

AfterAccess methodology: Nepal

LIRNEAS/A, 2018

The AfterAccess survey was implemented by LIRNEasia in Nepal in April and May 2018.

The AfterAccess methodology was applied with some local adjustments, considering the fact that in Nepal, the most granular sample frame available was at the ward level (*Nagarpalika* in urban and *Gaonpalika* in rural). The AfterAccess sampling methodology has been developed by Research ICT Africa and applied over the past decade in numerous countries in Africa¹ to achieve nationally representative results for multiple target groups simultaneously in a cost-effective way.

The fieldwork was conducted in Asia by competitively-procured market research companies – The Nielsen Company Nepal Pvt. limited. The company was mainly involved in the fieldwork set-up (including scripting, translating and pilot testing the questionnaire and training of enumerators) and execution of fieldwork as well as dataset delivery. LIRNEasia monitored these activities in most cases being involved in the field training, and monitoring the fieldwork both on the ground as well as remotely.

The Center for Law and Technology (CLT) was engaged by LIRNEasia as the local partner for the surveys, assisting with localization and translation checking of the Nepali language translation of the survey questionnaire; CLT also carried out over 200 independent back-checks calls, as well as assisted in liaison with the Central Bureau of Statistics at the initial stages. CLT as well as the Internet Society both acted as local partners in the dissemination of the research findings in Nepal to key stakeholders.

The details of the methodology applied in Nepal are provided in the following sections.

¹ See for example, https://researchictafrica.net/publications/Towards_Evidence-basedICT_Policy_and_Regulation_-Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%201%20-%20Household%20Survey%20Methodology%20and%20Fieldwork%202008.pdf

Sample Size Determination

The desired level of accuracy was set to a confidence level of 95% and an absolute precision (relative margin of error) of 5%. The population proportion (p) was set conservatively to 0.5, which yields the largest sample size. The minimum sample size (n) was determined by the following equation:²

$$n = \left(\frac{Z_{\alpha} \sqrt{p(1-p)}}{C_p} \right)^2 = \left(\frac{1.96 \sqrt{0.5(1-0.5)}}{0.05} \right)^2 = 384$$

Where:

n = Minimum sample size

Z_{α} = Z-value for 0.05 level of significance

C_p = Confidence level

p = Population proportion

Inserting the parameters for the survey yields the minimum sample size for simple random sampling; therefore, for our sample design (stratified with multiple levels in some cases) the minimum sample size was multiplied by the design effect variable.

In the absence of empirical data from previous surveys that would have suggested a different value, the default value of 1.5 was used as the design effect for all survey countries (except India). This yields then, a minimum sample size of 576 per country for households and individuals. The actual sample size for the Asian countries was increased beyond the minimum requirement to compensate for clustering effects, and allow for urban/rural disaggregation of data, as well as gender-based disaggregation. Therefore, in Nepal the sample size was increased to 2,000.

² Rea, L and Parker, R. (2014), Designing and Conducting Survey Research: A Comprehensive Guide.

Sampling

Survey target groups

The target groups of the AfterAccess survey in Nepal were:

- a) All households
- b) The population between the ages of 15-65

Note: In parallel to the AfterAccess household and individual survey, a survey of persons with disabilities was conducted in the AfterAccess sample locations; the disability survey was piggy-backed upon the AfterAccess survey as a means of achieving a nation-wide sample in a cost-effective way. *This methodology note relates only with the AfterAccess household and individual survey.* That of the disability survey will be elaborated on in separate research outputs in the near future.

Survey respondents

In a selected household, two persons were interviewed:

1. The household head, as identified by the households themselves. If the household head was not available, a suitable alternative was sought out (e.g., spouse or other) who would be able to provide sufficient detail on the household characteristics and other members.
2. A randomly selected individual from the pool of eligible household members, i.e., any household member aged 15 through 65, which could even include the household head or alternative household representative.

