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Methodology report | Phone survey

Haiti Phone Survey 2023

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Methodology Report

1. Overall aim and purpose

1.1. Project context

The Haiti mobile phone survey 2023 was implemented as part of Flowminder's work on the USAID-funded "Population Mobility Data for Disaster Management" project, the overall objective of which is to improve Flowminder's CDR-derived indicators of mobility and enable bias corrections, and to develop an automated system to produce indicators and standard reports in a timely manner to efficiently support humanitarian actors through a better understanding of human mobility in crisis. The project received funding **from the American people through the United States Agency for International Development (USAID)**.

Furthermore, in partnership with Digicel Haiti, Flowminder has developed the [Haiti Mobility Data Platform](#), a privacy-secure web platform providing mobility and population statistics derived from anonymised and aggregated Call Detail Records (CDRs) to approved third parties to support work in the humanitarian and development sectors.

The **objective** of the Haiti mobile phone survey 2023 was to validate and support Flowminder's methods of production of mobility estimates based on Call Detail Records (CDRs), particularly of key concepts (home location, mobility, migration), and to learn about the socio-demographic structure of phone users in Haiti.

1.2. Project partners

The analysis team at **Flowminder** created the research design of the phone survey and oversaw all stages of its implementation, from drafting the research questions, the sampling design, the questionnaire, selecting and commissioning the implementing organisation, monitoring of data quality, data processing and data cleaning, as well as data analysis and reporting.

Viamo Inc. was selected as the implementing organisation and was responsible for the questionnaire programming and testing, selection and training of call centre operators, as well as data collection, quality monitoring and initial data cleaning. Telephone interviews were conducted via Viamo's Call Center App by operators from the sub-contracted call centre, **CETEMOH Digital Center (CDC)**, based in Port-au-Prince, Haiti. Operators and their supervisors also contributed feedback on the questionnaire, leading to its improvement and refinement.

The gross sample for the telephone survey was created by **SampleSolutions**, based in the Netherlands.

The **Ethics Committee for the Humanities of the University of Ghana** reviewed and approved the survey design and questionnaires used in Flowminder's Ghana Phone survey 2022, on which the Haiti Phone Survey 2023 was largely based.

1.3. Content and topics

The objective of Flowminder's Haiti phone survey 2023 was to understand more about the mobility of the Haiti population as well as differences in demographics and mobility of various telephone users' groups, in order to inform Flowminder's estimates of internal mobility in Haiti.

In particular, the survey data are to be used for

- the assessment of measurement biases in CDR data arising from SIM sharing and multiple SIM use
- the assessment of household mobility
- the assessment of the demographic structure of phone users and various groups of users
- the validation of home locations as conceptualised from CDR data and
- the validation of indicators for mobility and migration.

Therefore the questionnaires covered the following topics

- Module I - Pre-call information
- Module S - Screening questions
- Module X - Gender and urbanisation
- Module R - Mobile phone use
- Module M - Migration and mobility
- Module A - Socio-demographics
- Module H - Household socio-economic status
- Module E - End
- Module Z - Interviewer questionnaire

2. Legal basis and data protection

The initial lawful basis for data processing was legitimate interests pursued by Flowminder (Article 6(f), GDPR) (Article 20(1)(e)). These legitimate interests are the following: improving access to health and social services, health service delivery planning, disaster management planning and response, marking progress towards the Sustainable Development Goals, as well as scientific research.

This initial lawful basis was required to enable a first contact to respondents. Once that contact was established, at the start of each call the interviewers introduced themselves, Viamo Inc. and Flowminder (as the commissioning organisations), outlined the purpose and goals of the survey, the project context, and highlighted the confidential nature of all data collected and that participation was voluntary. It was also outlined that the respondent could skip questions and that they could stop the interview at any time. Furthermore, respondents were informed that the data would be shared with Flowminder Foundation. Informed consent was secured for all interviews used for analysis.

All respondents who completed the interview were also referred to the [privacy notice](#) (French) on Flowminder's website, outlining respondents' rights in more detail.

3. Methodology

3.1. Modes of Data collection

Computer-Assisted Telephone Interview (CATI): individual telephone interviews with Haiti phone users; used for samples A, B1 and C.

Interactive Voice Response (IVR) Interview: automated interactive voice response interviews with individual Haiti phone users; used for sample B2.

