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Abstract

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1 Introduction

Hundreds of billions of dollars are spent each year on aid programs. In 2014, for example, OECD countries provided USD 135 billion in official development assistance (OECD, 2014) and US charitable giving to international programs exceeds USD 20 billion (Reuters, 2012). Beyond this, developing country governments allocate substantial sums to programs intended to benefit the poor and spur development. These billions of dollars are allocated across a wide variety of programs such as infrastructure, education, health, agriculture and direct assistance (e.g., subsidized goods, food aid, livestock transfers and cash transfers). A fundamental problem, impacting the hundreds of millions of individuals reached by aid, is how best to allocate spending across programs.Yet it is incredibly difficult to decide how to allocate resources across programs. One approach is to provide individuals with cash, and let their preferences guide the end use of charitable or development dollars. Underlying the notion that recipient preferences should inform the allocation of aid is that recipients' have unique and valuable information about what would most improve their lives. On the one hand, individuals do know their own skills, constraints, ambitions and preferences better than anyone else. On the other hand, people commonly make decisions that are not necessarily in line with their own long-term preferences. Moreover, people may prefer to delegate complex decisions to others. Financial advisors, for example, charge a fee to make investment decisions for others even though they do not beat the market rate of return on average, similarly low-income households may prefer that governments and donors make choices about the allocation of aid dollars even if it comes at a cost in terms of the poverty reduction impact of those resources. Finally, some believe that low-income households do not use money responsibly and it is therefore optimal to provide goods or services directly. This study will rigorously test whether incorporating recipient preferences in aid allocation leads to better outcomes.

There is an increasing emphasis on participatory approaches to development. A common form of this is community participation in the design and monitoring of programs implemented at the community level. By engaging local communities in targeting and monitoring, government and NGOs acquire better information about program beneficiaries as well as beneficiaries' satisfaction with program implementation. (Mansuri & Rao, 2013) undertake an extensive review of studies on participatory development, discussing the necessity of this approach and its impacts. (Olken, 2007) evaluates an intervention where villagers were invited to participate in accountability meetings for a locally provided public good (paved roads) as well as offer anonymous comments about their satisfaction with project implementation. (Banerjee *et al.*, 2010) conduct a randomized evaluation of interventions

to encourage parental participation in local public schools: information provision, training community members to implement a testing tool for children, and training volunteers to hold remedial reading camps.

Another strand of the literature focuses on beneficiary feedback about program performance. (Twersky *et al.*, 2013) discuss initiatives that incorporate beneficiary perspectives into program monitoring and evaluation and describe various stages at which feedback can be solicited – at the program design stage in order to understand the needs, preferences, interests, opportunities, and constraints of beneficiaries; during the program to enable adaptation based on beneficiaries' views on program performance; after program conclusion to determine whether a program worked or not and why. (Hoddinott *et al.*, 2013) conducted RCTs in Ecuador, Uganda, Niger and Yemen to assess the impact and cost-effectiveness of cash, food vouchers, and food transfers. The impact evaluations also incorporated surveys of beneficiaries' preferences over the different transfer modalities. The authors find no evidence that beneficiaries always prefer one type of transfer – beneficiary preferences were highly dependent on contextual factors such as functioning of markets for grains and severity of food insecurity. (Khera, 2014) conducted qualitative and quantitative surveys of rural households across India to elicit preferences over cash versus food transfers through the Public Distribution System. Overall, two-thirds of the respondents expressed a preference for food. Again, respondent preferences across different states were found to be highly dependent on the operational effectiveness of the existing distribution system. (Ghatak *et al.*, 2013) conducted a household survey among the beneficiaries of the Bihar Chief Minister's Bicycle Programme (which provides money to purchase a bicycle for every student enrolled in ninth grade at a government school) to examine program coverage, benefit utilization by recipients, and beneficiary preferences over cash vs in-kind transfers. In spite of good program implementation, only 45% of respondents preferred cash over receiving a bicycle. Various supply-side factors such as conditionality, delays in payment & inadequate payment and demand-side factors such as household income, liquidity, self-control problems & intra-household conflict are explored as reasons for this stated preference.