Sample frame and PSU definition

The sample size in Nepal was 2,000 households and individuals. The PSU in Nepal was the ward, or *Nagarpalikas* in urban, and *Gaonpalikas* in rural. The method was developed using data on household numbers in the wards of Nepal available in the list of local body units (Palikas) released by the Central Bureau of Statistics, Nepal³ in early 2018. Random sampling of PSUs was performed in two steps resulting in the selection of 100 PSUs across Nepal.

Overview of sampling procedure

The AfterAccess methodology ensures national representation through random selection of all sampling units (ward, household, individual, etc.), with known selection probabilities. In order to do this, selection of all units, including the household must be done from a list of all units. In the ideal case, the selection of primary sample units from the national census Enumerator Area (EA) sample frame would enable areas of 200-250 households (a

³ http://cbs.gov.np/sectoral_statistics/population/Population%20of%20753%20Local%20Units

manageable number for household listing) to be selected, in which a complete listing of households can be performed to generate a household sample frame at the PSU/EA level. This would enable the random selection of households with a known selection probability, key for national representation.

However, in most of the Asian survey countries, including Nepal, the national EA sample frame is not available publicly. Therefore, in such countries, the next most granular-level sample frame (usually ward/village) is used along with a segmentation methodology (described below) to create essentially EA-like divisions to enable national representation.

Segmentation of wards is necessary because the numbers of houses in wards can vary significantly (for instance, some wards in Katmandu can have as many as 20,000 households) – making complete listing challenging. Thus, wards over a certain size have to be segmented. Thereafter, a segment(s) has to be randomly selected, in which the listing and mapping of households can be done, enabling random selection of households. This ensures that randomness is maintained, and data collected across survey countries are still comparable.

The AfterAccess methodology – based on the selection of EAs – applied across countries therefore involves the following steps:

- (1) Separation of EA or ward/village sample frame into urban and rural PSUs
- (2) Sampling the required number of EAs/ward/villages from each stratum (urban and rural PSUs) using probability proportionate to size (PPS).
 - (a) Where the ward/village size exceeds a critical number, wards/villages re segmented and a segment is selected randomly, in which the remaining sampling steps were continued with.
- (3) Mapping, listing and marking all households in the selected PSU or segment – the lists serve as the sample frame for simple random selections if households; this was done with the assistance of key informants (e.g., ward / village leader, etc.)
- (4) Simple random selection of the required number of households (20-25) from each selected PSU / segment
- (5) Listing all household members or visitors aged 15-65⁴ staying the night at the selected household
- (6) Simple random selection of one household member or visitor for survey from household list compiled (using the Kish grid) in Step 5

⁴ Aged 15+ in Africa and Latin America

As explained above, in Nepal since the EA sample frame was not available, therefore EA-like divisions had to be developed using segmentation based on the ward sample frame. The details are described in the following sub-sections.

PSU selection

The selection of PSUs was conducted by LIRNEasia and provided to Nielsen Nepal in the following way; selected PSUs are depicted in Figure A5:

Step 1: The updated list of Palikas were split into urban (Nagarpalika) and rural (Gaonpalika)

Step 2: The required number of wards for each stratum were selected using PPS; a total of 100 wards were selected

Segmentation, mapping and listing within sample PSUs

For selected PSUs, PSU-level household and population data were not readily available. In order to draw a random sample of households within a PSU, all households within a PSU had to be mapped and listed.

The objective of the mapping and listing of households was to ensure that the list of households covers the entire population living in the PSU. In this way, when the sample is selected from the list of dwellings or households, all eligible households in a PSU get equal chance of being selected for the survey.

This process is used for creating a list of households from which a sample would be chosen for the main survey. This process provides a complete list of occupied residential households in a selected area. This helps in defining the complete range of households, making possible the employment of systematic and equal probability random selection of the households. As an advantage, this helps in circumventing the problem of biased household selection for the main survey.

Households are found in dwellings, dwellings are located in structures and structures in clusters (PSU). The listing operation consists of visiting each PSU, recording on listing forms a description of every structure together with the names of the heads of the households found in the structure, and drawing a location map of the PSU as well as a layout sketch map of all structures residing in the PSU.