3.2. Statistical concepts, definitions and classifications

The indicators for **individual and household socio-economic status** for modules A and H were taken from the Demographic and Health Surveys (DHS) Household Questionnaire (phase 8). Several indicators on **phone use** (module R) and **mobility** (module M) were taken and adapted from Flowminder’s 2022 Ghana phone survey.

For the classification of attempted, partially completed and completed codes, the **disposition codes** suggested by AAPOR were used.

3.3. Statistical population

The **target population** was defined as all mobile phone users in Haiti who were using a phone number of a Haiti Mobile Network Operator (MNO) and who (a) were the main user of that SIM card, (b) were resident in Haiti at the time of the call, and (c) were at least 15 years of age. The existing network prefixes at the time of data collection are shown in table 1.

Table 1: Haiti mobile phone network prefixes

Digicel	Natcom
+509 31	+509 32
+509 34	+509 33
+509 36	+509 35
+509 37	+509 40
+509 38	+509 41
+509 39	+509 42
+509 44	+509 43
+509 45	
+509 46	
+509 47	
+509 48	
+509 49	

Primary Sampling Units were individual phone users who used a SIM with a phone number from a Haiti Mobile Network Operator.

Geographic coverage: Haiti, national level. The data include respondents from all 10 departments of Haiti.

Reference period: Interviews were conducted **between 26 September and 18 November 2023**. Data collection took 54 days.

3.4. Sampling and sample size

The survey was designed as a **cross-sectional stratified simple random sample telephone survey** and combined three different sampling approaches.

- Sub-sample A: CATI questionnaire targeted at the general population of mobile phone users (all MNOs)
- Sub-sample B:
 - B1: CATI questionnaire targeted at mobile phone users who recently relocated
 - B2: IVR questionnaire targeted at mobile phone users who recently relocated
- Sub-sample C: CATI questionnaire targeted at Digicel users

The design foresaw **stratification by department**, with department Ouest being sub-divided into two strata (ZMPAP and non-ZMPAP), totalling 11 strata. The target net sample size for each stratum (see table 2 below) in sub-sample A was 450 (500 for Ouest: ZMPAP), while it was 14 per stratum for B1 and B2 each, and there were no net sample targets per stratum for sub-sample C.

Table 2: Target net sample per sub-sample and strata

Strata (departments)	Sub-sample A	Sub-sample B1	Sub-sample B2	Sub-sample C
Ouest: ZMPAP	500	14	14	n/a
Ouest: non-ZMPAP	450	14	14	n/a
Sud-Est	450	14	14	n/a
Nord	450	14	14	n/a
Nord-Est	450	14	14	n/a
Artibonite	450	14	14	n/a
Centre	450	14	14	n/a
Sud	450	14	14	n/a
Grand'Anse	450	14	14	n/a
Nord-Ouest	450	14	14	n/a
Nippes	450	14	14	n/a
TOTAL	5,000	150	150	2,000

However, this design could not be fully implemented, mainly due to a low contact rate for sample A.

Random digit generation was used to create a sample of Haiti mobile phone numbers. For this purpose, SampleSolutions was subcontracted by Flowminder as a technical partner.

SampleSolutions provided a **gross sample of 26,000 Haiti mobile phone numbers**. Sample Solutions initially drew a sample of 22,000 numbers, which were used for sub-samples A and B, later drawing an additional sample of 4,000 Digicel numbers for use in sub-sample C. The process to retrieve that gross sample involved multiple steps. In a first step, based on a potential total of existing mobile phone numbers related to prefix codes of providers (MNOs), a potential sampling frame was calculated. This potential sampling frame was much larger than the number of actual mobile phone numbers in use and only served the purpose of creating an initial sample. This pre-screening sample was screened via a Home Location Register (HLR) lookup - a check for the authenticity and activity status of a cell phone number - and via checks against Sample Solution's register of business numbers (B2B). Out of these numbers, a random subset of 26,000 numbers was selected and forwarded to Viamo for interviewing. Table 3 shows the total and MNO-specific counts for the gross sample and for all disposition codes.

From this overall gross sample of 26,000 Haiti cell phone numbers, **23,813 numbers were called**, and a total of 20,435 called working numbers were recorded.

The net sample (complete and partial interviews that can be used) consisted of **3,402 interviews** (see table 2). In addition to complete interviews, **partial interviews** (95 cases, code 1.2, P) were kept as part of the net sample, when at least 50% (and up to 80%) of all applicable questions were answered with a valid answer. Interviews with at least 80% valid answers count as full interviews (3,307 cases, code 1.1, I).

