

Pre-analysis plan for Benchmarking development programs: a preference-based approach

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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. An important input, among others, into the allocation decision is how much recipients value particular forms of aid relative to the cost of providing that aid, including both the value of goods and services received by beneficiaries and the overhead cost of providing those goods and services.

A central aim of this study is to develop a replicable methodology to rapidly and efficiently estimate the value of different types of aid to recipients. This information can be used to determine whether a particular form of aid is valued more highly than its cost and to assess the relative value of alternative uses of aid funding.

We begin by identifying common aid programs in Kenya and estimating the cost of providing those programs to (potential) recipients. Subsequently we ask potential recipients what amount of cash would make them just as well off as receiving each aid program. This study will employ various incentive compatible methods of eliciting the cash-equivalent value and will incentivize reporting by giving cash or the good or service provided by the aid program to randomly selected respondents. The chance that the respondent will actually receive what they say they want makes truthful reporting of the cash-equivalent value optimal. Upon delivery of the cash or the good or service, respondents will be allowed to change their mind: observing what percentage of respondents change their mind across modes of value elicitation will allow us to identify the most reliable method of obtaining respondent's subjective valuation for aid programs. As a point of contrast, we will also ask (potential) donors, including a general developed country population as well as aid professionals, their subjective valuations of funding particular aid programs vs. providing cash to recipients in order to contrast donor and recipient preferences.

2 Preference study

The goal of this study is to understand the subjective value potential recipients of aid programs place on those programs (their indifference point between the program and cash). We will further assess how the gap between subjective value and cost varies across program type. Finally we test what method is most reliable to measure potential recipients valuations. To that end, we will ask respondents their indifference points for a variety of programs using several distinct value elicitation methods.

2.1 Program selection

Our overarching aim is to provide actionable information to funders and implementers of development programs about which programs are most valued by recipients. To that end, we undertook a multistep process to select programs for benchmarking.

First, we identified entities primarily responsible for funding and/or delivery of development programs, specifically the Government of Kenya (GoK), official development assistance (ODA) by multilateral and bilateral donors, philanthropic foundations and international non-governmental organizations (INGOs). For each of these entities we collected data on development program spending in Kenya. GoK spending data was obtained from Kenya Open Data.¹ Since we are interested in development spending in particular, we classified GoK spending according to category (e.g., “Security”, “Education”) and then according to whether it was likely to directly improve the economic situation of Kenyans (e.g., education and health), do so through macroeconomic channels (e.g., trade policy and infrastructure investment) or was a government service (e.g., national defense); we focus on the first category of spending. Bi and multilateral donor data was obtained from the OECD.² For foundations, we focused on two large and prominent foundations (the Gates Foundation and Ford Foundation), obtaining grant level data from annual statements and reports.³ We selected 7 large INGOs, with total charitable spending >\$500 million in 2014, and obtained spending data from annual and financial reports.⁴

For each of these sources of development spending, we identified priority sectors. For the

¹<https://opendata.go.ke/dataset/Kenya-Government-Funded-Projects-2015/ncdd-s55u> ;
<https://opendata.go.ke/dataset/Kenya-Open-Budget-Program-Based-Budget-2015/5jh8-v7sc>

²http://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=CRS1&ShowOnWeb=true&Lang=en

³<http://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database#q/k=kenya&page=7> ;
<https://www.fordfoundation.org/library/financial-statements/2014-annual-tax-return-form-990-pf/>

⁴Including: CARE International, Catholic Relief Services (CRS), Médecins Sans Frontières, Oxfam International, Plan International, Save the Children and World Vision International (<http://www.cn.undp.org/content/dam/china/docs/Publications/UNDP-CH11%20An%20Overview%20of%20International%20NGOs%20in%20Development%20Cooperation.pdf>)

GoK, the primary sectors intended to directly improve the economic situation of Kenyans were education (25% of GoK spending), health (3% of GoK spending), agriculture (3% of GoK spending) and water (2% of GoK spending). Among categories intended to benefit Kenyans through macroeconomic channels, major categories included transport (15% of GoK spending) and energy (7% of GoK spending). OECD data indicates that the main category (46%) of ODA to Kenya goes to “Social Infrastructure & Services.” Major subcategories include health (62% of category spending), water (14% of category spending) and education (7% of category spending). The primary specific program areas are sexually transmitted disease control, malaria control, large water systems and primary education. For the Gates Foundation, primary spending categories are agriculture (20%), financial services for the poor (19%), family planning (16%) and water, sanitation and hygiene (12%). Ford Foundation grants were highly varied, with many larger grants focused on human rights issues. INGOs have varied programs, classified according to idiosyncratic categorizations. Broad categories assigned to these categories suggest that primary sectors of focus are health (30%) and humanitarian, emergency and disaster assistance (24%).

