes of interest are categorized into eleven (11) broad "families". For the main coefficient estimates of interest (for instance, β_1, β_2, and β_3 in equation 1) we will present two sets of p-values. First, we will present the standard "per-comparison", or naïve, p-value, which is appropriate for a researcher with an a priori interest in

a specific outcome. For instance, researchers interested in the effect of household electrification on non-agricultural earnings should focus directly on this p-value.

Second, since we test multiple hypotheses, it is also appropriate to control for the possibility that some true null hypotheses will be falsely rejected. Therefore, we will also present the false discovery rate (FDR)-adjusted q-value that limits the expected proportion of rejections within a hypothesis that are Type I errors (i.e., false positives). Thus, while a p-value is the unconditional probability of a Type I error, the analogous FDR q-value is the minimum proportion of false rejections within a family that one would need to tolerate in order to reject the null hypothesis.[6] Specifically, we will follow the approach to FDR analysis adopted in Casey et al. (2012) and the references cited therein (e.g., Anderson 2008).

We will present FDR-adjusted q-values for each of the outcomes within the primary outcomes group (Table 1), as well as FDR-adjusted q-values for each outcome within each of the eleven outcome families (Tables 3 through 13). Section 3 below describes the primary outcomes and the outcome families that we will analyze. As noted in Section 1.4, we anticipate that we will examine additional outcomes beyond those included in this plan.

2.10 Additional analyses

For a subset of outcomes in the main sample regressions, we will have comparable measures in the baseline survey as well as in all three Follow-up Rounds (e.g., we have such data for household size, home solar system usage, energy consumption, etc.). In these cases, we are also able to estimate ANCOVA regression specifications in which the baseline value of the outcome of interest is included as an additional covariate, as the resulting estimates may have greater statistical power (McKenzie 2012). However, note that we lack equivalent baseline measures for most outcome variables described below (in Section 3). As a result, the ANCOVA estimates will be presented mostly as a supplement to the analyses already described, and our main focus will be on the results of the specifications described in Sections 2.2 and 2.4 above.

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[6] In this sense, false positives are driven not only by sampling variation for a single variable (the traditional interpretation of a p-value) but also by having multiple outcomes to test.

3. Major outcomes of interest

3.1 Overview

In this section, we specify the 41 major economic and social outcomes of interest collected in Survey Follow-up Round 3, and mention outcomes collected in earlier rounds. These outcomes have been selected based on the judgment of the research team and are arranged into eleven broad families: (1) energy consumption, (2) household structure, (3) time use, (4) productivity, (5) wealth, (6) consumption, (7) health and wellbeing, (8) education, (9) social and political attitudes, (10) community outcomes, and (11) safety and crime outcomes. Based on this list, we also identify a group of nine "primary" outcomes, as well as two "grouped" outcomes, drawn from a number of different outcome families collected in Follow-up Round 3. The estimated impacts on these primary outcomes will serve as an overall summary of the impacts of household electrification in our setting.

Within each outcome family, there are outcomes at different levels of aggregation, ranging from specific variables to indices that combine data from multiple variables. Due to the novelty of many of these measures, some of the groupings are speculative. We will therefore report measures of index quality and coherence in the appendix, for example, by examining the correlation patterns of measures within each index. Depending on the index quality, we may also perform additional analyses, for example, presenting results with alternative groupings of outcomes. For completeness and transparency, in the appendix, we will also present estimated impacts for all specific outcomes individually, including those used to construct each of the indices.

3.2 Primary outcomes

Table 1 summarizes the primary outcomes that will serve as an overall summary of living standards and life outcomes in our setting. For certain primary outcomes, we are able to use the existing literature to guide our expectations on the impacts of electrification in our setting. See earlier pre-analysis plans for this project as well as Lee et al. (2019a, 2019b) for a discussion of the existing literature and a summary of findings from previous survey rounds. In our analysis of each primary outcome, we will test the null hypothesis of no effect. Finally, we will compare the estimated impacts in our study to other outcomes in the broader development economics literature in order to assess the cost effectiveness of rural electrification as a development policy.

Table 2 presents two groupings of the primary outcomes in Table 1. The primary economic outcomes (P3-P6) are combined into an economic mean effect index. The primary non-economic outcomes (P7-P11) are combined into a non-economic mean effect index. We will use these indices to test whether electrification had an overall economic effect or non-economic effect on households.

3.3 Family #1 – Energy consumption major outcomes

At the most basic level, electricity connections should impact the ways in which households consume energy. Family 1 outcomes are presented in Table 3. In Survey Follow-up Round 3, we have added new descriptive questions regarding households' purchase, use and experience with home solar systems, given the rise in adoption of these systems in Kenya over the past several years, including between Baseline to Round 2 of this project (questions f12b-e).

3.4 Family #2 – Household structure major outcomes

If there are changes in the patterns of energy consumption, there may also be changes in the structure of the household. For example, access to electricity may impact household structure by influencing incentives to migrate by making living in the household more attractive. Family 2 outcomes are presented in Table 4.

3.5 Family #3 – Time use major outcomes

Household electrification may operate as a labor-saving technology shock to home production, releasing female time from home to market work (Dinkelman 2011; Grogan and Sadanand 2012). Family 3 outcomes are presented in Table 5. Note that we did not collect Family 3 outcomes in Follow-up Rounds 2 or 3.

3.6 Family #4 – Productivity major outcomes

If electrification changes people's time use, and, for example, allows for more hours of work outside the home, there may be positive impacts on various measures of productivity and wealth.[7] Family 4, shown in Table 6, includes various measures of household agricultural

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[7] Grimm et al. (2015), for instance, present a theoretical model in which an increase in household electrification effectively reduces the price of energy faced by the household, which increases the productivity of domestic labor and the output of household production.

activities, wage employment, small businesses, and other outcomes. In Follow-up Rounds 2 and 3, it includes a measure of total household earnings, estimated by adding together net earnings for each household member from wage employment or self-employment as well as from agricultural activities.

3.7 Family #5 – Wealth major outcomes

Family 5, shown in Table 7, includes a housing quality index and estimated values of different types of household assets, based on current market prices. Note that we did not collect Family 5 outcomes in Follow-up Round 3.

3.8 Family #6 – Consumption major outcomes

We are interested in estimating the impacts of electrification on various measures of household consumption. In our setting, we focus on 23 items, including staples, vegetables, meat, fruits, and other goods. These 23 items were identified using data from the Kenya Life Panel Survey (KLPS-3).[8] Based on the KLPS-3 data, the 23 items account for 26% of total household consumption and 52% of total food consumption. Family 6, shown in Table 8, summarizes the various consumption outcomes. Note that in Follow-up Round 3, we collected a subset of 9 of the original 23 items that were among those found to be most strongly correlated with total measured consumption in previous survey rounds. These were the 5 main food consumption items, as well as 4 other goods (specifically, mobile airtime, travel expenses, clothing, and personal expenses).

3.9 Family #7 – Health and wellbeing outcomes

Family 7, shown in Table 9, includes various measures of respondent health and wellbeing. Note that Family 7 data was collected only during the Follow-up Round 1 survey. In Round 3, we collected data for one indicator on life satisfaction, 7.8.

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[8] The KLPS-3 project is located in the same study region as this project and is led by Edward Miguel and other researchers. In the full KLPS survey, respondents are asked in detail about their consumption of 153 items.

3.10 Family #8 – Education outcomes

It is possible that electrification may improve educational outcomes for students, if better lighting allows for more evening study time, for instance. The evidence, however, has been somewhat mixed to date. Randomized trials, including Furukawa (2014) and Hassan and Lucchino (2016), have focused on measuring the impacts of decentralized power solutions, such as solar lanterns, and have documented results ranging from negative impacts to positive impacts with substantial spillovers. Studies on the impacts of grid connections have been mostly non-experimental and have found positive impacts of electrification on school enrollment, study time, and school completion (see, e.g., Khandker et al. 2014). Family 8 includes a variety of educational outcomes, including test scores from English and Math tests that were administered to students in the sample villages by our project field staff.

The data include two different test scores. The first test scores come from English and Math tests administered by our project field staff as part of Follow-up Round 1 data collection. The second test scores come from the KCPE exam, normally administered to students in their final year of primary school education. If we do not find evidence that electrification affected likelihood of taking the KCPE (outcome 8.9), then we intend to pool data for the average of math and English test scores (outcome 8.3) and KCPE scores (outcome 8.10) to be used as a single outcome variable. If electricity connections affected the likelihood of taking the test, then interpretation of the average differences in Round 2 and 3 KCPE test scores will be more difficult, due to possible selection into the test score sample. In Follow-up Round 3, in addition to KCPE score information, we collected additional information on the highest standard/form (grade level) completed by children. Family 8 outcomes are listed in Table 10.

3.11 Family #9 – Social and political attitudes outcomes

Electrified households may consume more media content (via televisions, radios, and internet access), and as a result, could have greater knowledge of current affairs, or experience changes in social and political attitudes. Family 9 outcomes are listed in Table 11. Note that we did not collect any of these outcomes in Follow-up Round 3.

3.12 Family #10 – Community outcomes

There are a number of community-level outcomes that are of interest in this study. It is possible that electricity can affect actual or perceived within-village inequality, in income, educational outcomes, and consumption. In order to estimate the impacts of electrification on within-community inequality, we will take advantage of our random sample of households and calculate Gini coefficients, capturing within-community dispersion, using the productivity (Family 4), wealth (Family 5), education (Family 8), and consumption (Family 6) outcomes in our data. Family 10 outcomes are listed in Table 12.

3.13 Family #11 – Safety and crime outcomes

Access to electricity may help reduce local crime. For example, electric lights inside or outside the home may improve safety by making attempts to engage in criminal behavior more visible. Family 11 outcomes are listed in Table 13. Note that for Follow-up Round 3, for survey brevity, respondents were given an abbreviated list of possible crimes, with both categories of "Assault" combined into a single grouping.

Table 1. Primary outcomes

ID	Outcome	Unit	Type	Description	Ref.	R1	R2	R3
P.1	Grid connected	HH	Indicator	Indicator for main household connection	1.1	X	X	X
P.2	Grid electricity spending	HH	Total	Estimated prepaid top-up last month or amount of last postpaid bill	1.7	X	X	X
P.3a	Employed or own business – Household	HH	Proportion	Proportion of household members (18 and over) currently employed or running their own business	4.5	X	X	X
P.3b	Total household earnings	HH	Value	Sum of earnings for all household members that are employed or running their own business, as well as agricultural earnings.	4.12	–	X	X
P.4	Total hours worked	Resp.	Total	Total hours worked in agriculture, self-employment, employment, and household chores in last 7 days	4.11	X	X	X
P.5	Total asset value	HH	Estimated value	Estimated value of savings, livestock, electrical appliances, and other assets	5.6	X	X	–
P.6	Annual consumption	HH	Value	Estimated value of annual consumption of 23 goods	6.2	X	X	*
P.7	Recent symptoms index	Resp.	Index	Index of symptoms experienced by the respondent over the past 4 weeks	7.3	X	X	–
P.8	Life satisfaction	Resp.	Scale	Life satisfaction based on a scale of 1 to 10	7.8	X	X	X
P.9a	Average test score	Child	Z-score	Average of English reading test result and Math test result	8.3	X	–	–
P.9b	Average exam score	Child	Z-score	Average result on KCPE examination (taken during follow-up period)		–	X	X
P.10	Political and social awareness index	Resp.	Index	Index capturing the extent to which the respondent correctly answered a series of questions about current events	9.4	X	–	–
P.11	Crime index	Resp.	Index	Index of crime experienced by the respondent over the last 12 months	11.2	–	X	*

Table 2. Mean effect indices

	Outcome	Unit	Type	Description	Ref.	R1	R2	R3
G.1	Economic index	HH	Index	Index of primary economic outcomes	P3-P6	X	X	*
G.2	Non-economic index	HH	Index	Index of primary non-economic outcomes	P7-P11	X	X	*

For tables 1 and 2, * indicates shortened measure is included in survey round, with some sub-components missing.