These details help and guide interviewers to relocate selected households for interview during main survey data collection.

When arriving at a PSU, the field teams meet with key informants (KIs) to verify PSU details (e.g., numbers of households, locations of households, PSU boundaries and access routes, etc.).

Segmentation, mapping and listing was conducted in advance by listing teams and the survey itself was thereafter conducted by the main survey teams.

SEGMENTATION

The selected wards were divided into three categories, and segmentation of wards was done as appropriate:

1. Wards with less than 250 households (1 ward)
2. Wards with more than 250 but less than 1000 households (62 wards)
3. Wards with more than 1000 households (37 wards)

For wards with less than 250 households, no further segmentation was carried out.

Quadrant selection was used for wards with more than 1000 households. Each of these wards was divided into four quadrants in a clockwise manner and one quadrant was randomly selected. Ward maps were used wherever available; if not, ward maps were created by field teams with the help of KIs.

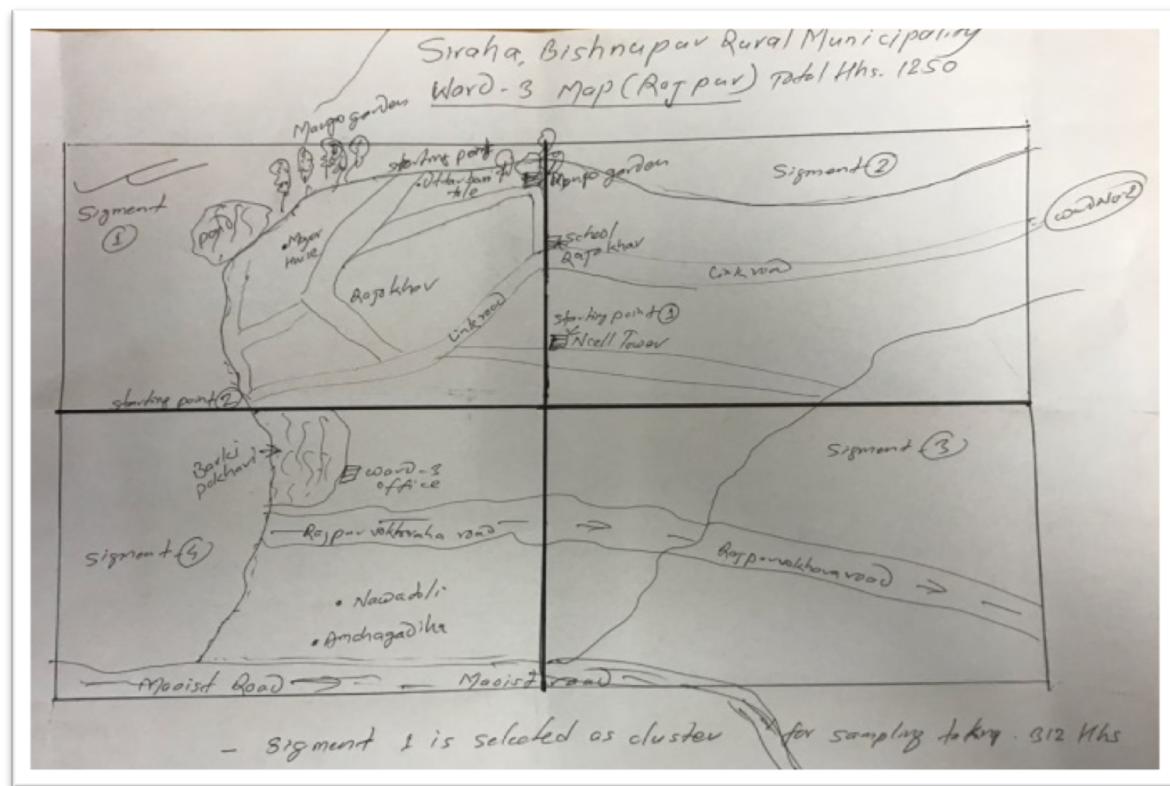