The literature focuses on community participation in a specific program to increase effectiveness and understanding beneficiary preferences for a specific program vs. alternatives. An unexplored question is whether using recipient preferences to make program allocation decisions leads to improved program outcomes. That question is the focus of this study. Through a randomized control trial respondents were randomly selected to receive either a particular development program (agricultural extension, agricultural inputs, livestock transfers) or an equivalent amount of cash. We then elicit respondents' indifference point for the program in question. Subsequently, we randomly assigned individuals to receive the program

in question or cash transfer equal to the cost of the program. After an appropriate delay, we will return to recipients to measure outcomes associated with their economic situation and general well-being (e.g., income, assets, psychological well-being). This design allows us to answer several questions related to the optimal allocation of aid dollars:

1. Do individuals who express a high valuation for a particular assistance program benefit more from that program than similar individuals who receive an equivalently valuable resource?

2. Do individuals whose choice was respected in the allocation decision (e.g., they receive the program if they value it more than the cost) benefit more from resource transfers than individuals whose choice was not respected in the allocation decision?

3. How do the impacts of several common development programs (agricultural extension, subsidized agricultural inputs and livestock transfers) compare to equally valuable cash transfers?

2 Study design

2.1 Location selection

We selected areas with relatively high poverty. Beginning with a list of Kenyan counties, we filtered all counties with less than a 40% poverty rate, or just below the national rate of 46% (World Bank, 2015). Due to logistical considerations, we then filtered out counties in the lower third based on household density. Remaining counties were then filtered or prioritized based on the poverty rate, household density, fertilizer use, HIV, diarrhea and malaria prevalence, bed net use and secondary school enrollment rates (all data comes from Kenya Open Data). Ultimately, we chose to work in Makueni county, specifically in the regions of Mbooni and Kilungu.

2.2 Program selection and delivery

2.2.1 Program selection

In selecting programs to benchmark against cash we firstly prioritized those that have a plausible direct, private benefit for recipients. While the issues of recipient preference and self-knowledge apply to public goods, they are more directly relevant to private goods. Secondly, we chose to include both the provision of subsidized goods, which are most directly

comparable to cash transfers, as well as knowledge transfer, which is a very common component of many programs. Third, we prioritized programs that are relatively commonly implemented by governments and development organizations.

Programs included in the study are:

1. Agricultural extension: we hired a team of 11 agriculture experts, with a combined experience of 66 years in the agricultural sector, to deliver in-person group training to randomly selected farming households. The training sessions ran from September to October 2016 - leading up to the "short rains" agricultural seasons in Kenya. The training includes education on: land preparation, planting, soil fertility, crop selection, soil and water management, field management (fertilization, pest and disease management, weeding), record keeping and financial management, farmer group dynamics and conflict resolution, harvesting, post-harvest management, value addition and marketing.

2. Agricultural inputs: based on the advice of agricultural experts, we provided recipients with enough inputs to plant approximately 0.5 acres of cabbages or maize. The type of inputs to be provided were recommended by our agricultural consultants who determined the requirements based on terrain and crops grown in the study areas. Specifically, for the cabbage-growing region of Mbooni, we provided 50 grams of Baraka F1 seeds and 75 kilograms of planting fertilizer. For the maize-growing region of Kilungu, we provided 4 kg of Duma 43 seeds, 25 kg of planting fertilizer and 25 kg of top-dressing fertilizer. These inputs are roughly modeled after the Government of Kenya's National Accelerated Agriculture Inputs Access Program. The program includes a voucher, valued at USD 60 - 80, to cover the cost of 10 kg of hybrid maize seed, 50 kg of basal fertilizer, and 50 kg of top-dressing fertilizer, inputs sufficient for approximately 1 acre (0.4 ha) of maize. This study provides similar, though not precisely the same, package. Our agricultural inputs package also included a one-time information session on proper input usage provided by our extension agents.

3. Livestock transfers: recipients received 25 one-month old chicks vaccinated for common diseases as well as a starter pack of feed (~10 kg). Recipients were also provided with basic information about taking care of their chicks by our team of agricultural experts and were visited occasionally by the agriculture team over the following 4 months.

4. Cash transfers: some households were randomly selected to receive direct cash transfers. The size of these transfers match the per-recipient cost of one of the above programs – $15 for agricultural extension, $75 for the 319 agricultural input recipi-

ents in Mbooni and \$35 for the 181 agricultural input recipients in Kilungu, and \$120 for livestock transfers. Cash transfers were delivered using the MPesa mobile money platform.

2.2.2 Program delivery

1. Agricultural extension: An agricultural training curriculum consisting of 6 sessions was developed by contracted agricultural consultants. These sessions were administered by our team of agriculture experts at a location convenient for the respondents to attend. Respondents randomly selected to receive this intervention were contacted via phone for identity verification and invited to attend training sessions at a nearby venue on specific dates. A few farmers who could not come to the training venue received training on their farms instead from one of our team members. Out of 500 respondents, 431 attended these training sessions.