Table 3. Energy consumption major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
1.1	Grid connected	HH	Indicator	Indicator for main household connection	x	x	x	F1a
1.2	Electric lighting	HH	Indicator	Indicator for electricity as main source of lighting	x	x	x	F1b
1.3	Lighting usage	HH	Total	Hours of lighting used (past 24 hours)	x	x	x	F18 (in R3, constructed from 1.13)
1.4	Installation	HH	Total	Number of electrical outlets available	x	x	–	F6b
				Number of lighting sockets available	x	x	–	F6c
				Number of power strips in use	x	x	–	F6e
1.5	Appliances owned	HH	Total	Number of "high-wattage" appliances owned[9]	x	x	x	F19a to F19c
1.6	Appliances desired	HH	Total	Number of "high-wattage" appliances desired	x	x	–	F19d to F19g
1.7	Grid electricity spending	HH	Total	Estimated prepaid top-up last month	x	x	x	F7a to F7e, F5h
				Amount of last postpaid bill	x	x	x	F8a to F8c, F5h
1.8	Kerosene spending	HH	Total	Kerosene spending last month[10]	x	x	x	F11
1.9	Other energy sources spending[11]	HH	Total	Solar power spending last month	x	x	x	F13d, F14d
				Battery spending last month	x	x	x	F15b, F15c
				Generator spending last month	x	x	x	F16c
				Purchased firewood spending last month	x	x	x	F17a
				Charcoal spending last month	x	x	x	F17b
				LPG spending last month	x	x	x	F17c
				Sawdust spending last month	x	x	x	F17d
				Mobile phone charging last month	x	x	–	F17h
				Other spending last month	x	x	–	F17e to F17g, F17i
1.10	Total energy spending	HH	Total	Total spending last month on grid electricity, kerosene, and other energy sources	x	x	x	See 1.7, 1.8, and 1.9 above. R3 omits some minor categories.

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[9] In general, we follow Lee, Miguel, and Wolfram (2016a) in the definition of high and low wattage appliances. For instance, there we define mobile phones and radios as "low-wattage" appliances.

[10] For several energy spending categories (including kerosene), we recorded how much the household spent over the past seven days. In these cases, we will estimate spending over the past month by multiplying the weekly amount by a factor of approximately 4.3.

[11] This outcome will include all other energy-related expenditures recorded in the household survey, beyond grid electricity and kerosene.

1.11	Home solar usage	HH	Indicator	Indicator for usage of solar lantern or solar home system	x	x	x	F12a
1.12	Power sharing	HH	Indicator	Indicator for household is sharing its electricity connection (e.g., electricity connection shared with a minor household or a neighboring household)	x	x	x	A2 (*R1 only*), F5b, F5i, F5j, A18b (*R2 only*), F5i, F5j (*R3 only*)
1.13	Energy Diary	HH	Hours	Over past three days, average hours of lighting obtained by energy source (electricity, kerosene, solar lantern, solar home system, dry cell battery, wet cell battery, generator)	–	–	x	F18aa, F11a, F12c_new, F12e, F15d, F15e, F16f
1.14	Solar home acquisition method	HH	Acquisition method	Indicator for how household acquired its solar home system(s): Purchased, Gift, One Acre Fund, or Other	–	–	x	F12D_new
1.15	Solar home system brand	HH	Brand	Indicator for solar home system brand	–	–	x	F12B_new

Table 4. Household structure major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
2.1	Household size	HH	Total	Total number of household members	x	x	X	Section A
2.2	Inhabited location	HH	Indicator	Baseline structure currently inhabited	x	x	X	Staff records
2.3	Household stayed	HH	Indicator	Household did not move to a new location	x	x	X	Staff records, AA9
2.4	Members living elsewhere	HH	Total	Household members documented at baseline that are now living elsewhere	x	x	-	Section A
2.5	Fertility	Resp.	Total	Number of times respondent (or sexual partner) has been pregnant since January 2014	x	x	-	sH3_3num_m, sH3_3num_f
2.6	Local social interactions	Resp.	Total	Number of times (over past week) neighboring respondents visited household and respondent visited neighboring households	x	–	-	Section K

Table 5. Time use major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2)
3.1	Hours sleeping	Resp.	Hours	Sleeping (code 1)	x	–	–	L1 to L48
3.2	Hours studying	Resp.	Hours	Playing with children or helping with homework (code 13)	x	–	–	L1 to L48
				Studying or attending class (code 16) *Note: All codes representing "studying" in survey*	x	–	–	
3.3	Hours working	Resp.	Hours	Light farm work (code 22)	x	–	–	L1 to L48
				Heavy farm work (code 23)	x	–	–	
				Fishing or hunting (code 24)	x	–	–	
				Office/desk work (code 25)	x	–	–	
				Light manual work (code 26)	x	–	–	
				Heavy manual work (code 27)	x	–	–	
				Other (work and travel) (code 32) *Note: All codes representing "work" in survey*	x	–	–	
3.4	Hours doing chores	Resp.	Hours	Cooking or preparing food (code 7)	x	–	–	L1 to L48
				Shopping for family (code 8)	x	–	–	
				Cleaning, dusting, sweeping, washing dishes or clothes, ironing, or doing other household chores (code 9)	x	–	–	
				Taking care of others, such as bathing, feeding, or looking after children, the sick, or the elderly (code 12)	x	–	–	
				Fetching water or firewood (code 10)	x	–	–	
				Repairs in or around the home (code 11)	x	–	–	
				Improving land or buildings (code 28) *Note: All codes representing "chores" in survey*	x	–	–	
3.5	Hours enjoying leisure	Resp.	Hours	Rest, watching TV, listening to the radio, reading a book, watching a movie, watching sports, or sewing (code 6)	x	–	–	L1 to L48
				Visiting or entertaining friends (code 14)	x	–	–	
				Playing sports (code 17)	x	–	–	
				Spending time with spouse or partner (code 18) *Note: All codes representing "leisure" in survey*	x	–	–	

Table 6. Productivity major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
4.1	Agriculture – Land use	HH	Proportion	Proportion of total land used for agricultural activities	x	–	-	C4a, C4b, D1c
4.2	Irrigation	HH	Indicator	Household used irrigation in last 12 months	x	x	-	D2e
4.3	Agriculture – Monthly revenue	HH	Total	Revenue from selling crops	x	x	X	D4a
				Revenue from selling livestock or livestock products	x	x	X	D4c
				Revenue from selling poultry or poultry products	x	x	-	D4e
				Revenue from selling fish	x	x	-	D4g
				Revenue from selling other agricultural produce *Note: Household revenue over past month*	x	x	X	D4i; for R3 this includes fish and poultry
4.4	Agriculture – Hours worked	Resp.	Total	Hours worked in agriculture in last 7 days	x	x	X	D3a
4.5	Employed or own business - Household	HH	Proportion	Proportion of household members (18 and over) currently employed or running their own business	x	x	X	A8
4.6	Business at household	HH	Indicator	Business operated out of household compound	x	–	-	sE1_15cdescpremise, sE1_51otherbus
4.7	Employed or own business – Individual	Resp.	Indicator	Currently self-employed, running a business, employed, or working for pay	x	x	X	sE1_1selfemp, sE2_1employed
4.8	Employed or own business – Individual monthly compensation	Resp.	Total	Monthly compensation, sum of last month compensation across all jobs and businesses	x	x	X	sE2_11, sE1_9aprofit, sE1_56profit
4.9	Employed or own business – Individual hours worked	Resp.	Total	Hours worked in self-employment in last 7 days	x	x	X	sE1_5wrkhrs
				Hours worked in employment in last 7 days	x	x	X	sE2_7hours_1
4.10	Household chores – Individual hours worked	Resp.	Total	Hours spent doing household chores in last 7 days	x	x	-	sL_49hhchores
4.11	Total hours worked	Resp.	Total	Total hours worked in agriculture, self-employment, employment, and household chores in last 7 days	x	x	*	See 4.3, 4.8, and 4.9 above. R3 is missing household chores.

| 4.12 | Total household earnings | HH | Value | Sum of earnings for all household members that are employed or running their own business, as well as agricultural earnings. (last 30 days) | – | x | X | A8, D4 (*R2 only*) |

Table 7. Wealth major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
5.1	Savings	Resp.	Total	Savings in mobile bank account	x	x	–	G2a
				Savings in SACCO, merry-go-round, or ROSCA	x	x	–	G2b
				Savings in formal bank account	x	x	–	G2c
5.2	Housing quality	HH	Index	Indicator for high-quality floors	x	x	–	C1a
				Indicator for high-quality roof	x	x	–	C1b
				Indicator for high-quality walls	x	x	–	C1c
5.3	Value of livestock assets	HH	Estimated value	Value of chickens owned	x	x	–	C8a
				Value of cattle owned	x	x	–	C8b
				Value of goats owned	x	x	–	C8c
				Value of pigs owned	x	x	–	C8d
				Value of sheep owned	x	x	–	C8e
5.4	Value of appliance assets	HH	Estimated value	Value of listed electrical appliances	x	x	X	F19a to F19c
5.5	Value of other assets	HH	Estimated value	Value of beds owned	x	x	–	C7a
				Value of bednets owned	x	x	–	C7b
				Value of kerosene stoves owned	x	x	–	C7c
				Value of kerosene lamps owned	x	x	–	C7d
				Value of hoes owned	x	x	–	C7e
				Value of bicycles owned	x	x	–	C7f
				Value of motorcycles owned	x	x	–	C7g
				Value of cars or trucks owned	x	x	–	C7h
				Value of sofa piece seats owned	x	x	–	C7i
5.6	Total asset value	HH	Estimated value	Estimated value of savings, livestock, electrical appliances, and other assets	x	x	–	See 5.1, 5.3, 5.4, and 5.5 above

Table 8. Consumption major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
6.1	Neediness index	HH	Index	Consumption of each of 23 goods over past twelve months, constructed according to the measure in Ligon (2015)	x	–	*	M5, M7, M8
6.2	Annual consumption	HH	Value	Estimated value of annual consumption of 23 goods[12]	x	x	*	M5, M7, M8 (for Round 1) sm_1staple, sm_2veg, sm_3meat, sm_4fruit, sm_5other (for Rounds 2, 3)
6.3a	Consumption diversity	HH	Index	Indicators for whether household has consumed each of 23 goods over the past twelve months	x	–	-	M1
6.3b	Consumption diversity	HH	Index	Indicators for whether household has consumed each of 23 goods over the past week	–	x	*	M1
6.4	Meals	Resp.	Total	Total number of meals eaten yesterday	x	x	-	sH1_1meals
6.5	Protein meals	Resp.	Total	Total number of meals eaten yesterday including meat or fish	x	x	-	sH1_2ameat

* indicates that, in R3, the consumption basket featured only a subset of 9 of the original 23 items. These were: staples (sm_1staple), vegetables (sm_2veg), meat (sm_3meat), fruit (sm_4fruit), other food items (sm_5other), mobile phone Airtime (sm_6airtime), travel expenses (sm_7travel), clothing and shoes (sm_8clothing), and personal items (sm_10personal).