Priority sectors for this study were selected based on major overall categories of development spending. A back-of-the-envelope calculation, which may include double counting but is indicative, suggests that the vast majority of spending is done by the GoK (72%) and ODA actors (24%). Foundations and INGOs make up a relatively smaller percentage of spending. Therefore we choose to focus on sectors that are primary for the GoK and ODA spending, namely: education, health (including reproductive health), agriculture and water. In addition, we consider some smaller but important categories of development spending (e.g., financial services and livelihoods).

Having identified major categories of development spending, we identified specific programs within each category that could be replicated, in whole or in part, to benchmark against cash transfers. To do so, we identified large GoK programs within each category from Kenya’s OpenData Government Funded Projects database.⁵ Thirty-four programs were identified, and researched to identify whether it would be feasible to replicate elements of the program and to benchmark against cash transfers. For ODA funded programs, we focused on USAID programs, as USAID is the largest donor to Kenya among bi and multi-lateral donors. We similarly identified large programs in priority thematic areas and assessed the feasibility of benchmarking them against cash transfers. Thirteen programs were selected for further research.⁶

Based on this research we compiled a list of specific interventions (e.g., extension services,

⁵<https://opendata.go.ke/dataset/Kenya-Government-Funded-Projects-2015/ncdd-s55u>

⁶Details of this process will be available at <http://jeremypshapiro.com>

agricultural input subsidies, family planning services) that appeared important based on the number of GoK or USAID programs where the specific intervention was included and the size of the program budget. That list was filtered to a smaller list of interventions based on logistical considerations of what we could feasibly provide to respondents (in order to incentivize accurate revelation of indifference points). The final list of interventions included in the study is:

1. Agriculture:

- (a) Extension - regular visits from an agricultural extension agent
- (b) Inputs - fertilizer and improved seeds

2. Water

- (a) Water supply - an easily accessible water source such as a water tank or a borehole in your community
- (b) Hygiene / WASH education - a half day training on safe water practices
- (c) Hygiene / WASH supplies - two months supply of basic hygienic supplies (soap and chlorine for water treatment)

3. Health

- (a) Family planning services - one free visit to a family planning clinic to receive family planning services with transportation
- (b) Condoms
- (c) Bed nets - an insecticide treated bed net
- (d) HIV research - a donation to HIV / AIDS research
- (e) Malaria research - a donation to malaria research
- (f) Mass deworming - a donation to support deworming

4. Education

- (a) Teacher training - training for one teacher
- (b) Computers in schools - computers provided to one government run school
- (c) Out of school tutoring - weekly tutoring sessions for one child for one school term
- (d) Vocational training - a vocational training course in computer skills

5. Energy

- (a) Solar power - a solar power system that allows you to have a rechargeable lamp and provide power to a cell phone

6. Other

- (a) Access to stress management smartphone app - a smartphone and training on how to use stress and anxiety reduction tools available on that phone
- (b) Financial literacy training - a training session on financial management and services (such as for borrowing and saving)

This list is not intended to comprise the “most important” interventions. Rather it is a selection of interventions which: a) pertain to thematic areas to which massive quantities of development aid is allocated and b) are similar to components included in government and donor funded aid programs. The purpose of this study, which informed the selection of these interventions, is to understand recipients relative preferences across broad categories of aid, and to illustrate a replicable method for eliciting recipients valuation for aid programs.

For the analysis below, interventions are considered *public interventions* (water supply, HIV research, malaria research, deworming, teacher training, computers in schools), *spillover interventions* (extension, WASH education, stress management smartphone app, computer skills training, after school tutoring and financial literacy training) and *private interventions* (agriculture inputs, WASH supplies, family planning services, condoms, bed nets, solar power).

2.2 Location selection

The aim of this study is to understand the preferences of current or potential recipients of development programs. We therefore 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). The one exception is Nairobi County, as we sought to include low-income households in urban centers as well. 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 collect data in three Kenyan counties: Nairobi, Nakuru and Makueni.

