# Technical Report

*On*

Comparison of the 2006 NPopC Enumeration Area Frame to the 2023 NPopC Frame: Implications on Financial Inclusion Indicators since 2018

**September 2023**

## Contents

## 1.0 Background

Over the last fifteen years, EFInA has conducted the Access to Financial Services in Nigeria (A2F) survey in pursuit of our goal of providing credible market information on the Nigerian financial sector. The demand-side survey conducted biennially, provides insights into how consumers manage their financial lives. Data from the survey is used by a diverse range of stakeholders, including regulators, as a benchmark for financial inclusion in Nigeria; and by financial services providers to develop a range of relevant financial products through a better understanding of consumers' needs. We are now planning to conduct the eighth Access to Financial Services in Nigeria survey in 2023. This Terms of Reference is a request for a proposal for an independent assessment of the newly demarcated NPopC sampling frame for use in the A2F 2023 survey.

## 2.0 Objective

A retrospective review of the 2018 and 2020 financial indicators reveals shifts in financial inclusion indicators, particularly among the unbanked and underbanked populations. Financial inclusion is not just a statistic; it's a means there is still the urgent need to ensure that financial services reach every corner of our nation, benefiting individuals and communities alike.

## 3.0 Methodological Framework for the task

The methodological framework was carefully developed to provide a thorough analysis of the impact of the 2023 enumeration areas frame on the 2018 and 2019 Financial Inclusion Survey. The following measures were taken;

(a) **Data requirement**

   The two most recent cycles of cleansed data were downloaded from the project's website, followed by a brief comparison of the two downloaded datasets prior to analysis.

(b) **Enumeration Area Frame**: The frame of EAs adopted for the last two cycles of Access to Financial Services survey estimation (2019 and 2021) was sourced from the NBS methodology division, as was the newly demarcated EA frame by NPopC for Population and housing census for 2023.

(c) **Computation of sample weight:** The sample weight for the 2019 and 2021 surveys was recalculated using the new EAs frame delineated for the 2023 population and housing census. Consequently, the

survey datasets for the two years now include two distinct sample weights based on distinct methodologies (stratified and unstratified weights in relation to urban and rural areas within the state);

**i**

$$Wt_{sj} = \frac{N_s}{n_s} \cdot \frac{H_j}{h_j}$$

$Wt_{zj}$ = is the weight per EA

$N_s$ = Total number of EAs in the $s^{th}$ State

$n_s$ = Selected number of EAs in the $s^{th}$ State

$H_j$ = Total number of Subscribers listed in the $j^{th}$ EA

$h_j$ = Selected number of subscribers interviewed in the $j^{th}$ EA

**2006 EA frame**

**State weight ($Wt_{sj}$)**

**Sample Weight for Rural**

$$Wt_{sj\_rural} = \frac{N_S}{n_S} \cdot \frac{H_j}{h_j}$$

$Wt_{zj\_rural}$ = is the weight per Rural EA

$N_s$ = Total number of Rural EAs in the $s^{th}$ State

$n_s$ = Selected number of Rural EAs in the $s^{th}$ State

$H_j$ = Total number of adults (18+) listed in the $j^{th}$ Rural EA

$h_j$ = Selected number of adult (18+) interviewed in the $j^{th}$ Rural EA

**ii**

**Sample Weight for Urban**

$$Wt_{sj\_urban} = \frac{N_S}{n_S} \cdot \frac{H_j}{h_j}$$

$Wt_{zj\_urban}$ = is the weight per Urban EA

$N_s$ = Total number of Urban EAs in the $s^{th}$ State

$n_s$ = Selected number of Urban EAs in the $s^{th}$ State

$H_j$ = Total number of adults (18+) listed in the $j^{th}$ Urban EA

$h_j$ = Selected number of adult (18+) interviewed in the $j^{th}$ Urban EA

**State weight ($Wt_{sj\_rural}$, $Wt_{sj\_urban}$)**

**2023 EA frame**

(d) **Application of sample weight:** The computed sample weight was applied to the two datasets (2019 and 2020) for a fast analysis to determine whether there is a statistically significant difference between the two-weight applications on the selected project indicators based on the urban and rural split.