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[12] Note that for Rounds 2 and 3, we will estimate annual consumption based on how the respondent reports consumption from the past seven days.

Table 9. Health and wellbeing major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
7.1	Respiratory illness index	Resp.	Index	Persistent cough	x	−	−	sH1_7bcough
				Asthma/breathlessness at night	x	−	−	sH1_7sasthma
				Note: Experienced over past 4 weeks				
7.2	Respiratory illness index - Child	Child	Index	Frequent cough	x	−	−	T3.5
				Itchy or stinging eyes	x	−	−	
				Sore throat	x	−	−	
				Runny nose	x	−	−	
				Asthma or breathlessness	x	−	−	
				Note: Experienced over past 7 days				
7.3	Recent symptoms index	Resp.	Index	Fever	x	−	−	sH1_7afever
				Persistent cough	x	−	−	sH1_7bcough
				Persistent tiredness	x	−	−	sH1_7ctired
				Stomach pain	x	−	−	sH1_7dstomach
				Blood in stool	x	−	−	sH1_7fstool
				Rapid weight loss	x	−	−	sH1_7gweightloss
				Frequent diarrhea	x	−	−	sH1_7hdiarrhoea
				Skin rash or irritation	x	−	−	sH1_7iskin
				Open sores/boils	x	−	−	sH1_7jboils
				Difficulty swallowing	x	−	−	sH1_7kswallow
				Sores or ulcers on the genitals	x	−	−	sH1_7pgenitalsore
				Asthma/breathlessness at night	x	−	−	sH1_7sasthma
				Frequent and excessive urination	x	−	−	sH1_7tfrequrine
				Constant thirst/increased drinking of fluids	x	−	−	sH1_7uthirst
				Unusual discharge from the tip of penis *(for men only)*	x	−	−	sH1_7wdischarge
				Other symptoms	x	−	−	sH1_7xother
				Note: All symptoms experienced over past 4 weeks				

7.4	Recent illnesses index	Resp.	Index	Worms	x	–	–	sH1_7eworms
				Malaria	x	–	–	sH1_7mmalaria
				Typhoid	x	–	–	sH1_7ntyphoid
				Tuberculosis	x	–	–	sH1_7otb
				Diabetes	x	–	–	sH1_7vdiabetes
				Cholera	x	–	–	sH1_7qcholera
				Yellow fever	x	–	–	sH1_7ryellow
				Note: All illnesses experienced over past 4 weeks	x	–	–	
7.5	Recent illnesses index - Child	Child	Index	Malaria	x	–	–	T3.5
				Fever	x	–	–	
				Typhoid	x	–		
				Note: All symptoms experienced over past 7 days			–	
7.6	Subjective health	Resp.	Indicator	Self-described health is either "good" or "very good"	x	–	–	sH1_13healthgd
7.7	Subjective health - Child	Child	Indicator	Self-described health is either "good" or "very good"	x	–	–	T3.4
7.8	Life satisfaction	Resp.	Scale	Life satisfaction based on a scale of 1 to 10	x	–	x	J9b

Table 10. Education major outcomes

ID	Outcome	Unit	Type	Component(s)	R1	R2	R3	Survey no. (R1, R2, R3)
8.1	English score	Child	Z-score[13]	English reading test result	x	–	–	T1
8.2	Math score	Child	Z-score	Math test result	x	–	–	T2
8.3	Average test score	Child	Z-score	Average of English reading test result and Math test result	x	–	–	T1, T2
8.4	Study hours - Total	Child	Total	Self-reported hours spent studying during the day	x	–	–	T3.1
				Self-reported hours spent studying during the night	x	–	–	T3.2
8.5	Study hours - Night	Child	Total	Self-reported hours spent studying during the night	x	–	–	T3.2
8.6	Attendance index	Child	Index	Fully completed first week of school last term	x	–	–	B2b
				Fully completed last week of school last term	x	–	–	B2c
				Completed end of term exams last term	x	–	–	B2d
				Fully completed first week of school this term	x	–	–	B2e
8.7	Grades	Child	Score	Marks (scaled out of 100) earned last term	x	–	–	B2f
8.8	Ambitions	Child	Indicator	Student planning to attend post-secondary education	x	–	–	T3.7
8.9	KCPE	Child	Indicator	Child took KCPE exam	–	x	x	A100
8.10	KCPE score	Child	Z-score	KCPE score	–	x	x	A100
8.11	KCPE age	Child	Age	Age of child when took KCPE exam	–	x	x	Section A
8.12	Highest standard/form completed	Child	Standard / form	Highest standard or form they were enrolled in in 2020, 2019, 2018, or if unenrolled past 2 years, highest standard/form completed.	–	–	x	A100I

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[13] We will create Z-scores by subtracting the mean and dividing by the standard deviation in the control group within our own sample, using age-gender groups.

Table 11. Social and political attitudes major outcomes

ID	Outcome	Unit	Type	Details	R1	R2	R3	Survey no. (R1, R2, R3)
9.1	Radio	Resp.	Total	Days in the past week respondent listened to the radio	x	x	-	J2a
9.2	Television	Resp.	Total	Days in the past week respondent watched television	x	x	–	J2c
9.3	Internet	Resp.	Total	Days in the past week respondent used the internet	x	x	–	J2d
9.4	Political and social awareness index	Resp.	Index	Knows date of next election	x	–	–	J1a
				Knows name of the president of Tanzania	x	–	–	J1b
				Knows name of the president of Burundi	x	–	–	J1c
				Knows name of a candidate in the 2016 U.S. presidential election	x	–	–	J1d
				Knows name of the CEO of Safaricom	x	–	–	J1e
				Knows name of the Managing Director of Kenya Power	x	–	–	J1f
				Knows the intended recipients of the Kenyan national government's Free Laptop program	x	–	–	J1i
				Knows who was responsible for the 2015 terrorist attacks at Garissa University	x	–	–	J1j
				Knows which team won the 2015-2016 English Premier League	x	–	–	J1g
				Knows who sings the pop song "Sura Yako" *Note: These are all binary variables*	x	–	–	J1h
9.5	Approval of national government index	Resp.	Index	Trusts national government	x	–	–	J5g
				Uhuru Kenyatta is doing a good job as president	x	–	–	J7a
				Government is doing a good job fighting terrorism	x	–	–	J7b
				Government corruption is not a problem in Kenya	x	–	–	J7d
				Government is doing a good job ensuring that electricity is provided in Kenya *Note: Binary variable indicating "agree" or "strongly agree"*	x	–	–	J7g
9.6	Gender equality index	Resp.	Index	It is acceptable for a woman to be a bus driver	x	–	–	J6a
				Important decisions of the family should not only be made by the man of the family	x	–	–	J6b

				Description				
				If the wife is working outside the home, the husband should help her with household chores	X	–	–	J6c
				Women should have more opportunities to become political leaders	X	–	–	J6d
				Note: Binary variable indicating "agree" or "strongly agree"				
9.7	Ethnic identity index	Resp.	Index	Ethnic identity is "important" or "very important" in respondent's life	X	–	–	J4e
				Indicator for belongs first to ethnic group (over other dimensions of identity)	X	–	–	J4f
9.8	Religiosity index	Resp.	Index	Religious identity is "important" or "very important" in respondent's life	X	–	–	J4d
				Indicator for belongs first to religious group (over other dimensions of identity)	X	–	–	J4f
				Attends church/mosque regularly	X	–	–	J4a
				Attended church/mosque last week	X	–	–	J4b
9.9	Social trust index	Resp.	Index	Trusts people, in general	X	–	–	J5a
				Trusts members of their own ethnic group	X	–	–	J5b
				Trusts members of other ethnic groups	X	–	–	J5c
				Trusts members of their own religion	X	–	–	J5d
				Trust members of other religions	X	–	–	J5e
				Note: Indicator for "can be trusted" or "can be somewhat trusted"				

Table 12. Community primary outcomes

ID	Outcome	Unit	Type	Details	R1	R2	R3	Survey no. (R1, R2, R3)
10.1	Comm. electrification rate	Com.	Proportion	Estimated community electrification rate	x	x	x	See Section 2.3
10.2	Comm. electricity reliability index	Com.	Index	Proportion of connected households reporting power blackouts in past 7 days	x	x	x	F10c, F10d
				Proportion of connected households reporting regular blackouts	x	x	x	F10e
10.3	Value of assets inequality	Com.	Index	Gini coefficient capturing within-community dispersion in total asset value	x	x	–	See 5.6 above
10.4	Education inequality	Com.	Index	Gini coefficient capturing within-community dispersion in student test score results (we use tests administered by the research team for Round 1 and KCPE scores for Round 2)	x	x	x	T1, T2 For R2, see 8.10 above
10.5	Consumption inequality	Com.	Index	Gini coefficient capturing within-community dispersion in total consumption of 23 consumption goods	x	–	*	M5, M7, M8
10.6	Gini coefficient for weekly consumption	Com.	Index	Gini coefficient capturing within-community dispersion in total consumption of 23 consumption goods	–	x	*	Section M
10.7	Perceived income inequality	Com.	Proportion	Proportion of respondents agreeing with statement that economic inequality is a problem in this village	x	–	–	J7e
10.8	Gini coefficient for total household earnings	Com.	Index	Gini coefficient capturing within-community dispersion in total household earnings	–	x	x	A8, D4
10.9	Voting	Com.	Proportion	Proportion of community that voted for Uhuru Kenyatta in the August 2017 general elections	–	x	–	Voting data from August 2017 national elections

* indicates set of goods in consumption basket survey is smaller than in previous rounds.

Table 13. Safety and crime major outcomes

ID	Outcome	Unit	Type	Details	R1	R2	R3	Survey no. (R1, R2, R3)
11.1	Safety	Resp.	Indicator	Area is described as "very secure" or "secure"	–	X	X	J10
11.2	Crime	Resp.	Index	Livestock stolen in last 12 months	–	X	X	J11
				Household items stolen in last 12 months			X	J12
				Cash stolen in last 12 months			X	J13
				Assaulted without weapon in last 12 months			*	J14
				Assaulted with weapon in last 12 months			*	J15
				Victim of arson in last 12 months			-	J16
				Victim of witchcraft in last 12 months			X	J17
				Other crime in last 12 months			X	J18

For the 2019-20 R3 follow-up, respondents were given a shorter list of possible crimes, where "Assault" was combined into a single category.

