

Indian Low Income Household Energy Survey Codebook

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This document contains information about the provenance and content of the survey dataset. The survey data was collected in the cities of Coimbatore, Kochi, Tiruchirappalli, and Trivandrum in South India between April-June 2019. A team of 11 survey enumerators and researchers were involved in the data collection which was a collaboration between the University of Cambridge and the Indian Institute for Human Settlements. 1707 households were surveyed across the cities of Coimbatore, Kochi, Tiruchirappalli, and Trivandrum. A breakdown of sample size is shown in Table I below.

Data collection for this project received ethical approval from both the Department of Engineering, University of Cambridge and Indian Institute for Human Settlements. This anonymised processed dataset is being released to allow full use by others. Details of the survey sample method are described in previous relevant papers¹, however a brief review is provided here for context.

Survey Sample

Wards in the four cities were selected using data from the 2011 Census of India. Wards were ranked based on access to banking, asset ownership, proportion of households using clean cooking fuels, home ownership rates, and metered electrical lighting. Selection of wards was conducted using this data and expert knowledge from the survey enumerators. This survey contains samples from the following wards in each city.

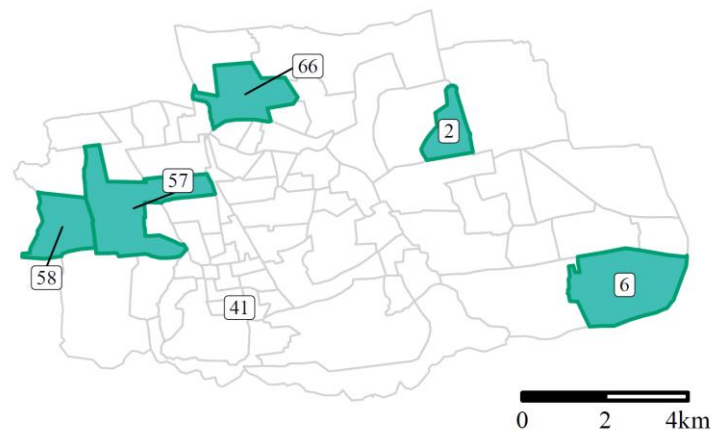


Figure 1: Selected wards for survey in the city of Coimbatore, TN.