2.3 Value elicitation methods

Related to the goal of developing an accurate, efficient and low-cost method to measure recipients' valuations of aid programs, we will test a variety of elicitation techniques. Specifically, respondents are divided into groups that are asked about their valuation of aid programs in distinct ways:

1. Hypothetical (H): respondents are asked how much cash would make them as well off as an aid program, with no mention of receiving either ($N = 200$).
2. Becker-DeGroot-Marschak with example (BDMe): respondents are asked how much cash would make them as well off as an aid program. The BDM mechanism is explained and an example is provided. Beyond a verbal example, respondents were shown a hypothetical "real world" example involving the drawing of numbers. Respondents are told that the question (choice between cash and a program) they will actually receive is determined by lottery ($N = 200$).
3. Becker-DeGroot-Marschak on faith (BDMf): respondents are asked how much cash would make them as well off as an aid program. Respondents are told that the question (choice between cash and a program) they will actually receive is determined by lottery. Respondents are told simply that they will receive either cash or the program by lottery and the lottery is designed by scientists in order to make sure it is always in their best interest to report the true valuation ($N = 200$).
4. Multiple Price List (MPL): Respondents are asked to choose between a program and an amount of cash. If they choose the program, they are asked the same choice for a larger quantity of cash. This continues until the respondent selects the cash or until an upper bound of cash is reached. Respondents are told that the question (choice between cash and a program) they will actually receive is determined by lottery ($N = 200$).
5. Certainty (c): In this condition, when making the choice about the final program, respondents are told that this (randomly selected in advance to be sanitation supplies) question is the one which will determine their award. Thus, they have certainty they will receive this program or cash when asked how much cash would make them as well off as the program ($N = 140$ / 35% of arms 2 and 3)

2.4 Data and program delivery

2.4.1 Recipient valuation survey

We will survey 800 individuals across the three locations mentioned above. In Nairobi, eligible individuals include those over 18 years of age residing in low-income neighborhoods. In Nakuru and Makueni eligible individuals are 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 2.5 hectares). Eligible households are first identified in a village census, and later revisited for data collection.

Each respondent will be administered a baseline survey that elicits indifference points between cash and aid programs. The survey⁷ also measures a variety baseline characteristics. The survey is administered on tablet computers using Survey CTO software. Through Survey CTO, respondents are randomized into one of the value elicitation treatments mentioned above. Further, the order in which different programs are asked about is randomized (with the exception of the last program, in order to complete the certainty treatment. The last program was randomly selected *ex ante* to be sanitation supplies).

Data integrity will be 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 will be created and run regularly (at least weekly) on incoming data to check for errors. If any errors are detected or discrepancies arise, action will be taken to correct these errors. Further, these checks inform the content of refresher training for field officers to emphasize attention to the particular error points within the survey.
- Random Spot Checks and Field Observations: field officers are supervised by project leads, who will regularly sit with field officers to observe the manner in which questions are asked in the field. Specifically, project leads observe if probing occurs during questioning and advise the field officers on when and if necessary or appropriate. Observations will be recorded and feedback will be relayed to field officers on areas that require improvement and acknowledgement of areas that were conducted well. Additionally, senior project management will make random visits to the field (approximately bi-weekly). During the random spot checks, management will visit field officers to confirm that data protocols are being followed.

⁷which will be available at <http://jeremypshapiro.com>

- GPS checks: GPS coordinates are recorded for all surveys. A separate team member will check these coordinates on Google Earth to confirm the existence of a house at the specified location.

2.4.2 Donor valuation survey

As a point of comparison, we will collect similar data from a group of individuals from donor countries. Respondents will be asked to indicate the minimum amount of cash they would rather give a low-income household instead of a particular program. This question will be repeated for each of the programs listed above. To incentivize accurate responses, randomly selected choices by these respondents will be implemented for low-income Kenyan households. This will be determined by the Becker-DeGroot-Marschak method, an example of which is presented to respondents. The donor survey will be collected through Google Forms, using Amazon's MTurk service, as well as direct requests sent by the researchers to organizations, to solicit responses.

2.4.3 Valuation method reliability survey

Each of the valuation methods above reveals an indifference point between cash and each program. After randomly selecting which program will determine the respondents' award, we will return to the respondent and ask if they prefer the program or the amount of cash determined by the choice mechanism employed in the initial survey. Respondents will be informed that no matter what choice they make, the cash or the program will be delivered to them at the same time. Based on the comparison of the elicited indifference point and the cash offer, we can predict which choice the respondent will make. Thus, measuring the relative proportions in each group whose choice concedes with that indicated by their previously measured indifference point is a reflection of the accuracy of the method in eliciting valuations for each program. In addition, we measure bounds around the indifference point: we ask respondents choosing cash if they would, hypothetically, prefer the program for 5%, 10%, 30% and 50% less cash than their indifference point, and respondents choosing the program if they would prefer the program if they received 5%, 10%, 30% and 50% more cash than their indifference point.