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Appendices

Appendix A. Living Standards Kenya (LSK) Survey – Follow-up Round 3 (2019-20)

Identifier	Introduction	Introduction
pg_ab1_	Script	Script
	READ: Hello. How are you? I am ${aa1_name} from REMIT, an independent research organization collaborating with the University of California. We are conducting research on living standards in the rural parts of Kenya. As you may know, five years ago we helped some households in this area get a connection to electricity. We have finished with that program now. Currently, we are not connecting any more houses to electricity, we are only conducting a survey to measure living standards.	SOMA: Hujambo, naitwa ${aa1_name} kutoka REMIT, mji wa Busia. REMIT ni shirika la kibinafsi linalo fanya utafiti likishirikiana na chuo kikuu cha Califonia. Tunafanya utafiti ju ya viwango vya maisha maeneo ya mashinani nchini Kenya. Vile unaweza kuwa unajua, miaka mitano zilizo pita tulisaidia nyumba zingine katika kijiji hiki kuunganishiwa stima. Tumemalizana na huo mradi kwa sasa. Kwa sasa hatuunganishi tena nyumba zingine tena kwa stima, tunafanya tu utafiti kuhusu viwango vya maisha.
	READ: Today, we wanted to conduct a short follow-up interview to ask you a few additional questions about living standards in your area.	Leo tunataka kufanya utafiti fupi wa kufuatilia kukuliza maswali mengine machache kuhusu viwango za maisha katika eneo hili.
	NOTE: If conducting phone interview, please read the below informed consent protocol. If conducting an in-person interview, please now give the respondent the written consent form for review.	NOTE: If conducting phone interview, please read the below informed consent protocol. If conducting an in-person interview, please now give the respondent the written consent form for review.
	READ: We will keep your study data as confidential as possible. If we publish or present results of this study, we will not use individual names or other personally identifiable information. To help protect confidentiality, any information that identifies you will be separated from your other answers. Your identifying information will be replaced with a	Tutaweka majibu yako ya utafiti siri iwezekanavyo. Ikiwa tutachapisha au kuwasilisha matokeo ya utafiti huu hatutatumia majina ya kibinafsi au ujumbe ya kibinafsi yanayoweza kukutambulisha. Kusaidia kuzuia uvujaji wa siri, habari yoyote inayokutambulisha itatenganishwa na majibu yako mengine. Matambulisho yako yata akilishwa na nambari, ili watafiti wetu pekee

	code, so that only our researchers will be able to track your answers back to you. We plan to keep this identifying information for the foreseeable future, in case we want to conduct future studies, but we will follow the same steps we just described to keep it as confidential as possible.	ndio wataweza kufuatilia majibu yako hadi kwako. Tunapanga kuweka matambulisho haya siri kwa matumizi ya siku yajayo, ikiwa tungetaka kufanya utafiti hapo mbeleni, lakini tutafuata mtindo huo tuliokueleza ili tuweke mahojiano hayo siri iwezekanavyo.
	Participation in research is completely voluntary. You have the right to decline to participate or to withdraw at any point in this study without penalty.	Kushiriki katika utafiti huu ni kwa hiari, uko huru kukata kushiriki au kuwacha kushiriki wakati wowote bila adhabu.
	We anticipate that this survey will take 30 minutes of your time.	Tunatarajia mahojiano haya yatachukua dakika 30.
ab1	May we have your permission to ask you some questions?	Tunaomba ruhusa kukuliza maswali?
pg_ab3_	Informed consent not obtained	Umenyimwa idhini
	READ: Thank you for your time and I hope that you have a wonderful day.	SOMA: Asante kwa muda wako. Natumai utakuwa na siku njema.
	Questions	
a1b	What is your year of birth?	Ulizaliwa mwaka gani?
	NOTE: Please enter the observed sex of the respondent below without asking.	NOTE: Please enter the observed sex of the respondent below without asking.
a1c	The respondent's sex is:	Jinsia ya mhojiwa:
	READ: I would now like to ask you for some basic contact information.	SOMA: Ningependa kukuuliza kuhusu habari za mawasiliano
a1g1	1g1. What is a phone number we can use to contact you in the future?	1g.Ni nambari gani ya simu nyingine tunaweza tumia kuwasiliana na wewe siku zijazo?
a1g2	1g2. Who owns this phone number?	Ni nani anamiliki nambari hii ya simu?
a1h1	1h1. What is a second phone number we can use to contact you in the future?	1h. Ni nambari gani ya simu ya tatu tunaweza tumia kuwasiliana na wewe siku zijazo?
a1h2	1h2. Who owns this second phone number?	1g2 Ni nani anamliki numbari hii ya pili ya simu ?
a1i	1i. Are you still living in the same household you were in 2016?	1i. Bado unaishi kwa nyumba ambayo ulikuwa unaishi mwaka wa 2016?

a1j	1j. Why did you move?	1j. Mbona ulihama?
a1l	1l. How many people currently live in your household? Think only of the people who regularly eat and sleep in your house.	1l. Ni watu wangapi kwa sasa wanaishi kwa nyumba yako? Fikiria tu kuhusu watu ambo kwa mara nyingi hula na kulala katika nyumba yako
noChildren	1m. How many children live in this household who were born between 2000 and 2004?	1m. Ni watoto wangapi ambao walizaliwa mwaka wa 2000 hadi 2004 ambao wanaishi kwa nyumba hii?
m_	Section M - Consumption Goods	Sehemu ya M
	READ: Now I want to ask about all food that your household consumed, regardless of whether it was purchased or grown by your household. For items that were produced at home, think about the value if you had bought them. Please exclude from your answer any food purchased for processing, livestock consumption, or resale in a household enterprise.	SOMA: Sasa ningependa kukuuliza kuhusu vyakula vyote nyumba yako ilitumia pasipo kujali kama ilinunuliwa au kupandwa na nyumba yako. Kwa bidhaa zilizozalishwa nyumbani, fikiria kuhusu dhamani kama ungezinunua. Tafadhali usijumuishe kwa majibu yako vyakula vilivyonunuliwa kwa kutengeneza vingine, vyakula vya mifugo au vya kuuza tena
sm_1staple	1. What was the amount of these particular staples consumed in total by your household in the past 7 days (KSH)? FO: read list of staples and calculate total. rice, irish potato, wheat flour, plantains	1. Ni kiwango kipi cha nafaka kilichotumika kwa jumla kwa muda wa siku saba zilizopita? (KSH) FO: read list of staples and calculate total. Mchele, Viazi za waru, Unga ngano, Ndizi
sm_2veg	1. What was the amount of vegetables consumed in total by your household in the past 7 days (KSH)? FO: read list of vegetables and calculate total. Beans, green grams, tomatoes, onions, kale, cabbage	1. Ni kiwango kipi cha mboga kilichotumika kwa jumla kwa muda wa siku saba zilizopita? (KSH) FO: read list of vegetables and calculate total. Maharagwe, Ndengu, Nyanya, Vitunguu,Sukuma, Kabegi

sm_3meat	1. What was the amount of meat consumed in total by your household in the past 7 days (KSH)? FO: read list of meat and calculate total. Beef chicken_duck_and_other_poultry eggs	1. Ni kiwango kipi cha nyama kilichotumika kwa jumla kwa muda wa siku saba zilizopita? (KSH) FO: read list of meat and calculate total. Nyama ya ngombe, Kuku, Bata, aina zingine za kuku, mayai
sm_4fruit	1. What was the amount of fruit consumed in total by your household in the past 7 days (KSH)? FO: read list of fruit and calculate total. Watermelon, bananas, oranges_and_other_citrus, pineapple, avocado, mango	1. Ni kiwango kipi cha matunda kilichotumika kwa jumla kwa muda wa siku saba zilizopita? (KSH) FO: read list of fruit and calculate total. Watermelon(tiki tiki maji), Ndizi, Machungwa, Nanasi,Avakado, Maembe na matunda zingine za siturasi
sm_5other	1. What was the amount of the following other goods consumed in total by your household in the past 7 days (KSH)? FO: read list of other goods and calculate total. Cooking fat, sugar, tea/coffee, breads/biscuits/cakes	1. Ni kiwango kipi cha bidhaa zingine kilichotumika kwa jumla kwa muda wa siku saba zilizopita? (KSH) FO: read list of other goods and calculate total. Mafuta ya kupika, Sukari, Majani, Kahawa, mkate/Biskuti/Keki
sm_6airtime	In the past one month, How much did your household spend on Airtime, other phone expenses in total (KSH)?	Kwa mwezi mmoja iliyopita,ni pesa ngapi nyumba yako ilitumia kwa airtime na gharama zingine za simu kwa jumla?
sm_7travel	In the past one month, How much did your household spend on travel, transport and hotels (NOT including medical reasons) in total (KSH)? FO: Read list of travel and transport expenses, calculate total Petrol, tolls, transport such as taxi/bus/matatu/boda/piki/train/flight fare, hotel stays	Kwa mwezi mmoja iliyopita,ni pesa ngapi nyumba yako ilitumia kwa usafiri,kusafirisha na hoteli(Usijumuishe sababu za matibabu) kwa jumla?(KSH). FO:Soma orodha ya matumizi ya usafiri na usafirishaji, jumuisha petroli, tolls, usafirishaji kama vile taxi/basi/matatu/piki/treni/kukodesha ndege/kuishi kwa hoteli.