2. Agricultural inputs: Inputs were procured from a well-known seed distributor in Nairobi and transported to the target areas by the supplier. Before the goods were disbursed, participants were contacted via phone and all identity and contact information provided at baseline was verified using a contact verification phone survey. After verification, respondents were contacted via phone and informed of the inputs collection point and were advised and encouraged to collect their inputs. 280 respondents in Mbooni and 179 in Kilungu collected their inputs, meaning 459 of 500 recipients collected the inputs. Following input collection, respondents received another call from field staff to confirm that the amount of inputs stipulated during the verification survey was exactly the same as that collected.

3. Livestock transfers: The chicks were procured from a well-known seed & livestock distributor in Nairobi and transported to the target areas by the supplier. Before the goods were disbursed, participants were contacted via phone and all identity and contact information provided at baseline was verified using a contact verification phone survey. After verification, respondents were contacted via phone and advised to construct suitable chicken coops in preparation for the storage of the birds. This call was made two weeks before the chicks were scheduled to be collected by the respondents. A week after the first preparation call, respondents were again contacted via phone and reminded to construct suitable chicken coops if they had not yet done so and advised on suitable storage conditions for the chicks. After the preparation reminder calls, respondents were contacted via phone and informed of a date and venue to collect the chicks. At collections, respondents were advised on basic upkeep and care. 489 out of

500 respondents showed up to collect their chicks. Following the livestock collection, respondents that collected their chicks received another call from field staff to confirm that the amount of chicks stipulated for collection at the time of verification was exactly the same as that collected. In addition, two of our agricultural trainers visited the chick recipients on a rotating basis to answer any queries.

4. Cash transfers: As cash transfers were to be implemented through MPesa, respondents' MPesa numbers were verified before the transfer was initiated. Additionally, the name of the respondent was matched with the name under which the MPesa account was registered before the transfer was initiated. All respondents scheduled to receive cash transfers were contacted on the phone to be informed of the impending transfer and the amount. Out of 500 respondents in each category, 491 respondents received the agricultural extension equivalent cash transfer, 483 received the agricultural inputs equivalent cash transfer, and 497 received the livestock equivalent cash transfer. The remaining respondents refused the cash transfer when contacted.

2.3 Data and program delivery

2.3.1 Baseline survey

Eligible individuals comprised those over 18 years of age residing in a home made of all or partially natural materials (e.g., wood, local stone or mud, excluding homes which include cement or cinder blocks) and with relatively small land holdings (less than 6 hectares). We surveyed ~3,000 individuals meeting these criteria. Each respondent was administered a baseline survey that elicited their indifference point between cash and the relevant programs (agricultural extension, agricultural inputs or livestock transfer). The survey also measured a variety of baseline characteristics. The survey was administered on tablet computers using Survey CTO.

Data integrity was maintained through the following checks:

- High Frequency Checks: this entails continuous monitoring of data coming into the server to check for missing observations and inconsistencies in responses. A standardized project-specific .do file was created and run regularly (at least weekly) on incoming data to check for errors. If any errors were detected or discrepancies arise, corrective action was taken to resolve these issues. Further, these checks informed the content of refresher training for field officers.

- Back Checks: these checks consisted of revisiting respondents that were earlier surveyed and asking them time-invariant questions from the baseline survey. Responses in the

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backcheck survey were matched with baseline responses to monitor the reliability and quality of the data collected. These back check survey were also designed to confirm the identity and payment details (phone number for MPesa transfer) of respondents. Back checks were conducted within a week of the original baseline survey. Back checks surveys were conducted by field officers other than those who collected the baseline data.

- Random Spot Checks and Field Observations: field officers were supervised by project leads, who regularly sst with field officers to observe the manner in which questions are asked to respondents. Specifically, project leads observed if questions were asked as per the protocol discussed during the training, such as probing respondents with hints. This ensures consistency of questioning across field officers. Continual feedback was relayed to field officers on areas that needed improvement. Additionally, senior project management made random visits to the field.

- GPS checks: GPS coordinates were recorded for all baseline and backcheck surveys. A separate team member checked these coordinates on Google Earth to confirm the existence of a house at the specified location.

- MPesa confirmation: for those receiving cash transfers, we confirmed that the MPesa numbers provided at baseline and backcheck matched and that the name associated with the mobile money account matched the name of the intended recipient before the transfer was initiated.