As life events may cause the need for liquidity, we will also inquire whether the household received a liquidity shock since our initial visit. Finally, the interviewer will also confirm the names and ID numbers of primary male and female household members, the location of residence and phone numbers listed for MPesa transfers. This information is used to ensure any transfers reach the intended recipient. These surveys will be conducted by individuals

other than those who conducted the initial recipient surveys. If discrepancies are found between this survey and the initial survey, transfers will be delayed until issues are resolved.

2.4.4 Program delivery

If respondents chose to receive the program, the goods or services will be delivered in-person by an individual not involved in the initial data collection. At that visit, the respondent’s name, ID number and location will be verified. In the event of discrepancies, the program delivery is delayed until further investigation. For respondents choosing cash, a transfer will be sent through the MPesa digital payment platform. This platform allows the researchers to confirm the name from the survey matches the name associated with the mobile money account. Finally, we will follow up with a randomly selected 15% recipients (by phone or in person) to confirm receipt of goods, services or cash within one week of making the transfer.

2.5 Econometric specification

2.5.1 Recipient valuations across programs and sectors

The primary goal of this study is to ascertain how recipients value various categories of development programs relative to the cost of those programs. For each development program we begin by estimating the cost of the intervention, drawing on a variety of public data sources and internal estimates based on actual intervention costs. We will calculate the 25th to 75th percentile of valuations and compare that to the estimated costs of each program. Additionally, we will assess whether the mean and median valuation by respondents differs statistically from the estimated cost.

To understand how valuations differ by type of program we will define v_{ip} as the ratio of the value for program p for person i relative to the estimated cost of program p . We will plot v_{ip} for each sector, test that the mean of v_{ip} is 1 (i.e., whether respondents prefer cash or programs overall) and regress v_{ip} on indicator variables for program sector:

$$v_{ip} = \alpha_i + \alpha_p + \beta_1 AG_p + \beta_2 WATER_p + \beta_3 HEALTH_p + \beta_4 ENERGY_p + \beta_4 EDUCATION_p + \varepsilon_i \quad (1)$$

where the programs belonging to miscellaneous sector are the omitted category. Each β measures the relative over / under valuation of a program sector relative to miscellaneous programs and testing the equality of coefficients captures statistically significant differences across sectors. We include individual and program fixed effects and standard errors are clustered at the respondent level.

In addition we will plot v_{ip} for private goods (agricultural inputs, water supply, WASH supplies, family planning services, condoms, bed nets and solar energy connections), private goods with spillovers (extension and after school tutoring) and public goods (WASH education, teacher training, mass deworming and research on malaria and HIV). We will also regress v_{ip} on indicator variables for the nature of the program:

$$v_{ip} = \alpha_i + \alpha_p + \beta_1 \text{PRIVATE}_p + \beta_2 \text{SPILLOVER}_p + \varepsilon_i \quad (2)$$

where public good interventions are the omitted category. Each β measures the relative over / under valuation of a program relative to public goods and testing the equality of coefficients captures statistically significant differences across types of programs. Again, we include individual and program fixed effects and standard errors are clustered at the respondent level.

We will also run analogues of equations 1 and 2 based on donor data. Additionally, for each program sector (agriculture, water, etc.), type (public, private, spillover) and individual program we will test whether donor and recipient valuations are aligned by estimating:

$$v_{ip} = \alpha_i + \alpha_p + \beta D_i + \varepsilon_i \quad (3)$$

where D is an indicator that the respondent is a donor. β measures the difference in donor vs. recipient valuation for program (or program sector or type) p . We include individual and program fixed effects and standard errors are clustered at the respondent level (except when an individual program, rather than a program category, is the outcome). Finally, we will segment the donor sample into individuals who have worked in the development industry (DI) and those who have not worked in the development industry (NDI) and test equality of preferences between those groups and with the respondent sample:

$$v_{ip} = \alpha_i + \alpha_p + \beta_1 NDI_i + \beta_2 DI_i + \varepsilon_i \quad (4)$$

2.5.2 *Heterogeneous valuations*

In addition, we aim to understand how valuation varies by household type. This allows us to understand whether targeting programs based on perceived need correlates with recipient valuations for particular programs. To that end, the baseline survey includes variables that capture respondent's likely need or value for a particular program. In particular, we hypothesize that:

1. Households spending more time in agriculture (% of total time on own agricultural

activities) will have a higher valuation for agricultural interventions

2. Households experiencing water shortages (indicator variable for shortages of water for drinking or household use) will have a higher valuation for water access
3. Households without a bed net (indicator) will have a higher valuation for bed nets
4. Households scoring low on our educational outcomes index (see below) will have a higher valuation for educational interventions
5. Households without electricity (indicator) will have a higher valuation for solar energy

Finally, we will consider whether households that differ according to broad demographics have distinct preferences for particular types of programs. In particular, we will investigate heterogeneous valuations for programs based on per capita consumption, assets and average education of adult (>18) household members. For donors, we will estimate heterogeneous effects based on education (years), individual income (estimated \$US), average income in zip code (\$US) and individual and zip code income simultaneously.