sm_8clothing	In the past one month, How much did your household spend on Clothing and shoes in total (KSH)?	Kwa mwezi mmoja iliyopita,ni pesa ngapi nyumba yako ilitumia kwa ununuzi wa nguo na viatu kwa jumla?(KSH)
sm_10personal	In the past one month, How much did your household spend on Personal items such as Hair cuts, toiletries, cosmetics, combs, soap in total (KSH)?	Kwa mwezi mmoja iliyopita ni pesa ngapi nyumba yako ilitumia kwa vitu vya kibinafsi kama vile kunyoa nywele,vifaa vya choo,mapambo,vichana,sabuni kwa jumla?(KSH)
m_		
f_	Section F - Energy	Sehemu ya F
pg_f1_	Main and secondary energy sources	Main and secondary energy sources
	READ: I would like to begin this section by asking you some questions about your energy use.	SOMA: Ningependa kuanza kukuliza maswali kuhusu matumizi yako ya nishati
f1a	1a. Does this household have a connection to the national grid?	1a. Je, nyumba hii ina umeme kutoka kwa KPLC/ REA? Kampuni ya Kenya Power au mamlaka ya kusambaza umeme mashinani
f1b	1b. What is your main source of lighting energy?	1b. Kwa sana, nyumba hii, hutumia nini kwa mwangaza?
f1c	1c. What are your other (secondary) sources of lighting energy?	1c. Ni vitu vipi vingine nyumba hii hutumia kwa mwangaza?
f1d	1d. What is your main source of cooking energy?	1d. Kwa sana, nyumba hii hutumia nini kwa kupika?
f1e	1e. What are your other (secondary) sources of cooking energy?	1e. Ni vitu vipi vingine nyumba hii hutumia kwa kupika?
f1f	1f. Do you use any additional sources of energy?	1f. Nyinyi hutumia nishati nyingine kando na hizi?
pg_f2_	Other sources of energy	Other sources of energy
f1g	1g. What are these sources of energy?	1g. Nishati hizi ni gani?
f1g1	Specify other	Specify other
f1h	1h. If main source of lighting energy is other, please specify.	1h. Ikiwa nishati kuu ya mwangaza ni nyingine, tafadhali eleza
f1i	1i. If secondary source of lighting energy is other, please specify.	1i. Kama kuna nishati nyingine ya mwangaza, tafadhali eleza
f1j	1j. If main source of cooking energy is other, please specify.	1j.Ikiwa nishati kuu ya upishi ni nyingine tafadhali eleza

f1k	1k. If other source of cooking energy is other, please specify.	1k. Kama kuna nishati nyingine ya upishi, tafadhali eleza
pg_f3_	Other sources of energy	Other sources of energy
f1l	1l. If additional sources of energy is other, please specify.	1l. Kama kuna nishati ya ziada tafadhali eleza
pg_f4_	No electricity connection	No electricity connection
	READ: What are the reasons why your household does not have electricity?	SOMA: Ni kwa nini nyumba yako haina umeme kutoka kwa KPLC/ REA?
	NOTE: Allow respondent to respond naturally. When he/she has finished, select all of the reasons that apply.	NOTE: Allow respondent to respond naturally. When he/she has finished, select all of the reasons that apply.
f2	2. Please select all that apply.	2. Chagua zote ambazo zinahusika.
f2a	Specify other	Specify other
f3a	3a. Has anyone in this household ever applied for an electricity connection?	3a. Je, mtu yeyote katika nyumba hii amewahi kutuma maombi ili nyumba hii iunganishwe na stima?
pg_f5_	No electricity connection	No electricity connection
f3b	3b. When did your household apply for this connection?	3b. Maombi hayo yalitumwa lini?
f3c	3c. What is the current status of your application?	3c. Kwa sasa, maombi hayo yamefikia wapi?
pg_f8_	Electricity connection	Electricity connection
	READ: When was this household first connected to electricity? Record the approximate date that electricity first began to flow into this household.	SOMA: Ni lini nyumba hii liliunganishiwa umeme?
f4a	4a. Month of connection:	4a. Mwezi wa kuunganishiwa
f4b	4b. Year of connection:	4b. Mwaka wa kuunganishiwa:
f4c	4c. In total, how much did you pay to connect your household to the electricity grid? Think about just the cost of connection, not including costs for wiring or	4c. Kwa jumla ulilipa pesa ngapi kuunganishiwa umeme kwa nyumba yako ?
pg_f9_	Electricity connection	Electricity connection
f4h	4h. Generally speaking, how satisfied are you with your electricity connection?	4h. Ukizingatia vitu vyote, umeridhika kiasi gani na hali ya stima yako?
f4i	4i. Over the past 7 days, has your electricity connection delivered power to your home?	4i. Kwa siku saba zilizopita, umekuwa na umeme kwa nyumba yako?

pg_f10_	Electricity connection	Electricity connection
f4j	4j. Why not?	4j. Kwa nini ?
	READ: How long has the electricity connection not been working?	SOMA: Ni kwa muda gani stima haijakuwa ikifanya kazi
f4k	4k: Length of time:	4k. Kiasi cha muda:
f4l	4l. Select units:	4l. Chagua vitengo:
pg_f11a_	Electricity connection	Electricity connection
f4m	4m. If other reason why there is no power, please specify.	4m. Iwapo kuna sababu nyingine umeme haukuwepo tafadhali eleza
f4q	4q. In your interaction with Kenya Power have you ever been asked to pay a bribe?	4q. Katika kuhusiana kwako na watu wa Kenya Power, umewahi kuombwa kutoa hongo?
pg_f12_	Electricity meter	Electricity meter
f5a	5a. What type of electricity meter do you have?	5a. Una aina gani ya mita ya stima ?
f5i	5i. READ: How many households (i.e., "pots") within your compound, including your own, are connected to electricity?	5i. SOMA: Ni nyumba ("pots") ngapi kwa boma lako pamoja na yako zimeunganishwa kwa stima?
f5j	5j. How many households outside of your compound are connected to your electricity meter?	5j. Ni nyumba ngapi nje ya boma lako zimeunganishwa kwa mita yako ya stima?
pg_f14_	Prepaid consumption	Prepaid consumption
	READ: When was your last top-up?	SOMA: Ni lini mwisho ulinunua stima
f7a	7a. Select month:	7a. Chagua mwezi?
f7b	7b. Select year:	7b. Chagua mwaka?
f7c	7c. What was the amount of your last top-up?	7c. Mara ya mwisho ulinunua stima ilikuwa ya pesa ngapi?
	READ: In the past three months…	SOMA: Kwa miezi mitatu iliyopita…
f7d	7d. …how many times did you top-up?	7d. …ni mara ngapi ulinunua au lipa stima?
f7e	7e. …how much in total did you spend on top ups?	7e. …ulilipa pesa ngapi kwa jumla?
pg_f15_	Postpaid consumption	Postpaid consumption
	READ: I would now like to ask you about your monthly electricity bill.	SOMA: Ningependa kukuuliza kuhusu malipo yako ya stima ya kila mwezi.
f8a	8a. How much was the amount of your last monthly electricity bill?	8a. Mwezi uliopita, ulilipa bill/ ada ya stima ya pesa ngapi?
f8b	8b. Please re-enter the amount.	8b. Tafadhali jaza tena kiwango.
f8c	8c. For which month did you receive your last bill?	8c. Kwa mwezi gani ulipata bill yako ya mwisho?

f10c	10c. Over the past 7 days did you experience any power blackouts?	10c. Kwa siku saba zilizopita umeme ilipotea hapa kwa nyumba yako?
f10d	10d. Over the past 3 days for roughly how many hours was the power not working?	10d. Kwa siku 3 zilizopita ni kama masaa mangapi stima haikuwa inafanya kazi?
f10e	10e. Do blackouts occur regularly?	10e. Kupotea kwa stima hufanyika mara kwa mara?
	READ: Thank you. I would now like to ask you details about your energy sources.	SOMA: Ahsante. Ningependa kukuuliza kuhusu nishati yako
pg_f18_	Kerosene usage	Kerosene usage
f11	11. In the past 7 days, how much money in total did your household spend on kerosene?	11. Nyumba yako imetumia pesa ngapi kununua mafuta taa kwa jumla, kwa siku saba zilizopita?
f11a	11a. Think about the past three days. On average, how many hours a day did you use kerosene for lighting?	11a. Fikiria kuhusu siku tatu zilizopita. Kwa wastani, ni kwa masaa mangapi kwa siku ulitumia mafuta ya taa kwa mwangaza?
	Solar	
f12a	12a. Do you use a solar lantern or solar home system?	12a. Huwa unatumia taa ya 'Solar' ndogo au kubwa?
f12d_new	12b. How did you acquire your solar home system?	12b. Ulipataje taa yako kubwa ya miale ya jua?
f12d_new_other	12c. If "other", please specify.	12c. Kama ni nyingine tafadhali eleza.
f12b_new	12b. What brand of solar home system do you use?	12b. Ni aina gani ya taa kubwa ya miale ya jua unayotumia?
f12b_new_other	12c. If "other", please specify.	12. Kama ni nyingine tafadhali eleza.
f12c_new	12d. Think about the past three days. On average, how many hours a day did you use your solar lantern for lighting?	12d. Fikiria kuhusu siku tatu iliopita. Kwa kiwango cha kati,ni kwa masaa mangapi kwa siku ulitumia taa yako ndogo ya sola au taa kubwa ya sola?
f12e	12e. Think about the past three days. On average, how many hours a day did you use your solar home system for lighting?	12e. Fikiria kuhusu siku tatu zilizopita. Kwa wastani, ni kwa masaa mangapi kwa siku ulitumia taa yako kubwa ya miale ya jua kwa mwangaza?
pg_f22_	Solar lanterns	Solar lanterns
f13a	13a. How many solar lanterns do you use in this household?	13a. Unatumia taa ndogo za 'Solar' ngapi kwa nyumba hii?

	READ: I'd like you to think only about the main solar lantern that you use.	SOMA: Ningependa ufikirie kuhusu taa ya 'Solar' kuu mnayo tumia.
f13b	13b. Do you own, rent or hire purchase this particular solar lantern?	13b. Unamiliki/ kukodesha au unalipa polepole hii taa ya nishati ya jua?
pg_f23_	Solar lanterns	Solar lanterns
f13d2	13d. How much did you pay upfront (as a "deposit") to rent or hire purchase this particular solar lantern?	13d Ulilipa pesa ngapi kama arubuni (deposit) ili kukodesha taa hii ya solar?
f13d	13d. In the past month, how much did you pay to rent or hire purchase this particular solar lantern?	13d. Kwa mwezi uliopita ulilipia pesa ngapi kukodesha au malipo ya pole pole kwa taa hii?
pg_f24_	Solar home systems	Solar home systems
f14a	14a. How many solar home systems do you use in this household?	14a. Unatumia taa kubwa ya 'Solar' ngapi kwa nyumba hii?
	READ: I'd like you to think only about the main solar home system that you use.	SOMA: Ningependa ufikirie kuhusu mtambo wa nishati la jua unalotumia
f14b	14b. Do you own, rent or hire purchase this particular solar home system?	14b. Unamiliki/ kukodesha au aunalipa polepole hii nishati ya jua ya sola home system?
pg_f25_	Solar home systems	Solar home systems
f14d2	13d. How much did you pay upfront (as a "deposit") to rent or hire purchase this particular solar home system?	13d Ulilipa pesa ngapi kama arubuni (deposit) ili kukodesha mtambo huu wa solar?
f14d	14d. In the past month, how much did you pay to rent or hire purchase this particular solar home system?	14d. Kwa mwezi uliopita ulilipia pesa ngapi kukodesha au malipo ya pole pole kwa nishati ya jua ya sola home system?
pg_f26_	Batteries (dry cells) & car batteries (wet cells)	Batteries (dry cells) & car batteries (wet cells)
f15b	15b. In the past 7 days, how much did you spend recharging this wet cell (i.e. car) battery?	15b. Kwa siku saba zilizopita ulilipia pesa ngapi ku chaji betri hii ?
f15c	15c. In the past 7 days, how much did you spend on your dry cell batteries?	15c. Ulilipia pesa ngapi kununua battery (kama za radio/ torch e.g. Everready), kwa siku saba zilizopita?