¹ <https://doi.org/10.1016/j.scs.2020.102697>

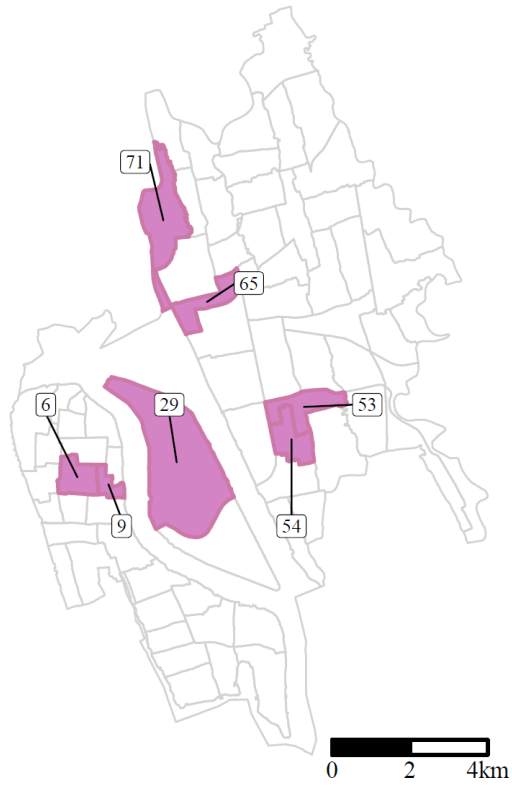


Figure 2: Selected wards for survey in the city of Kochi, KL

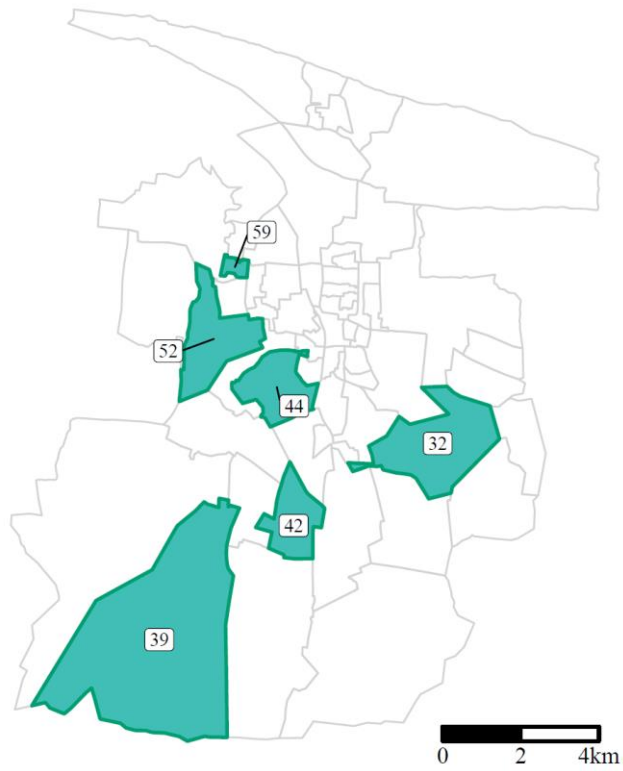


Figure 3: Selected wards for survey in the city of Tiruchirappalli, TN

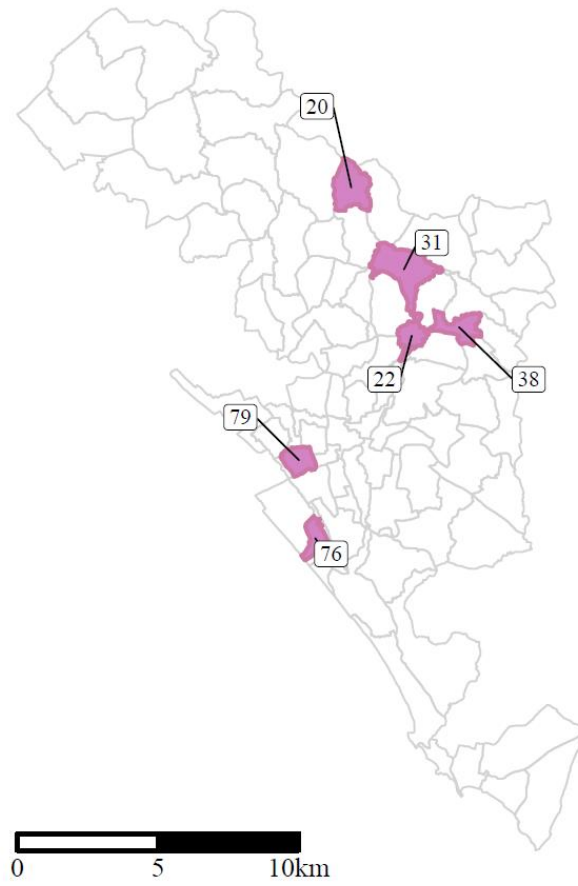


Figure 4: Selected wards for survey in the city of Trivandrum, KL

Table 1: Sample size of selected wards in each city surveyed

| Ward No. | City | State | Sample size |
|--------------|------------|------------|-------------|
| 2 | Coimbatore | Tamil Nadu | 72 |
| 6 | Coimbatore | Tamil Nadu | 73 |
| 41 | Coimbatore | Tamil Nadu | 70 |
| 57 | Coimbatore | Tamil Nadu | 71 |
| 58 | Coimbatore | Tamil Nadu | 73 |
| 66 | Coimbatore | Tamil Nadu | 72 |
| Total | | | 431 |
| 6 | Kochi | Kerala | 60 |
| 9 | Kochi | Kerala | 60 |
| 29 | Kochi | Kerala | 61 |
| 53 | Kochi | Kerala | 60 |
| 54 | Kochi | Kerala | 60 |
| 65 | Kochi | Kerala | 61 |
| 73 | Kochi | Kerala | 60 |

| | | | |
|--------------|-----------------|------------|------------|
| Total | | | 422 |
| 32 | Tiruchirappalli | Tamil Nadu | 70 |
| 39 | Tiruchirappalli | Tamil Nadu | 70 |
| 42 | Tiruchirappalli | Tamil Nadu | 71 |
| 44 | Tiruchirappalli | Tamil Nadu | 70 |
| 52 | Tiruchirappalli | Tamil Nadu | 70 |
| 59 | Tiruchirappalli | Tamil Nadu | 70 |
| Total | | | 421 |
| 20 | Trivandrum | Kerala | 72 |
| 22 | Trivandrum | Kerala | 72 |
| 31 | Trivandrum | Kerala | 73 |
| 38 | Trivandrum | Kerala | 72 |
| 76 | Trivandrum | Kerala | 72 |
| 79 | Trivandrum | Kerala | 72 |
| Total | | | 433 |

The survey sample of over 60 households per ward is sized such that the estimated mean energy consumption values should have a margin of error of +/- 10% at a 90% confidence interval (based on means and standard deviations from the Indian Human Development Survey II, 2011).