Figure A1: Ward maps created in case of absence of available ward maps

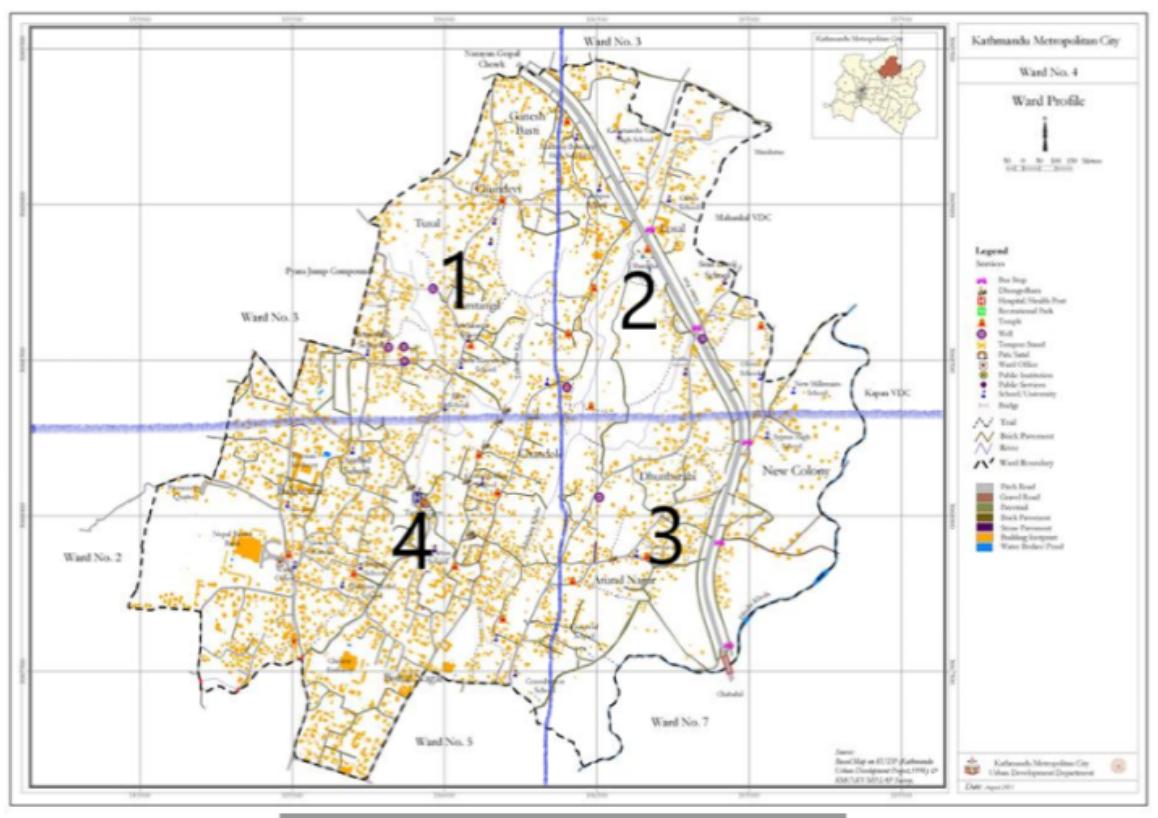


Figure A2: Ward maps used wherever available for making quadrants

For wards falling into the range of 250-1000 households, as well as the selected quadrants (i.e., in the case of wards with more than 1000 households) the field teams identified pockets of approximately 250 households each, with the help of a KI. Based on the number of such pockets formed, selection of these pockets constituting the enumerator areas, was performed using a random number generator for complete listing.

Once the enumeration area was identified for the selected wards, a notional map was created with natural or permanent boundaries. The listing team was given a starting point from where they followed a right-hand rule to complete the listing of all structures within the boundaries of the enumeration.

NOTIONAL MAPS FOR ENUMERATION AREAS

The Notional map was used to identify the boundaries within which the enumeration was to be conducted. The listing team followed a right-hand rule while listing the structures and marked the same on the map with major landmarks highlighted for ease of identification.