f15d	15d. Think about the past three days. On average, how many hours a day did you use your wet cell battery for lighting?	15d. Fikiria kuhusu siku tatu zilizopita. Kwa wastani, ni kwa masaa mangapi kwa siku ulitumia betri ya gari kwa mwangaza?
f15e	15e. Think about the past three days. On average, how many hours a day did you use your dry cell battery for lighting?	15e. Fikiria kuhusu siku tatu zilizopita. Kwa wastani, ni kwa masaa mangapi kwa siku ulitumia betri ya torch kwa mwangaza?
pg_f27_	Batteries (dry cells) & car batteries (wet cells)	Batteries (dry cells) & car batteries (wet cells)
f15f	15f. Is this because your batteries are rechargeable?	15f. Ni kwa sababu betri zako zinaweza kuchajiwa?
pg_f28_	Generator	Generator
f16c	16c. In the past 7 days, how much did you spend on fuel for your primary generator?	16c. Kwa siku saba zilizopita ulitumia pesa ngapi kununua petroli ya jenereta yako ya kimsingi?
f16d	16d. For what activities do you use this generator?	16d. Ulnatumia generator hii kwa matumizi gani?
f16d1	Specify other	Specify other
f16f	15d. Think about the past three days. On average, how many hours a day did you use your generator for lighting?	15d. Fikiria kuhusu siku tatu zilizopita. Kwa wastani, ni kwa masaa mangapi kwa siku ulitumia jenereta kwa mwangaza?
pg_f29_	Generator	Generator
f16e	16e. If other, please specify.	16e. Kama ni wazo lingine, tafadhali baini.
pg_f30_	Other sources of energy	Other sources of energy
f17a	17a. In the past 7 days, how much did you spend on purchased firewood?	17a. Ulitumia pesa ngapi kwa ununuzi wa kuni, kwa siku saba zilizopita?
f17b	17b. In the past 7 days, how much did you spend on charcoal?	17b. Ulitumia pesa ngapi kwa ununuzi wa makaa, kwa siku saba zilizopita?
f17c	17c. In the past 7 days, how much did you spend on LPG?	17c. Ulitumia pesa ngapi kwa ununuzi wa gasi (LPG), kwa siku saba zilizopita?
f17d	17d. In the past 7 days, how much did you spend on sawdust?	17d. Ulitumia pesa ngapi kwa ununuzi wa vumbi ya mbao kwa siku saba zilizopita?
pg_f30b		
	READ: Earlier, you mentioned that you use another source of energy.	SOMA: Awali,ulitaja kuwa unatumia nishati nyingine.kwa siku saba zilizopita nipesa ngapi ulitumia ?

	In the past 7 days, how much did you spend…	
f17e	17e. ...on this other source of lighting fuel?	17e. ...kwa ununuzi ingine wa nishati ya mwangaza ?
f17f	17f. ...on this other source of cooking fuel?	17f. ...kwa ununuzi wa nishati nyingine ya kupika ?
f17g	17g. ...on this other source of additional energy?	17g. ...kwa ununuzi wa nishati nyingine ya kuongezea
pg_f32_	Other sources of energy	Other sources of energy
f17i	17i. In the past 7 days, have you spent any additional money in order to collect/ acquire your energy sources? For example, the money spent on boda boda when collecting kerosene, firewood, charcoal, etc.?	17i. kwa siku saba zilizopita, umetumia pesa zozote za ziada katika kuleta vyanzo vyako vya nishati, kama vile pesa za boda boda ukienda kununua mafuta taa, kuni, makaa, n.k.?
f17j	17j. In the past 7 days, how much additional money did you spend to acquire all of your energy sources?	17j. Umetumia pesa ngapi ya ziada kupata nishati za upishi au mwangaza, katika siku saba zilizopota?
pg_f33a_	Lighting hours	Lighting hours
f18aa	15d. Think about the past three days. On average, how many hours a day did you use electricity from your connection for lighting?	15d. Fikiria kuhusu siku tatu zilizopita. Kwa wastani, ni kwa masaa mangapi kwa siku ulitumia stima yako kwa mwangaza?
pg_f35_	Electrical appliances	Electrical appliances
	READ: Thank you. Now I'd like to ask you about electrical appliances.	SOMA: Ahsante. Sasa ningependa kukuuliza kuhusu vifaa vinavyo tumia stima.
f19a	19a. Does your household own any electrical appliances, such as a cell phone or a radio? If an appliance is broken but you plan to fix it, please still include it.	19a. Nyumba yako ina miliki vifaa vya stima, kama vile simu ama redio? Kama imeharibika na unapanga kuunda, tafadhali jumuisha.
pg_f36_	Electrical appliances	Electrical appliances
	NOTE: Recall that an electrical appliance is any electronic device that can be plugged into an electricity socket.	NOTE: Recall that an electrical appliance is any electronic device that can be plugged into an electricity socket.

f19b	19b. What electrical appliances do you own? Please include type of device or machine that uses electricity. Also please count any devices that are being used by anyone living in this household	19b. Ni vifaa gani vya stima mlivyo navyo? Tafadhali jumuisha kila chombo kinachotumia stima. Pia hesabu kila chombo au kifa kinachotumiwa na mtu yeyote wa nyumba hii.
f19c	19c. What other electrical appliances do you own?.	19c. Ni vifaa gani vingine vya stima mnamiliki?
comments_f	Additional comments?	Additional comments?
d_	Section D - Agriculture	Sehemu ya D
pg_d1_	Activities	Activities
d1a	1a. What are the agricultural or pastoralist activities that members of your household perform?	1a. Ni shughuli gani za kilimo au ufugaji/ uchungaji watu wa nyumba hii, ujihusisha nayo?
d1a1	Specify other	Specify other
pg_d4_	Agricultural labor	Agricultural labor
d3a	3a. Over the past 7 days, how many hours did you work in total on these activities?	3a. Kwa siku saba zilizo pita ulitumia muda wa masaa mangapi kwa jumla kufanya kazi katika shuguli hizi?
pg_d5_	Income from agricultural activities	Income from agricultural activities
	In this section we will discuss total sales and net profits. When we ask about net profits we mean the value of everything you produced, whether or not you sold it, but then subtracting out expenses for this activity, including hired workers, land rental, storage, and purchase of inputs, such as raw materials, fuel, and electricity, but before purchasing personal items for yourself or your household.	Katika sehemu hii tutajadiliana kuhusu jumla ya mauzo na faidha halisi.Tunapouliza juu ya faida halisi tunamaanisha thamani ya kila kitu ulichokizalisha, ikiwa uliuuza au la, lakini kisha unaondoa gharama za shughuli hii, ikiwa ni pamoja na wafanyakazi walioajiriwa, kukodisha ardhi, kuhifadhi, na ununuzi wa pembejeo, kama vile malighafi, mafuta, na umeme, lakini kabla ya kununua vitu binafsi mwenyewe au nyumba yako.
	How much did your household receive in total in sales from selling crops…	Ni kiasi kipi cha fedha ulipata kwa jumla kutoka kwa mauzo ya mazao…
d4a	4a. …over the past month?	4a. …mwezi uliopita?
d4b	4b. …over the past 12 months?	4b. …miezi kumi na miwili iliyopita?
	How much did your household receive in total in net profits from selling crops…	Je! nyumba yako imepokea kiasi gani kwa faida kamili kutokana na kuuza mazao ?

d4a2	4a. ...over the past month?	4a. ...mwezi uliopita?
d4b2	4b. ...over the past 12 months?	4b. ...miezi kumi na miwili iliyopita?
	How much did your household receive in total in sales from selling livestock/ livestock products over the...	Ni kiasi kipi cha fedha ulipata kwa jumla kutoka kwa mauzo ya mifugo au mazao kutoka kwa mifugo kwa...
d4c	4c. ...over the past month?	4c. ...mwezi uliopita?
d4d	4d. ...over the past 12 months?	4d. ...miezi kumi na miwili iliyopita?
	How much did your household receive in total in net profits from selling livestock/ livestock products over the...	Je! Nyumba yako imepokea kiasi gani kwa faida kamili kutokana na kuuza mifugo / mazao kutoka kwa mifugo kwa .....
d4c2	4c. ...over the past month?	4c. ...mwezi uliopita?
d4d2	4d. ...over the past 12 months?	4d. ...miezi kumi na miwili iliyopita?
	How much did your household receive in total in sales from selling your "other" activity over the...	Ni kiasi kipi cha fedha ulipata kwa jumla kutoka kwa mauzo ya shughuli nyingine kwa.....
d4i	4i. ...over the past month?	4i. ...mwezi uliopita?
d4j	4j. ...over the past 12 months?	4j. ...miezi kumi na miwili iliyopita?
	How much did your household receive in total in net profits from selling your "other" activity over the...	Je! Nyumba yako imepokea kiasi gani kwa faida kamili kutokana na kuuza "nyingine" shughuli kwa...........
d4i2	4i. ...over the past month?	4i. ...mwezi uliopita?
d4j2	4j. ...over the past 12 months?	4j. ...miezi kumi na miwili iliyopita?
comments_d	Additional comments?	Additional comments?
e1_	Section E1 - Self-Employment	Sehemu ya E1
	READ: I will now ask you some questions about your employment status.	SOMA: Sasa nitakuuliza maswali machache juu ya hali yako ya ajira.
	READ: Please remember that this survey is confidential and that the information will be used for research purposes only.	SOMA: Tafadhali kumbuka kwamba haya mahojiano ni ya siri na ya kwamba habari itatumika kwa minajili ya utafiti pekee.
sE1_1selfemp	1. Other than farming, are you currently self-employed or running a business to earn a living?	1. Kando na kilimo, kwa hivi sasa umejiajiri au unaendesha biashara ili kujimudu kimaisha?
pg_e11_		

	READ: Now we would like to learn about each of the current businesses you are running or the activities you are performing while self-employed, starting with your current most important self-employment position.	SOMA: Sasa tungependa kujua ju ya kila biashara au shughuli zako unazo zifanya hivi sasa, kwanzia ile ya umuhimu zaidi unayo fanya hivi sasa.
repeat_e_selfempl	Self-employment	Self-employment
	READ: Now, let's talk about your next business.	READ: Sasa, hebu tuzungumuze kuhusu biashara yako inayofuatia
sE1_2aocc	2. In what industry is this business?	2. Biashara hii ilikuwa katika industry gani?
sE1_2aoccoth	2a. SPECIFY OTHER	2a. SPECIFY OTHER
pg_e12_		
sE1_4buselec	4. Does this business use electricity?	4. Biashara hii inatumia stima?
sE1_5wrkhrs	5. How many hours did you work in total in this business in the last 7 days?	5. Kwa siku saba zilizopita, ni masaa mangapi kwa jumla ulifanya kazi kwa biashara hii?
sE1_6wrkmths	6. In the last 12 months, how many months did you work in this business?	6. Kwa miezi 12 iliyopita, ni miezi mingapi ulifanya kazi kwa biashara hii?
sE1_7workers	7. How many workers are you currently employing, not including yourself?	7. Kwa hivi sasa ni wafanyakazi wangapi umeajiri usipojijumuisha?
pg_e13_		
sE1_8aearn	8a. What were your total earnings (money in only – do not subtract any expenses) from this business in the last month? Here we mean the amount you received from this business for sales & services provided BEFORE subtracting any expenses for payment of workers, or purchase of inputs, personal, or family items. Please report this in Kenyan shillings.	8a. Kwa jumla, ulipata mapato kiasi gani (pesa zilizoingia pekee usitoe gharama zozote) katika hii biashara kwa mwezi uliopita? Hapa tunamaanisha kiasi cha pesa ulichopokea katika hii biashara kwa mauzo ya bidhaa na huduma zilizopeanwa KABLA ya kuondoa gharama za kulipa wafanyakazi au ununuzi wa vifaa, matumizi ya kibinafsi au bidhaa za familia. Andika kwa pesa za Kenya.
sE1_8bearn	8b. What were your total earnings from this business in the last 12 months?	8a. Kwa jumla, ulipata mapato kiasi gani katika hii biashara kwa miezi kumi na miwili iliyopita?