For the general hypotheses (3 for recipients and 3 for donors) we will estimate equation 5 with pooled data, with program fixed effects clustering standard errors at the respondent level, and for each individual program, without fixed effects and clustering:

$$v_{ip} = \alpha_{\mathbf{P}} + \beta \mathbf{X}_i + \varepsilon_i \quad (5)$$

where \mathbf{X} is one of the sources of heterogeneity mentioned above.

For the 5 program specific hypotheses, we will estimate:

$$v_{ip} = \alpha_{\mathbf{P}} + \beta_1 \mathbf{X}_i + \beta_2 P + \beta_3 X_i * P + \varepsilon_i \quad (6)$$

where \mathbf{X} is one of the sources of heterogeneity mentioned above and P is an indicator for the specific program to which the hypothesis pertains. β_3 measures whether individuals with characteristic X have disproportionately lower or higher valuations for program P .

2.5.3 *Valuations by elicitation method*

As noted above, we expect that a reliable value elicitation method should result in the recipient sticking with the choice suggested by their stated indifference point. We therefore estimate:

$$Consistent_i = \alpha_p + \beta_1 BDM e_i + \beta_2 BDM f_i + \beta_3 MPL_i + \beta_4 c_i + \varepsilon_i \quad (7)$$

where *Consistent* is an indicator that the respondent chose the option predicted from their indifference point, *BDM_e*, *BDM_f* and *MPL* are indicators that the respondent was in the BDM with explanation, BDM on faith or MPL group. *c* is an indicator that the choice in question was *ex ante* certain to be selected in determining the respondent’s award. α_p represents indicator variables for the program the individual was offered in lieu of cash. The hypothetical choice condition is the omitted category.

We also estimate a fully saturated model:

$$Consistent_i = \alpha_p + \beta_1 BDM_e_i + \beta_2 BDM_f_i + \beta_3 MPL_i + \beta_4 BDM_e c_i + \beta_5 BDM_f c_i + \varepsilon_i \quad (8)$$

Additionally, for those that choose cash, we asked how much less cash would induce them to choose the program, and for those that chose the program we asked how much more cash would induce them to accept cash. This provides a revisited, semi-continuous valuation for the program they can actually receive. We estimate analogues of equations 7 and 8 taking the percentage by which respondent’s stated indifference point at the follow up survey differs from respondents stated indifference point in the initial survey as the dependent variable.

Finally, we will address how valuations - relative to estimated costs - vary by elicitation method by estimating:

$$v_{ip} = \alpha_P + \beta_1 BDM_e_i + \beta_2 BDM_f_i + \beta_3 MPL_i + \beta_4 c_i + \varepsilon_i \quad (9)$$

2.5.4 *Outliers*

Given that the distributions of valuation may be skewed, we will topcode outliers (determined by the distribution of values). Further, as the median valuation is also of interest, we will report quantile regressions based on the specifications above.

2.6 **Sample size and power**

Two hundred households are included in each value elicitation method arm, allowing us to make comparisons between arms with a sample size of 400. A traditional power calculation indicates that we can detect a small to moderate change (~ 0.25 standard deviations in the outcome) with 80% power. Assuming the “success” rate (i.e., proportion of people choosing cash in one arm) is 50%, we can detect differences between arms of ~ 15 percentage points with 80% power. If the success rate is smaller than 50%, as predicted, power will increase.

2.7 Results

Data collection began on June 22, 2016. Results are expected late 2016 / early 2017.

3 Indices and Variables

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. 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

3. Labor

- (a) Hours spent per week on income generating activities, including:
 - i. Working in agriculture for this household
 - ii. Tending animals for this household
 - iii. Working in a non-farm or livestock business owned by this household
 - iv. Working for pay for someone outside the household (in agriculture, livestock, housework, casual labor, salaried job or other paid work)

4. Education index

- (a) Weighted standardized index of:
 - i. Average years of schooling per adult (18+)

- ii. Proportion of children (<19) in school
- iii. Average days of school missed per child (<19) - *negatively coded*
- iv. Average perception of child (<19) school performance
- v. Average spending on school expenses per child (<19)
- vi. Average time studying or in school per child (<19)