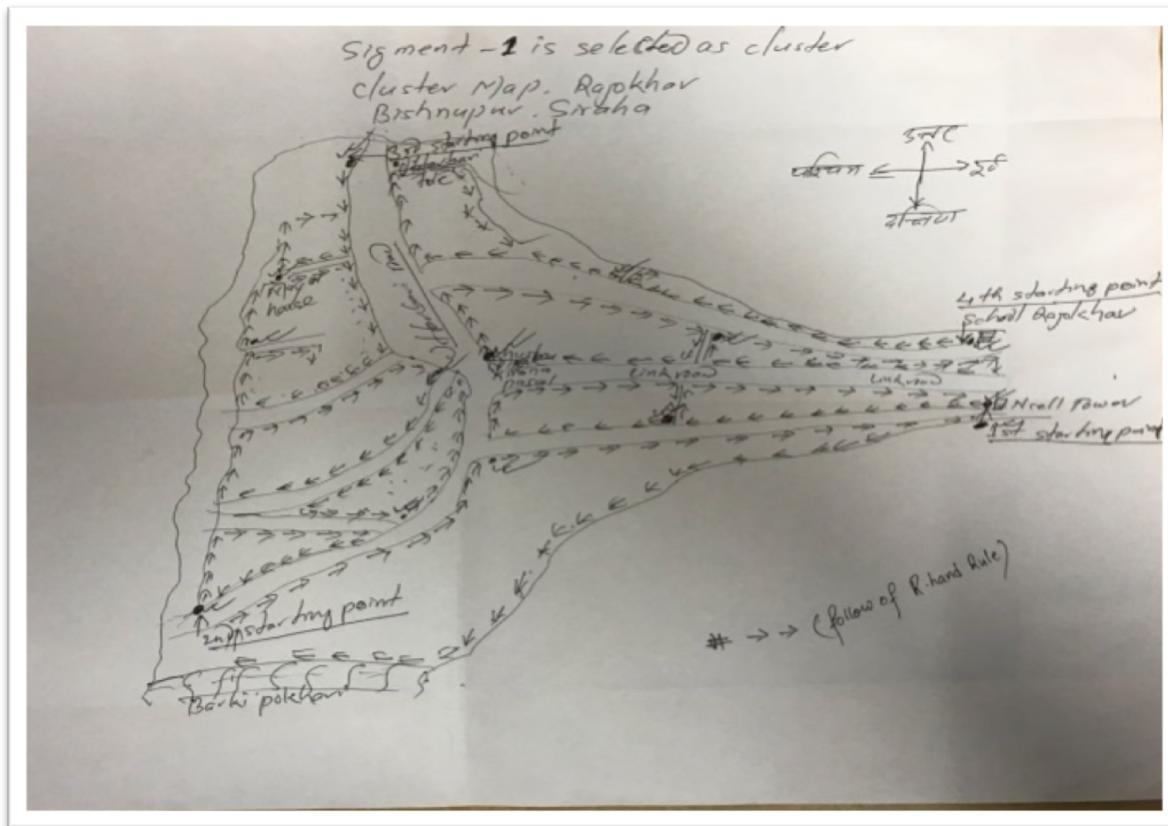


Figure A3: Notional Map of selected enumerator area

LISTING

In the selected PSU/EA, all structures including nonresidential, Institutional, residential were listed to prepare the sampling frame for the study. GPS coordinates were taken for all structures (See Figure A4 for example). For residential households, the following details were captured:

1. Location Details along with GPS coordinates'
2. Type of Structure-Institutional, Common Living, Commercial, Residential
3. Name of household head
4. Respondent type
5. Number of members

For the purpose of sampling for the disability survey which was being run in parallel with the AfterAccess household and individual survey, the presence of any member with any form of disability (as per the *Washington Group* criteria) were also sought from the household to flag those with the presence of any disability.