Variables

The table below provides correspondence for the numerical categories used to encode each variable, and a brief description of the variable where relevant. Several of these variables have been constructed from underlying variables in the raw dataset.

| Variable Name | Original Survey ID Code | Type | Possible Values |
|----------------------|--|--------------------|---|
| city | hhid3 | Character String | coim – Coimbatore kochi – Kochi trichy – Tiruchirappalli triv - Trivandrum |
| ward | hhid4.1, hhid4.2, hhid4.3, hhid4.4, hhid4.5 | Continuous Integer | [ward no.] |
| religion | hhid5 | Categorical | 1 = Hindu 2 = Muslim 3 = Christian 4 = Sikh 5 = Buddhist 6 = Jain 7 = Tribal 8 = Others 9 = None |
| caste | hhid7 | Categorical | 1 = General/Forward 2 = OBC |

| Variable Name | Original Survey ID Code | Type | Possible Values |
|---|--------------------------------|--------------------|---|
| | | | 3 = SC 4 = ST |
| income_source | hhid8 | Categorical | 1 = Cultivation 2 = Allied agriculture 3 = Agricultural wage labour 4 = Non-agricultural wage labour 5 = Artisan 6 = Petty shop/small business 7 = Organised trade/business 8 = Salaried employment 9 = Government 10 = Pension/rent/dividend 11 = Other |
| migration_arrival <i>years since migration</i> <i>* 90 years is the maximum available value indicating a household has lived in place for 90 or more years.</i> | hhid9 | Integer | 0 <= years >=90 |
| migrated_from | hhid10 | Categorical | 1 = Same state, same district 2 = Same state, another district 3 = Another state 4 = Another country |
| dwelling | hhid14, hhid14a | Categorical | 1 = Bungalow, no shared walls 2 = House with shared walls 3 = Flat 4 = Chawl 5 = Notified slum 6 = Non-notified slum 7 = Blue tent slum 8 = Other slum type 9 = Other dwelling type |
| hh_size <i>no. of people in household</i> | hhidsize | Continuous Integer | [no. of members of household] |
| hoh_payment | HHR1.hhid3.3.1 | Categorical | 1 = Daily 2 = Weekly 3 = Monthly |
| hoh_schooling | HHR1.hhid4.3.1 | Categorical | [categorical 1:16 years] |
| expenditure | incl | Continuous Integer | [monthly expenditure in INR] |
| house_ownership | appl | Categorical | 1 = Owned 2 = Rented 3 = Office Accommodation 4 = Lease 5 = Other |
| rooms | fuel1 | Continuous Integer | [no. of rooms in dwelling] |
| cooking_location | fuel2 | | 1 = Outdoors 2 = Indoors 3 = Outhouse |

| Variable Name | Original Survey ID Code | Type | Possible Values |
|--|--------------------------------|--------------------|---|
| electricity_hours | fuel4a | Continuous Integer | [no. of hours] |
| government_programme <i>Awareness of existing government energy access schemes and subsidies available to them.</i> | Fuel6 | Categorical | 0 = No 1 = Yes |
| programme_awareness <i>How the household became aware of any schemes or subsidies.</i> | fuel6a | Categorical | 1 = Household member 2 = Relative 3 = Neighbour 4 = Work colleague 5 = Public official 6 = Radio/TV advert/Social media 7 = School teacher 8 = Other |
| meals | ene1 | Continuous | [no. of meals per day] |
| stove_change <i>Reason for a recent change of stove.</i> | ene4a | Categorical | 1 = Cost of fuel 2 = Availability of fuel 3 = Subsidy 4 = Convenience/time saving 5 = Neighbours had one 6 = Health benefits 7 = Free/discounted stove |
| timber_kwh <i>Constructed from fuel mass, expenditure, and unit price questions in raw dataset.</i> | timber_mag | Continuous | [monthly kwh] |
| lpg_kwh <i>Constructed from fuel mass, expenditure, and unit price questions in raw dataset.</i> | lpg_mag | Continuous | [monthly kwh] |
| kerosene_kwh <i>Constructed from fuel mass, expenditure, and unit price questions in raw dataset.</i> | kerosene_mag | Continuous | [monthly kwh] |
| electric_kwh <i>Constructed from fuel mass, expenditure, and unit price questions in raw dataset.</i> | electric_mag | Continuous | [monthly kwh] |
| class_1 <i>Constructed variable representing ownership of the following group of appliances:</i> <ul style="list-style-type: none"> - Grinder - Mixer - Pressure Cooker - Chulha - Table Fan - Ceiling Fan | class_1 | Continuous | [proportion of class] |
| class_2 <i>Constructed variable representing ownership of the following group of appliances:</i> <ul style="list-style-type: none"> - LPG Stove - TV - Mobile phone - Water pump - Electric geyser - AC | class_2 | Continuous | [proportion of class] |

| Variable Name | Original Survey ID Code | Type | Possible Values |
|--|--------------------------------|-------------|------------------------------|
| cooking_appliances <i>Constructed variable representing ownership of the following group of appliances:</i> <ul style="list-style-type: none"> - Pressure Cooker - Mixer - Grinder - Roti Maker - Stainless Steel - Improved Chulha - Kerosene Stove - LPG Stove | - | Continuous | [proportion of class] |
| it_appliances <i>Constructed variable representing ownership of the following group of appliances:</i> <ul style="list-style-type: none"> - Television - Mobile Phone - Inverter/battery | - | Continuous | [proportion of class] |