2.3.2 Program delivery

We randomized 1,000 respondents into the "extension or cash" group, 1,000 into the "inputs or cash" group and 1,000 into the "livestock or cash" group. Within each group, we randomized individuals to receive either the program of a cash transfer equal to the cost of the program. Randomization is conducted at the individual level. Though the informational components may have spillover effects, individual randomization is a deliberate choice: the primary goal of this study is to compare across cash or program arms in order to isolate the effect of the choice mechanism. In equilibrium, were recipients to be given a choice between programs and cash transfers, we expect some would choose the program, thus having a mix of those receiving cash and the program in the same village provides the most relevant comparison. Further, we chose a valuation based approach to estimating whether a respondent prefers cash or the program, as opposed to a direct choice between the two. This choice was made as a valuation approach could potentially be extended to multiple interventions of various

costs (if preferences matter, it may be wise to provide the program with the highest ratio of valuation to cost).

For respondents receiving the program, the goods or services were delivered in person by an individual not involved in the initial data collection. At that visit, the respondent's name, ID number and location were verified. In the event of discrepancies, the program delivery was delayed until further investigation. For respondents receiving cash, a transfer was sent through the MPesa digital payment platform. This platform allowed the researchers to confirm the name from the survey matches the name associated with the mobile money account. Finally, we followed up with a recipients (by phone or in person) to confirm receipt of goods, services or cash.

2.3.3 Endline survey

A full endline survey will be completed at the end of the following agricultural season, approximately 6 months after the baseline survey. The same data integrity checks applied to the baseline will be incorporated into the endline process.

2.4 Econometric specification

2.4.1 *Estimating the impact of recipient choice*

To answer the question of whether individuals who value a particular program highly benefit more from receiving that program as compared to similar individuals receiving a cash transfer, we pool data across the three interventions and estimate:

$$y_i = \alpha + \beta_1 Program_i + \beta_2 Program_i v_i + \beta_3 v_i + \varepsilon_i \tag{1}$$

where v is the ratio of the respondent's expressed value for the program to the cost of the program, and $Program$ is an indicator for the recipient receiving a program rather than cash. Receiving a cash transfer of any value is the omitted category. If individuals who value programs much more than the cost benefit from the programs more than others, we expect that $\beta_2 > 0$.

We also estimate analogues of these equation for each specific program by restricting the data to individuals receiving program p or a cash transfer of equal value:

$$y_i = \alpha + \beta_1 Program_{ip} + \beta_2 Program_{ip} V_{ip} + \beta_3 V_{ip} + \varepsilon_i \tag{2}$$

where V_p is the value (in Kenyan shillings) the respondent's expressed for program p, and $Program_{ip}$ is an indicator for recipient i receiving specific program p rather than cash.

Receiving a cash transfer equal to the cost of program p is the omitted category.

To assess whether it is optimal to provide programs to those who would prefer them to cash and cash to those who prefer cash, we define an indicator variable R which takes value 1 if either: a) the respondent values the program less than the median respondent and receives cash, or b) the respondent values the program more than the median respondent and receives the program. Thus R can be interpreted as an indicator that the respondent's preferences were respected in the (random) decision to provide the program or cash. We pool data across the three programs and estimate:

$$y_i = \alpha_p + \beta_1 R_i + \varepsilon_i \tag{3}$$

where α_p are dummies for each program / cash group. We will also report analogues of this equation estimated for each specific program. We also report this specification where R is based on valuing the program more/less than the cost (rather than more/less than the median value).

Finally, we estimate the relative impacts of receiving cash transfers compared to specific programs. First we estimate the impact of receiving a cash transfer of any value compared to receiving any program, noting that the values of the goods and services received is equal in aggregate for those receiving cash or programs:

$$y_i = \alpha_p + \beta_1 Cash_i + \varepsilon_i \tag{4}$$

We also estimate analogues of this equation for each specific programs as well as a

$$y_i = \alpha + \beta_1 Extension_i + \beta_2 Inputs_i + \beta_3 InputsCash_i + \beta_4 Livestock_i + \beta_5 LivestockCash_i + \varepsilon_i \tag{5}$$

where $InputsCash$ and $LivestockCash$ are indicators the individual received a cash transfer equal to the cost of inputs and livestock respectively. The omitted category is receiving a cash transfer equal to the value of extension.