The listing was carried out on CAPI devices as well as in a hardcopy. The reason for following this practice was to help combine the listing sheets of the listing teams to help in sample selection. This step was taken in Nepal to avoid delays due to mobile network quality issues which might have delayed the merging of the listing information.



Figure A4: Plotting of Coordinates of Listed Structures in an EA

Household and individual selection

After listing of households, the supervisors combined all the listing sheets into frame of households. In each EA, 30 households were selected using Systematic Random sampling. The intervals and the random start numbers were mentioned on the listing sheet and the requisite number of sample households allotted to each enumerator. Out of the 30 selected households 20 households were interviewed in each EA; the purpose of extra sample was to avoid lower sample coverage due to refusals or incomplete interviews.

The main survey team then had to identify the households, select the target respondents according to set procedures, and interview them. The CAPI programme linked the listing information with the selected household.

SELECTION OF HOUSEHOLD RESPONDENT DURING MAIN SURVEY

In a selected household, after obtaining consent for participation, the household head was interviewed on household characteristics; if the household head was not available, a suitable alternative were sought out (e.g., spouse or other) who can provide sufficient detail on the household characteristics and other members.



SELECTION OF INDIVIDUAL RESPONDENT DURING MAIN SURVEY

In sample households, all eligible individuals (age 15-65 years) were listed with the help of the household head or representative and one was selected automatically (randomly) using the CAPI device. The CAPI device was programmed to flash the selected individual's details (name, gender, age and relationship to the household head) on the screen and was not allowed to go back after this stage.

If the enumerator failed to reach the relevant respondent on first visit, the enumerator consulted with other members of the household/staff or neighbors about the time availability of the target respondent. In case the selected respondent was not available at the first visit, a minimum of three (3) attempts (first visit +two follow up) were made (at different times of day or based on an appointment) to reach the target respondent.

Replacement of a selected respondent within a household was not allowed. If required, whole household were replaced by drawing additional sample from the frame.

Replacement procedures

Strict replacement procedures were set in place, to ensure the randomness of the sample at all levels was preserved. The circumstances under which replacements were allowed are detailed below.

INDIVIDUAL REPLACEMENT

If a target respondent could not be reached after a minimum of three (3) attempts were made (at different times of day, or based on an appointment) to reach the target respondent during the survey duration (within 2 to 3 days), or the target respondent refused to participate in the research, then the household had to be replaced, with one of the (randomly) pre-selected replacement households for that PSU/EA. Replacement of respondents within the household (either household or individual respondents) was strictly not allowed.

HOUSEHOLD REPLACEMENT

A household was replaced in the following situations:

- A household head or suitable alternative refused to participate in the survey
- A household head or suitable alternative was unavailable after three (3) attempts to contact them
- A house had been found to be locked/vacant after three (3) attempts to contact the house were made

A household was replaced if the randomly **selected individuals** from a household either (*individual replacement in a household was not permitted*):

- Refused to be surveyed
- Was unwell or unable to communicate (e.g., due to sickness or disability)
- Could not be reached, after three (3) consecutive attempts to reach them were made by the enumerator.

If any of these situations arose, the house had to be replaced with a random selection from the list of houses in the PSU/segment (applying the pre-determined sampling interval).

PSU REPLACEMENT

In some cases, it becomes impossible to conduct fieldwork in a selected PSU. For example, where security concerns prevent field teams from accessing the selected PSU, or local administrative leaders do not allow field teams to conduct research, or even entire villages may have migrated for a particular season. In these cases, the local fieldwork partner (Nielsen Nepal) make requests for replacement PSUs. LIRNEasia provided random replacements, where the fieldwork partner then proceeded to carry out fieldwork in.

During the Nepal fieldwork, one PSU had to be replaced. The PSU was Himali Gaonpalika in Bajura district. The supervisor and the listing team reached this PSU but found that most members had migrated for Yarshagumba (caterpillar fungus) collection during this period. Hence a PSU replacement was requested. LIRNEasia replaced the PSU with another PSU in the same district. Apart from this replacement, all other PSUs were as per the originally sampled PSUs.