In summary, the main reasons for unsuccessful calls were unreachable numbers, unsuccessful contacts with respondents and refusals.

Refusals (code 2.11, R) comprise all situations where the respondent explicitly refuses or declines to be interviewed. If the interview was aborted prematurely or the respondent gave valid answers to less than 50% of all applicable questions, that interview was marked as a **break-off** (code 2.12, R). Such break-offs (451) were less common than refusals (2,225).

A large number of cases (3,343) were **non-contacts** (code 2.2, NC) - eligible cases where there was a conversation on the phone, but no interview was started for reasons other than refusals, for example when call-backs were agreed but the respondent was subsequently unavailable. These cases were much more prevalent for Natcom numbers than Digicel. Other types of non-interviews included persons currently ill and cases of language barriers.

The largest group of unsuccessful calls were unanswered phone calls (8,985), comprising situations where there was a ringtone but the call was not answered, situations where an automated message informed the caller that the phone was currently switched off, and situations where the call did not pass (e.g. no ringtone). The **eligibility** of these numbers remains **unclear** (disposition code 3.0, U).

More than 20% of cases (5,407) were **not eligible** (code 4). Most of these cases (3,378) were non-working numbers, where there was an explicit message that the number dialled was incorrect, not assigned, or not in service (code 4.3). In a smaller number of cases the district quota was filled (732), or persons were not recently mobile (screening question for sub-samples B1 and B2), or not living in Haiti, minors under 15 and business numbers (1,297 out-of-sample cases).

Table 3. Haiti mobile phone statistics, sampling frame, gross and net phone survey sample and weights

I. Mobile phone market statistics		Digicel	Natcom	TOTAL
Active subscriptions, voice calls (Oct 2023) ¹⁾		3,822,636	1,637,692	5,460,328
II. Sampling frame and overall gross sample		Digicel	Natcom	TOTAL
Overall gross sample (randomly generated & screened)		17,708	8,292	26,000
III. Worked gross sample	Code	Digicel	Natcom	TOTAL
Interviews	1.0	2,577	825	3,402
Complete interviews	1.1 (I)	2,518	789	3,307
Partial interviews	1.2 (P)	59	36	95
Non-interviews, eligible	2.0	3,448	2,894	6,342
Refusal	2.11 (R)	1,614	611	2,225
Break-off	2.12 (R)	315	136	451
Non-contact, respondent not available	2.2 (NC)	1,310	2,033	3,343
Unknown eligibility	3.0 (U)	7,390	1,595	8,985
No answer	3.13	7,390	1,595	8,985
Not eligible	4.0	3,346	2,061	5,407
Out of sample	4.1	867	430	1,297
Non-working/disconnected number	4.3	1,933	1,445	3,378
Quota filled	4.8	546	186	732
Working numbers called ²⁾	-	14,619	5,816	20,435
Total numbers called		16,552	7,261	23,813
IV. Weights, contact, response and refusal rates		Digicel	Natcom	TOTAL
Probability of inclusion		0.0038	0.0032	0.0037
Design weights, normalised		0.9760	1.1818	1.0279
Combined weights, normalised		0.9402	1.1869	1.0000
Contact rates ³⁾		32.5%	28.4%	31.3%
Response rates ⁴⁾		20.0%	16.3%	19.0%
Refusal rates ⁵⁾		12.5%	12.1%	12.4%

1) Provided by Digicel Haiti

2) The sum of interviews, non-interviews, unknown eligibility cases and ineligible cases (but working numbers):
I + P + R + NC + U + 4.1 + 4.8

3) The contact rate CON1 suggested by AAPOR: $(I + P + R + O)/(I + P + R + NC + U)$

4) The response rate RR2 suggested by AAPOR: $(I + P)/(I + P + R + NC + U)$

5) The refusal rate REF1 suggested by AAPOR: $R/(I + P + R + NC + U)$

Sources: Sampling data, gross sample, final survey data (v1.3)

The **overall contact rate** was 31% (using the contact rate CON1 suggested by AAPOR, see table 1 and footnote 3). The contact rate measures the share of effective contacts with respondents out of all eligible units.

The **overall response rate** was 19% (using the response rate RR2 suggested by AAPOR, see table 1 and footnote 4). The response rate is the share of interviews out of all eligible units.

The **overall refusal rate** was 12% (using the response rate RR2 suggested by AAPOR, see table 1 and footnote 5). The refusal rate is the share of refusals or break-offs out of all eligible units.