2.4.2 *Heterogeneous impacts*

In exploratory analysis, we will assess whether the effect of respondent choice and the relative benefit of cash vs. programs vary by recipient characteristics. To do so we will interact exogenous respondent characteristics with the independent variable R, and $Cash$ in equations 3 and 4 above. Dimensions of heterogeneity considered include:

1. Age

2. Gender

3. Wealth (assets)

4. Mindset

5. Grit

2.4.3 *Outcomes and multiple inference adjustment*

Our primary outcomes of interest for this study are:

1. Consumption

2. Food security

3. Assets

4. Psychological well-being

5. Autonomy, dignity, trust

Details on the construction of these outcomes are below. When estimating each of the equations above we will adjust p-values based on 5 outcomes of interest, reporting both Family Wise Error Rate adjustments and False Discovery Rate adjustments. We are interested in the effects on labor outcomes and will report naive p-values for the impact on labor, but do not consider this to be a primary outcome. We further will estimate the impact on income in order to understand where any income gains accrue from, however our primary outcome of interest is consumption so we do not adjust standard errors for the income regressions. We also do not have a strong ingoing hypothesis that education or health outcomes will be impacted, but will report naive p-values for these outcomes as well. In addition, we will report impacts on the sub-components of each overall outcome.

2.5   Sample size and power

Based on a sample of 3,000 (those receiving either a program or cash) to estimate equation 3 and 4, we can detect an effect size of 0.09 standard deviations with 80% power. For reference, based on data from (Haushofer & Shapiro, 2016), a 0.09 SD change corresponds to a 7% change in the value of assets and a 5% change in consumption.

2.6   Results

The baseline launched in August, 2016. The endline is expected to launch in March 2017 and results for the impact study are expected mid 2017 / late 2017.

3   Indices and Variables

Variables or indices below marked with a $^+$are primary outcomes of interest. Variables or indices below marked with a # are secondary outcomes. Impacts on variables or indices below marked with a * will also be reported to illuminate the specific cause of the change in the primary outcome.

1. Consumption$^+$ - monthly KES consumption per capita

    (a) Food*

        i. Food own production*
        ii. Food bought
            A. Meat, fish & dairy*
            B. Fruit & vegetables*
            C. Cereals*
            D. Other food*

    (b) Temptation good expenditure*

        i. Alcohol
        ii. Tobacco
        iii. Gambling

    (c) Airtime, internet, other phone expenses*

    (d) Travel, transport, hotels*

    (e) Personal and household items*

        i. Clothing and shoes
        ii. Personal items such as soap, shampoo, etc.
        iii. Household items such as matches, kerosene, etc.
        iv. Cooking fuel

    (f) Recreation/entertainment*

(g) Housing*

    i. Rent

    ii. Electricity

    iii. Water

(h) Education expenditures*

(i) Medical expenditure*

(j) Social expenditure*

    i. Religious expenses or other ceremonies

    ii. Weddings

    iii. Funerals

    iv. Charitable donations

    v. Dowry/bride price

    vi. Fees paid to the village elder, chiefs or other officials

(k) Other expense greater than KSH 1,000

2. Food security[+] - weighted standardized index of:

(a) Number of times last month adults cut or skipped meals (negatively coded)*

(b) Number of times last month children cut or skipped meals (negatively coded)*

(c) Number of times last month had to borrow food or rely on help from a friend or relative (negatively coded)*

(d) All household members eat two meals a day (indicator)*

(e) All household members usually eat until content (indicator)*

(f) Number of times last week respondent has eggs, meat or fish*

3. Income[#] - sum (KSH) of monthly household income from:

(a) Livestock*

    i. Cows

        A. Value of milk (sold and consumed)

        B. Value of meat (sold and consumed)

        C. Value of animals sold

        D. Value of other products

        E. Cost of care (e.g. fodder, veterinary care, etc.)

    ii. Small ruminants

        A. Value of meat (sold and consumed)

        B. Value of animals sold

        C. Value of other products

        D. Cost of care (e.g. fodder, veterinary care, etc.)

    iii. Birds

        A. Value of eggs (sold and consumed)

        B. Value of meat (sold and consumed)

        C. Value of animals sold

        D. Cost of care (e.g. fodder, veterinary care, etc.)

(b) Agricultural income (monthly average)*

    i. Value of crops harvested in short rains season

    ii. Costs of seeds, fertilizers/herbicides/pesticides, hired machines, water, labor and other expenses in short rains season

(c) Enterprise income*

    i. Sales in prior month (prorated for share of enterprise owned if applicable)

    ii. Costs of electricity, wages, water, transport, purchase of inputs, other costs (prorated for share of enterprise owned if applicable)