Research Instrument

Development, translation and scripting

A structured questionnaire was used to capture the household and individual level data. The English language questionnaire was developed by the global AfterAccess team (DIRSI, LIRNEasia and Research ICT Africa); country and regional localization was done by LIRNEasia with input from CLT as well as Nielsen Nepal.

The questionnaire was translated and back-translated into Nepali language by Nielsen Nepal. LIRNEasia had the questionnaire translations checked over by external consultants (CLT) to ensure accurate and context-appropriate translations.

The scripting of the questionnaire was done by Nielsen Nepal.

The pilot and pretest carried out helped to fine-tune the questions and responses to suit the Nepal context.

Pilot Testing

AIMS AND OBJECTIVES

Prior to the launch of the main survey, a pilot-test exercise was conducted by Nielsen Nepal. The pilot-test was carried out in the Baneshwor and Machegaon (non-sample) areas in and around Kathmandu, on 23 and 24 April 2018.

The aim of this exercise was to fine-tune the questionnaire and the fieldwork procedures for the AfterAccess survey. Specifically, key objectives were:

1. To customize the language used in the questionnaire
2. To check respondents' understanding of the questions and modify the Nepali language accordingly.
3. To check the skip patterns and flow of questions in the CAPI program.
4. To check the response options and make any additions required
5. To gauge the length of interview
6. To gauge the possible constraints that could be faced during the main fieldwork
7. To gauge respondents' understanding of the various terms used in some of the specific sections of the questionnaire

The core project team members from Nielsen Nepal and its supervisors were given an orientation on the study tools and the area identified for carrying out the pilot. A six-member team accompanied by a representative from LIRNEasia carried out the pilot tests. The pilot test was conducted in 20 households, using both pen and paper and CAPI methods.

Based on the observations made during the pilot tests, various improvements to the field process as well as the research tools were made.

Fieldwork Implementation

Coverage Maps

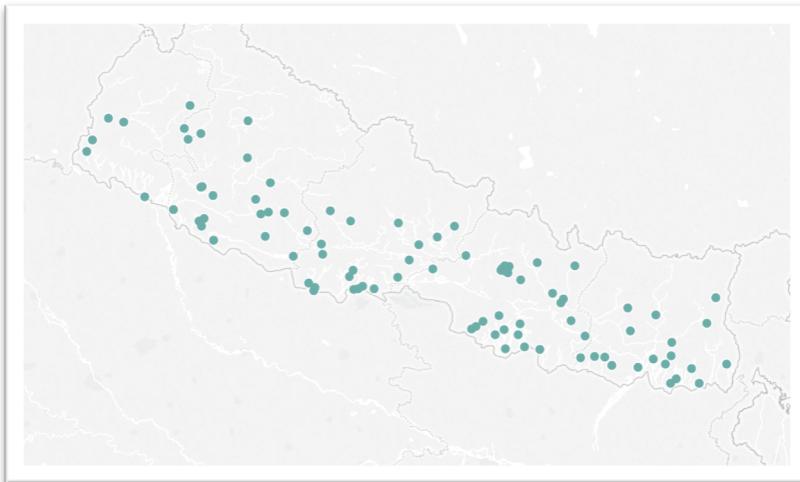


Figure A5. Nepal sample locations

Consent

Prior to the commencement of an interview, the respondent was informed of the following:

1. The objectives of the research
2. That his/her participation was voluntary
3. That he/she could choose to end the interview at any point

Once informed of these, the respondent's written or verbal consent was obtained from the respondent to (1) proceed with the interview; (2) be photographed [if applicable]; and (3) be contacted again for further research. Respondents who refused to be photographed could still be interviewed if they agreed to participate.

Photography

In every PSU, while working high resolution digital photographs were captured. Proper consent of the relevant community members was taken before taking photograph.

Photographs and scanned copies of the field maps were taken for documentation and verification purposes.