sE1_9aprofit	9a. What was your total profit from this business in the last month? Here we mean the amount you received AFTER paying for expenses for this business, including hired workers, money for household members who helped, purchase of goods for sale or for inputs, such as raw materials, fuel, and electricity, but BEFORE purchasing personal items for yourself or your household. Please report this in Kenyan shillings.	9a. Kwa jumla ulipata faida ya pesa ngapi kutoka katika biashara hii mwezi uliopita? Hapa tunamaanisha kiasi cha pesa ulichopokea katika hii biashara kwa mauzo ya bidhaa na huduma zilizopeanwa BAADA YA kuondoa gharama za kulipa wafanyakazi au ununuzi wa vifaa, lakini KABLA ya kutoa matumizi ya kibinafsi au bidhaa za familia. If unsure, FR can estimate.
sE1_9bprofit	9b. What was your total profit from this business in the last 12 months?	9b. Kwa jumla ulipata faida ya pesa ngapi kutoka katika biashara hii miezi kumi na miwili iliopita?
	IF THERE IS ANOTHER BUSINESS OR ACTIVITY, SELECT "ADD GROUP." IF YOU HAVE RECORDED 3 ACTIVITIES, SELECT "DO NOT ADD" ANOTHER GROUP.	IF THERE IS ANOTHER BUSINESS OR ACTIVITY, SELECT "ADD GROUP." IF YOU HAVE RECORDED 3 ACTIVITIES, SELECT "DO NOT ADD" ANOTHER GROUP.
sE1_10a	10a. In the past year, did you run a business that you are not currently running now?	10a. Kwa mwaka uliopita uliendesha biashara ambayo hufanyi kwa sasa?
sE1_10b	10b. In your last month of running this business, what were your total earnings?	10b. Kwa mwezi wako wa mwisho wa kufanya biashara hii. Mapato yako kwa jumla ilikuwa ngapi?
sE1_10c	10c. In your last month of running this business, what were your total profits?	10c. Kwa mwezi wako wa mwisho wa kufanya biashara hii kwa jumla faida yako ilikuwa ngapi?
e2_	Section E2 - Employment	Sehemu ya E2
	READ: Now we would like to learn about what jobs you currently hold, starting with your most important position. Please do not include self-employment positions in your answer.	READ: Sasa tungependa kujua kuhusu kazi za malipo ambazo unashikilia kwa sasa, kuanzia na nafasi yako ya muhimu sana. Tafadhali usijumulishe kazi za kujiajiri mwenyewe katika majibu yako.
sE2_1employed	1. Are you currently employed, working for pay?	1. Hivi sasa umeajiriwa, kufanya kazi ya malipo?
pg_e21_		
repeat_e_jobs	Current jobs	Current jobs

pg_e22_		
	Now, let's talk about your next job.	Sasa, hebu tuzungumuze kuhusu kazi yako inayofuatia.
	2. In what month and year did you start this job?	2. Ni mwezi na mwaka gani ulipoanza kazi hii?
sE2_2year_1	YEAR:	YEAR:
sE2_2month_1	MONTH:	MONTH:
sE2_3occ_1	3. In what occupation is this work?	3. Kazi hii iko kwa nyanja gani?
sE2_3occ_1other	3. SPECIFY OTHER OCCUPATION:	3. SPECIFY OTHER OCCUPATION:
sE2_6amonths	6a. In which months did you work at this job during the last 12 months?	6a. Ni kwa miezi gani ulifanya kazi hii kwa miezi 12 iliyopita?
sE2_7hours_1	7. How many hours did you work at this job during the last 7 days?	7. Kwa siku saba zilizopita umefanya hapo kazi kwa masaa mangapi?
pg_e25_		
	Please estimate your total compensation from this job over the last month. Please include your cash salary, in addition to any other benefits such as: payment in kind in food, NSSF / health insurance, housing benefits, uniforms / clothing benefits, training allowance, and any other allowances and benefits.	Tafadhali kadiria mapato yako yote kwa jumla kutokana na kazi hii kwa mwezi uliopita. Tafadhali jumuisha mshahara wako taslimu, na uongeze marupurupu k.v. malipo kwa njia ya chakula, NSSF, Bima ya Afya, maruprupu ya nyumba, sare, nguo, marupurupu ya mafunzo, na marupurupu mengine yoyote.
sE2_11	11. What is / was the amount of your total compensation over the past month? Please record this amount in Ksh.	11. Nini jumla ya mapato yako kwa mwezi uliopita. Nakili kiasi kwa KES.
pg_e26_		
sE2_11iconfirm	You listed ${sE2_11} Ksh. Is that correct?	Ulisema KSH.${sE2_11}. Hiyo ni sawa?
sE2_17anotherjob	17. Do you have another current job?	17. Una kazi nyingine yoyote sasa?
	IF THE FR HAS ANOTHER JOB, CHOOSE "ADD GROUP".	IF THE FR HAS ANOTHER JOB, CHOOSE "ADD GROUP".
pg_othjobs		
sE2_17aconfirmjobs	17a. You currently have ${njobs} jobs. Is that correct?	17a. Sasa una kazi ${njobs} sasa. Hiyo ni sawa?
sE2_priorjobs	18a. Were there any jobs in the last year in which you are not currently working?	18a. Kulikuwa na kazi yoyote kwa mwaka uliopita ambayo haufanyi kwa sasa?

sE2_months	18b. Think about all those other jobs. In which months during the past year were you working those jobs?	18b. Fikiria kuhusu kazi zingine zote, kwa miezi gani kwa mwaka uliopita ulikuwa unafanya kazi hizo?
SE2_priorjobs_pay	18c. In your last month of working, what was your total compensation?	18c. Kwa mwezi wako wa mwisho wa kufanya kazi, kwa jumla fidia yako ilikuwa ngapi?
comments_e2	Additional comments?	Additional comments?
pg_a8_	Household members	
	READ: You previously stated that there are ${hhsizeNS} number of people in your household.	SOMA: Hapo awali ulitaja kuna ${hhsizeNS} nambari ya watu kwa nyumba yako.
	READ: I would now like to know the education and the occupation of the people that live in your current household.	SOMA: Sasa ningependa kujua elimu na kazi ya watu unao ishi nao kwa sasa
repeat_e_hh_members	Household members	
a8name	What is this person's name?	Jina la mtu huyu ni nani?
a8a	What is their highest level of education completed?	Amemaliza kiwango gani ya masomo?
a8b	Are they currently employed or running their own business?	Ameajiriwa kwa sasa au anaendesha biashara yake mwenyewe?
a8c	What is their current occupation?	Anafanya kazi gani kwa sasa?
a8d	Were they self-employed or running a business in the last 30 days? Please do not include any businesses already discussed.	Walikuwa wamejiajira au kufanya biashara kwa siku 30 zilizopita? Tafadhali usijumuishe biashara tulishajadiliana
a8e	What were their self-employment profits in the last 30 days (in Ksh)? We mean the amount received after paying for expenses for this business, including hired workers, money for household members who helped, rental of space, purchase of goods for sale or for inputs, such as raw materials, fuel, and electricity, but before purchasing personal items. If unsure, FR can estimate.	Ni nini faida yao ya kujiajiri kwa siku 30 zilizopita? Hii tunamanisha kiasi walichopokea baada ya kulipia garama ya biashari hii, ikiwa ni pamoja na wafanyikazi waliajiriwa, pesa watu wa nyumba walio saidia, yakukodisha, ununiza wa bidhaa kwa ajili ya kuuza au kwa pembejeo kama vile malighafi, mafuta na umeme, lakini kabla ya kununua vitu binafisi. Ikiwa haijulikani, muhojiwa anaweza kukukadiria.

a8f	Was this person employed or working for pay in the last 30 days? Please do not include self-employment. Also, please do not include employment in your own businesses that we've discussed, but do include employment in the businesses of other household members.	Alikuwa ameajiriwa au alikuwa na kazi ya kulipwa kwa siku 30 zilizopita? Tafadhali usijumuishe kazi ya kujiajiri. Tena usijumuisha kazi katika biashara yako ambayo tumejadili, lakini jumuisha kazi katika biashara za watu wengine katika nyumba lako.
a8g	What was their wage employment compensation in the last 30 days? This includes both cash salary and the total value of all benefits and payment in kind (e.g. food, NSSF/ health insurance, housing, uniforms/ clothing, training, etc) received in the last 30 days worked at this job. If this employment is in the business of a hh member: READ: If you are working for a household member, only include direct job compensation, but not food and housing that you share in as a household. Ask for pre-tax compensation, where applicable. If unsure, FR can estimate.	Ni nini fidia yao ya ajira ya mshahara katika siku 30 zilizopita? Hii inajumuisha mshahara wa fedha zote na dhamani ya jumla ya faida na malipo kwa aina (kama vile chakula, NSSF, NHIF, Nyumba, sare /nguo, mafunzo na kadhalika) alizipata katika siku 30 za mwisho alifanya kazi hii. Ikiwa ajira hii ni katika biashara ya mtu wa nyumba yako: SOMA: Ikiwa unyafanya kazi kwa mtu ya nyumba, jumuisha faida ya moja kwa moja, lakini si chakula ya nyumba ambazo unashiriki kama familia. Ulizia fidia kabla ya kulipa kodi, ikiwa inaitajika. Ikiwa haijulikani, muhojiwa anaweza ku kadiria.
j_	Section J - Social and Political Attitudes	Sehemu ya J
pg_j9_	Opinions	Opinions
j9a	9a. Taking all things together, would you say you are "Very happy", "Rather happy", "Not very happy", or "Not at all happy"?	9a. Ukichukulia mambo yote kwa pamoja, ungeweza kusema uko na "furaha sana", "furaha kiasi", "huna furaha" au "huna furaha kabisa"?