3.5. Questionnaire development and translations, programming

The questionnaire was developed in English and programmed using **Viamo's platform** for CATI and IVR data collection. Viamo also oversaw translation of the survey questionnaires into **Haitian Creole** for both CATI and IVR versions.

3.6. Recruitment and training of interviewers

Viamo hosted a training for 34 interviewers, plus two additional supervisors working with CDC, on how to use the Viamo Platform from 30 August to 5 September 2023.

3.7. Pilot interviews

The pilot interviews took place from 7 to 10 September 2023. A sample of 2,946 phone numbers - taken from the gross sample - was called by interviewers. Notably, a majority of these numbers were not called five times, and those whose use was not exhausted during the pilot exercise were later fed back into the sampling pool for subsample A. 277 interviews were completed, resulting in a total response rate of 9.4% (lower than for the full survey).

3.8. Data collection (incl. logistics)

The full data collection started on 26 September 2023. Out of the gross sample, 23,813 numbers were shared with interviewers and called. Interviews were conducted on all days of the week, although fewer on Saturdays and Sundays. Interviewers always used mobile phones and SIM cards provided by the call centre, and used Viamo's online platform for making calls and capturing interview and call data. The phone credit for the calls was also provided by Viamo.

Interviewers were instructed to make five attempts to contact an individual; a single call *attempt* could have been more than one instance of dialling the number itself within a short window of time. For example, an interviewer may have dialled a number three times in the span of five minutes and this would be counted as one attempt. Non-response was to be marked as final:

- after explicit refusal
- in case of non-eligibility of respondent
- after 2 unsuccessful call attempts: wrong number
- after 5 unsuccessful call attempts: if the number was currently not available or in case of a free signal, but no response

Instructions were also given to interviewers to always ask for the main user of the number/SIM card. If the main user was currently not available, a call-back time was to be noted and a call-back made.

As compensation for their time, respondents were offered an **incentive** in the form of phone credit, worth 170 Haitian Gourde (~ 1.30 USD). This credit was transferred to the respondent after the interview had been completed.

Data collection finished on 18 November 2023.

3.9. Accuracy and reliability

With an estimated population size of nearly 5.5 million mobile phone users in Haiti (*Table 1*) and a sample size of $n=3,402$ the **standard error for proportion estimates** is up to **0.9% for the full sample**. Region-level or district-level standard errors will be higher and will depend on the respective sub-sample sizes.

4. Quality management

4.1. Data cleaning

Because of insufficient capacity, Viamo Inc. was unable to conduct extensive data quality checks, resulting in this work being primarily conducted by Flowminder's survey team. Data cleaning included checks and edits for duplicates, ineligible mobile phone numbers, data entry errors, consistency errors, filter errors as well as outliers and highly implausible cases.

4.2. Weights

Two sets of weights are provided with the dataset. **Design weights** account for the sampling probability of respondents. For each of the Mobile Network Operators, sampling probabilities were calculated based on the number of calls placed to working numbers and the number of active phone numbers reported by the regulator (see table 1). Although the sampling was not stratified by MNO, differences in sample realisation of some MNO groups during data collection could have influenced the actual sampling probabilities. The sampling probability π_i of MNO group i can thus be written as $\pi_i = n_i/N_i$, where n_i is the total of working numbers called from MNO group i , and N_i is the total of all existing working numbers of MNO group i . The design weights d_i are then the inverse of the sampling probabilities π_i ($d_i = \pi_i/1$, see Valliant et al. 2013: 311f). These weights were transformed to normalised design weights (mean=1). The design weights can be used for calculating user-generated weights.

The **combined weights** include the design weights and further adjustments for the MNO-specific non-response rates (see Valliant et al. 2013: 316f). When response rates differ between groups - here MNO groups - this additional selection effect might influence the relative weights of cases. The MNO-specific response rates were used to create non-response adjustment factors. The combined weights were then calculated as the product of the standardised design weights and the standardised non-response adjustment factors (see table 1 and Groves et al. 2009: 352), and also normalised (mean=1). These combined weights should be used for all inferential analyses.

5. Data management and archiving

Flowminder, as the project lead and as a research-driven organisation, will keep the data for future research purposes. Requests for access to microdata (e.g. by researchers) will be handled by Flowminder.

6. Citation

Flowminder Foundation (2024). Haiti Mobile Phone Survey 2023 [Dataset]. Version 1.3.

Flowminder Foundation (2024) Methodology report for the Haiti Mobile Phone Survey 2023.

7. References

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