Collection of network quality data

GIS-tagged network quality metrics were collected in all sample locations by the Netradar application which was installed and running on all CAPI devices. The network quality data was automatically uploaded via the mobile network that the CAPI device was connected to, and collected from the back-end by LIRNEasia for analysis.

Quality control

Quality control by Nielsen Nepal

Each of Nielsen's field teams comprised of four enumerators and one supervisor which spent 3-4 days in an EA. The supervisor accompanied 25% of the interviews. Apart from the accompanied checks, 10% back checks were done by the core team members after receiving data from field in some case telephonically (for remote locations).

Each interviewer conducted close to 5 interviews in each PSU, the supervisor allotted to each team undertook at least 1 accompanied interview for each of the interviewer every day of survey in the PSU.

The core team members also undertook back checks during field monitoring as well as using telephonic interviews for select parameters. Any deviation from the captured information was flagged immediately for revisits.

Quality checks by LIRNEasia

LIRNEasia conducted different types of quality checks during the fieldwork:

- **Monitoring the listing process in the field** – These monitoring exercises covered the end-to-end listing procedure of randomly selected PSUs. This includes meeting with KIs, Identifying the ward boundaries, segmentation of large wards, random selection procedure of the blocks (segments), listing activity, marking of the structures etc.
- **HCC (household count check)** – This was done after finalizing the listing by the Nielsen Nepal team. The LIRNEasia team followed the maps created by the Nielsen team after verifying the maps with the KIs from the PSU. The LIRNEasia team conducted a complete re-count of the households in some randomly selected PSUs.
- **In-house checks using GPS** – LIRNEasia conducted some quality checks using GPS coordinates captured during the listing exercise. The team visually inspected the GPS coordinates plotted on the Google maps. The purpose of these checks was to look at whether the listing is conducted in the correct PSU location. This check went down to the enumerator level.
- **Independent back-check phone calls** – LIRNEasia's local partner, CLT made over 200 phone calls to a random sample of respondents who had consented to being re-contacted, to verify details of the survey, including whether or not the respondent had indeed been surveyed, basic details of the respondent, mobile owning status, and feedback on the enumerator.

Weighting

Weights were calculated and applied to the data collected in each country in order to gross up the data to the national level. Two weights were constructed, one for household and one for individuals. The weights are based on inverse selection probabilities. This method was used to weight the data in Nepal.

$$\text{Household weight: } \mathbf{HH}_W = DW \frac{1}{P_{AU} * P_{SEG} * P_{HH}}$$

$$\text{Individual weight: } \mathbf{IND}_W = DW \frac{1}{P_{AU} * P_{SEG} * P_{HH} * P_I}$$

$$\text{Administrative unit (AU) selection probability: } P_{AU} = m \frac{\mathbf{HH}_{GN}}{\mathbf{HH}_{STRATA}}$$

$$\text{Segment selection probability: } P_{SEG} = \frac{\mathbf{HH}_{SEG}}{\mathbf{HH}_{WARD}}$$

$$\text{Household selection probability: } P_{HH} = \frac{n}{\mathbf{HH}_{SEG}}$$

$$\text{Individual selection Probability: } P_I = \frac{1}{\mathbf{HH}_{m15-65}}$$

The administrative units in Nepal were the ward (*Nagarpalika* in urban and *Gaonpalika* in rural). **The above-mentioned weights were applied for Nepal.**

When $\mathbf{HH}_{AU} \leq 250$, $\mathbf{HH}_{AU} = \mathbf{HH}_{SEG}$. Thus, $P_{SEG}=1$. (i.e., if an AU has less than 250 households, it will be treated as a PSU)

DW = design weight compensation for over-sampling of urban PSUs and under-sampling of rural PSUs;

HH_{AU}= number of households in selected AU based on information of last census or updated listing by field team;

HH_{STRATA}=number of households in strata (urban, rural);

HH_{m15-65}=number of household members or visitors aged 15 -65 years;

m = target number of AUs for each strata, (urban, rural);

n = target number of households in a segment;

The target number of households in each PSU (AU/segment) was 20.