(d) Wage income*

    i. Sum of income from outside labor

4. Assets[+] - sum (in KSH) of value of:

(a) Productive assets*

    i. Irrigation pump

    ii. Hose pipe

    iii. Ox-Ploughs

    iv. Oxen/work bulls

    v. Knapsack sprayers

    vi. Wheelbarrows

     vii. Ox-carts/donkey carts

    viii. Hand carts

      ix. Other farming tools

       x. Fishing equipment (boats, canoes, etc)

      xi. Other asset used for agriculture or business

(b) Vehicles*

       i. Bicycle

      ii. Motorbike

(c) Furniture*

       i. Sofas

      ii. Chairs

     iii. Table

     iv. Clock/Watch

      v. Beds

     vi. Mattresses

    vii. Cupboards

   viii. Other furniture

(d) Household durables*

       i. Cell phone

      ii. Sewing machine

     iii. Radio, tape- OR CD player

     iv. Battery

      v. Solar panel

     vi. Television or computer

    vii. Kerosene stove

   viii. Refrigerator

     ix. Insecticide treated bed net

(e) Other

(f) Livestock*

       i. Cows

      ii. Birds

  iii. Small ruminants

 (g) Financial assets* - net balance (KSH) of savings minus outstanding loans:

  i. Savings with an institution (bank, SACCO, micro-finance organization)

  ii. Savings with MPesa

  iii. Savings in any other place (e.g., with family or friends)

  iv. Loans made by friends or family

  v. Loans from moneylenders, micro-finance institutions, shops, banks or other sources

5. Psychological well-being$^+$ - weighted standardized index of:

 (a) CESD (depression)* with standard scoring (https://www.outcometracker.org/library/CES-D.pdf)

 (b) GHQ-12* with standard scoring

 (c) WVS (happiness)* (1-4 scale)

 (d) WVS (life satisfaction)* (1-10 scale)

6. Autonomy, dignity, trust$^+$ - weighted standardized index of:

 (a) "I feel that I am autonomous - I make the important decisions in my life for myself"* (1-4 scale)

 (b) "Other people and organizations enable me to live with dignity"* (1-4 scale)

 (c) "NGOs and organizations that try to lift people from poverty trust the people they seek to help"* (1-4 scale)

 (d) "I would rather have little money and make my own decisions than have more money and let others make my decisions" (1-4 scale)

 (e) "The organization and people from whom I received the aid treated me as an equal" (1-4 scale)

 (f) "The organization and people from whom I received the aid treated me with contempt" (1-4 scale)

 (g) "The organization and people from whom I received the aid behaved arrogantly" (1-4 scale)

 (h) "The aid I received was tailored for my benefit and to solve my problems" (1-4 scale)

(i) "The organization providing the aid treated me as an individual, not just another one of the masses" (1-4 scale)

(j) "Did anyone from the organization from whom you received the aid ridicule you?" (0-1)

(k) "Did you feel that you could ask the person who gave you the aid for what you needed, and make demands upon them?" (0-1)

(l) "Did the organization and people from whom you received the aid do anything to reduce your sense that you could control your own life?" (0-1)

(m) "Did the organization and people from whom you received the aid try to persuade you to make a particular decision?" (0-1)

(n) "Did the organization and people from whom you received the aid do anything to help you feel in control of your life?" (0-1)

7. Labor[#]- Hours spent per week per capita on income generating activities, including:

   (a) Working in agriculture for this household*

   (b) Tending animals for this household*

   (c) Working in a non-farm or livestock business owned by this household*

   (d) Working for pay for someone outside the household (in agriculture, livestock, housework, casual labor, salaried job or other paid work)*

8. Education index[#]

   (a) Weighted standardized index of:

       i. Proportion of children (<19) in school*

       ii. Average days of school missed per child (<19)* - *negatively coded*

       iii. Average perception of child (<19) school performance*

       iv. Average spending on school expenses per child (<19)*

       v. Average of highest level of education expect children (<19) will complete*

       vi. Average time studying or in school per child (<19)*

9. Sources of heterogeneity (as measured at baseline)

   (a) Age (of respondent)

   (b) Gender (indicator for female)

(c) Wealth

    i. Land and buildings - sum (in KSH) of value of:

        A. House and the land under it

        B. Fish pond

        C. Other buildings (e.g., sheds)

        D. Land

    ii. Assets - defined above (excluding value of livestock)

(d) Mindset

(e) Grit

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