	READ: I would now like you to think of a scale in which 1 means you are "completely dissatisfied" and 10 means you are "completely satisfied". So 1 means you are "completely dissatisfied". 2 means you are a little bit more satisfied than 1, but still very dissatisfied. 3 means you are a little bit more satisfied than 2, but still quite dissatisfied. Continuing all the way up the ladder to 9 where you are "very satisfied" and 10 where you are "completely satisfied".	SOMA: Sasa ningependa ufikirie kuhusu ratili ambapo 1 inamaanisha haujaridhika kabisa na 10 inamaanisha umeridhika kabisa. Kwa hivyo 1 inamaanisha kuwa "Haujaridhika kabisa" 2, inamaanisha umeridhika kidogo kuliko 1, lakini bado uko kwa hali ya kutoridhika kabisa.3 inamaanisha umeridhika kidogo kushinda mbili lakini bado hujaridhika. Ukiendelea mpaka juu ya ratili au ngazi hadi 9 ambapo utakuwa "umeridhika sana" na kwa 10 "Umeridhika kabisa".
j9b	9b. All things considered, how satisfied are you with your life as a whole these days? Please choose one number between 1 and 10.	9b. Vitu vyote vikizingatiwa, umeridhika kwa kiwango gani na maisha yako kwa jumla siku hizi? Tafadhali chagua numbari moja kutoka kwa 1 hadi 10.
j9c	9c. How satisfied are you with the financial situation of your household? Please choose one number between 1 and 10.	9c. Umeridhika kwa kiwango gani na hali ya kifedha ya nyumba yako? Tafadhali chagua numbari moja kutoka kwa 1 hadi 10.
pg_j10_	Security	
	READ: Now I would like to ask you some questions about safety in this area. Please remember that this survey is confidential and that the information will be used for research purposes only. Feel free to skip these questions if you do not feel comfortable answering them.	SOMA: Sasa ningependa kukuuliza maswali kuhusu usalama katika eneo hili. Tafadhali kumbuka kuwa mahojiano haya ni ya siri au habari zitatumiwa tu kwa madhumuni ya utafiti. Jiskie huru kutojibu maswali haya ikiwa hujiskii kuyajibu.
j10	10. With regards to safety, would you describe this area as very secure, secure, neither secure nor insecure, insecure, or very insecure?	10. Kulingana na usalama, utaeleza eneo hili kuwa salama kabisa, salama, katikati (salama na si salama), si salama, au si salama kabisa?
j19	19. During the last 12 months, have you been the victim of one of the following crimes?	19. Kwa miezi 12 iliopita, umekuwa mhathiriwa wa vitu vifuatavyo?
j21	21. If other, please describe the crime.	21. Ikiwa ni nyingine, tafadhali eleza uhalifu huo?
pg_j10_		

comments_j	Additional comments?	Additional comments?
pg_a81_	Children test scores	Children test scores
	READ: You previously stated that there are ${noChildren} children in your household born between 2000 and 2004.	SOMA: Hapo awali ulitaja kuwa kuna watoto ${noChildren} kwa nyumba yako waliozaliwa mwaka wa 2000 hadi 2004.
	READ: I would now like to know about each child in the household who was born between 2000 and 2004.	SOMA:Sasa ningependa kujua kuhusu kila mtoto kwa nyumba hii aliyezaliwa kati ya mwaka ya 2000 na 2004.
repeat_e_children	Children	
a100name	What is the name of this child?	Mtoto huyu anaitwa nani?
a100year	What year was this child born?	Mtoto huyu alizaliwa mwaka gani?
a100aa1	What is the name of the primary school this child attended?	Jina la shule ya msingi ni gani? TK alihudhuria?
a100aaa1	Does this child attend boarding school?	Je huhudhuria shule ya bweni?
a100a1	Did this child take the KCPE?	Alifanya KCPE?
a100b1	Did this child take it in 2015?	Aliifanya mwaka 2015?
a100c1	What was his/her score for the 2015 test?	Alipata alama ngapi kwa mthihani wa 2015?
a100d1	Did this child take it in 2016?	Allifanya mwaka wa 2016
a100e1	What was his/her score for the 2016 test?	Alipata alama ngapi kwa mthihani wa 2016?
a100f1	Did this child take it in 2017?	Allifanya mwaka wa 2017?
a100f1a	What was his/her score for the 2017 test?	Alipata alama ngapi kwa mthihani wa 2017?
a100g1	Did this child take it in 2018?	Allifanya mwaka wa 2018?
a100g1a	What was his/her score for the 2018 test?	Alipata alama ngapi kwa mthihani wa 2018?
a100h1	Did this child take it in 2019?	Allifanya mwaka wa 2019?
a100h1a	What was his/her score for the 2019 test?	Alipata alama ngapi kwa mthihani wa 2019?
a100i4	What was the highest standard or form they were enrolled in in 2020?	Ni kiwango gani cha juu au fomu waliyoandikishwa mnamo mwaka wa 2020?
a100i1	What was the highest standard or form they were enrolled in in 2019?	Ni kiwango gani cha juu au fomu waliyoandikishwa mnamo mwaka wa 2019?

a100i2	What was the highest standard or form they were enrolled in in 2018?	Ni kiwango gani cha juu au fomu waliyoandikishwa mnamo mwaka wa 2018?
a100i3	What was the highest standard or form they have completed?	Ni kiwango gani cha juu au fomu wamekamilisha?
other_children	Are there any children, born between 2000 and 2004, who lived in this household after 2014 and who are no longer living with you?	Kuna watoto wowote ambao walizaliwa kati ya mwaka wa 2000 hadi 2004, ambao waliishi kwa nyumba hii baada ya 2014 na hawaishi na wewe kwa sasa?
	READ: I would now like to know about these children.	SOMA: Sasa ningependa kujua kuhusu watoto hawa
repeat_e_children_not_living_with	Children	
a200name	What is the name of this child?	Mtoto huyu anaitwa nani?
a200year	What year was this child born?	Mtoto huyu alizaliwa mwaka gani?
a200aa1	What is the name of the primary school this child attended?	Jina la shule ya msingi ni gani? TK alihudhuria?
a200aaa1	Does this child attend boarding school?	Je huhudhuria shule ya bweni?
a200a1	Did this child take the KCPE?	Alifanya KCPE?
a200b1	Did this child take it in 2015?	Aliifanya mwaka 2015?
a200c1	What was his/her score for the 2015 test?	Alipata alama ngapi kwa mthihani wa 2015?
a200d1	Did this child take it in 2016?	Allifanya mwaka wa 2016
a200e1	What was his/her score for the 2016 test?	Alipata alama ngapi kwa mthihani wa 2016?
a200f1	Did this child take it in 2017?	Allifanya mwaka wa 2017?
a200f1a	What was his/her score for the 2017 test?	Alipata alama ngapi kwa mthihani wa 2017?
a200g1	Did this child take it in 2018?	Allifanya mwaka wa 2018?
a200g1a	What was his/her score for the 2018 test?	Alipata alama ngapi kwa mthihani wa 2018?
a200h1	Did this child take it in 2019?	Allifanya mwaka wa 2019?
a200h1a	What was his/her score for the 2019 test?	Alipata alama ngapi kwa mthihani wa 2019?
a200i4	What was the highest standard or form they were enrolled in in 2020?	Ni kiwango gani cha juu au fomu waliyoandikishwa mnamo mwaka wa 2020?
a200i1	What was the highest standard or form they were enrolled in in 2019?	Ni kiwango gani cha juu au fomu waliyoandikishwa mnamo mwaka wa 2019?

a200i2	What was the highest standard or form they were enrolled in in 2018?	Ni kiwango gani cha juu au fomu waliyoandikishwa mnamo mwaka wa 2018?
a200i3	What was the highest standard or form they have completed?	Ni kiwango gani cha juu au fomu wamekamilisha?
z_	Section Z	Sehemu ya Z
end_time	LSK 2017 - End time	
	READ: Thank you very much for your time, all of this information will be kept strictly confidential. You will receive no direct benefits for having participated in this survey.	SOMA: Ahsante sana kwa muda wako. Habari hizi zitawekwa siri. Tutayafuatilia tena baada ya mwaka moja hivi. Hakuna faida ya moja kwa moja ya kushiriki kwako katika utafiti huu.
	NOTE: Thank you for your hard work! You have reached the end of the survey. Please allow the respondent to continue with his or her day. Please fill in the remaining questions before exiting the compound.	NOTE: Thank you for your hard work! You have reached the end of the survey. Please allow the respondent to continue with his or her day. Please fill in the remaining questions before exiting the compound.
pg_z1_	Comprehension and cooperation	Comprehension and cooperation
z1a	1a. Rate the comprehension level of the respondent:	1a. Rate the comprehension level of the respondent:
z1b	1b. Rate the cooperation level of the respondent:	1b. Rate the cooperation level of the respondent:
z1d	1d. Have you given your respondent a gift of appreciation?	1d. Have you given your respondent a gift of appreciation?
z1e	1e. In what language did you use the Survey on your tablet today?	1e. In what language did you use the Survey on your tablet today?
z1f	1f. What was the main language you used to communicate verbally with the respondent today?	1f. What was the main language you used to communicate vserbally with the respondent today?
z1c	1c. What language(s) is this respondent most comfortable with?	1c. What language(s) is this respondent most comfortable with?
pg_z2_	Presence of others	Presence of others
z2a	2a. Was anyone else present during the interview?	2a. Was anyone else present during the interview?
pg_z3_	Presence of others	Presence of others
z2b	2b. What is the name of this person?	2b. What is the name of this person?

z2c	2c. Did this person assist the respondent with his/her answers?	2c. Did this person assist the respondent with his/her answers?
pg_z5_	Survey information	Survey information
z4a	4a. Please enter your REMIT ID number:	4a. Please enter your REMIT ID number:
pg_z6_	Comments	Comments
z5	5. Please enter any additional important comments.	5. Please enter any additional important comments.

Appendix B. Note on data management/access and pre-analysis plan

Date: December 5, 2019

On October 9, 2019, we launched a third follow-up survey to measure the social and economic living standards of roughly 2,500 households in our sample of communities in Western Kenya.

As of December 5, 2019, we have neither analyzed any data nor filed a third pre-analysis plan, outlining key research questions, outcomes, and estimating equations related to this particular round of data collection. This third pre-analysis plan will be prepared by Kenneth Lee, Edward Miguel, Catherine Wolfram, and Oliver Kim, and will be uploaded to the AEA RCT Registry in the near future.

In general, survey data will be compiled, organized, and stored by the field management team based in Busia, Kenya. Before analysis, survey data will also be stripped of any indicators that may expose the treatment status of households, except for the purpose of calculating tracking rates. De-identified survey data without treatment status indicators will be accessed by Kenneth Lee, Edward Miguel, Catherine Wolfram, and Oliver Kim.

This initial access will be provided in order to:
1. Identify and correct any coding errors in the survey instrument that are causing certain questions to be skipped.
2. Make improvements to the choice sets for multiple-choice questions, to better reflect the types of answers that are provided on the ground.
3. Identify and amend questions that are taking too much time and, as a result, are creating delays.
4. Identify and address any other technical issues with the survey instrument.
5. Make any final additions to the survey instrument to address minor questions.

Full access to the dataset will be provided to all research team members once the pre-analysis plan has been filed on the AEA RCT Registry.