(e) **Simulation process**: The purpose of the simulation process was to project the results of the study indicators under the assumption that the same pattern or rate of access would be maintained while testing the impact of the proposed sample size based on the urban/rural dichotomy on the Financial Strands indicators. Based on the newly chosen samples, a different sample weight was developed and applied to the 2018 & 2020 dataset for analysis.

(f) **Sampling error estimation**: Sampling errors estimation was part of the process to further test the consistency and efficiency of the two-sampling weight on each selected project indicator across the
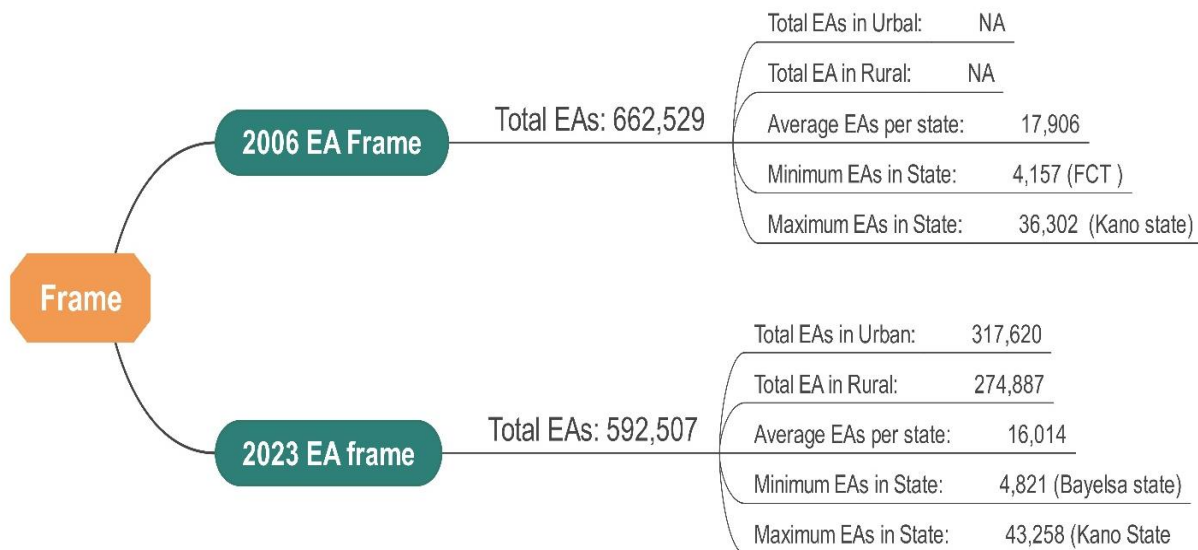
states. The estimate is to help determine; (i) Coefficient of Variation (ii) Design Effects (iii) Standard error and (iv) confidence level of the estimated proportion of the indicators.

4.0 Key Findings

The review of the sampling frame shows a high degree of discrepancies between the two frames and the effect of the application on sample weight.

From the review, it was seen that the total number of enumeration areas went down by 11%, from 662,529 in 2006 to 592,507 in 2023. Also, the 2023 EAs frame was broken down by urban and rural settlements, which wasn't done in the 2006 EAs frame. This shows that the new frame will be more useful and accurate for estimating study indicators.

*Figure 1: Breakdown of enumeration areas structure for 2006 and 2023*

| | | |
|---|---|---|
| **2006 EA Frame** | Total EAs: 662,529 | Total EAs in Urbal: NA |
| | | Total EA in Rural: NA |
| | | Average EAs per state: 17,906 |
| | | Minimum EAs in State: 4,157 (FCT ) |
| | | Maximum EAs in State: 36,302 (Kano state) |
| **Frame** | | |
| **2023 EA frame** | Total EAs: 592,507 | Total EAs in Urban: 317,620 |
| | | Total EA in Rural: 274,887 |
| | | Average EAs per state: 16,014 |
| | | Minimum EAs in State: 4,821 (Bayelsa state) |
| | | Maximum EAs in State: 43,258 (Kano State |

Impact of 2023 enumeration areas frame on 2018 and 2020 survey indicators

After using the 2023 enumerations areas frame to compute sample weight and applied on 2018 and 2020 survey dataset, the following were observed;

## 4.1 Effect of Sample Weight application on Study Indicator's performance

One of the objectives of the analysis is to determine the impact of the recently delineated enumeration areas frame for the 2023 Housing and Population Census on the 2018 and 2020 Financial Inclusion Surveys. Four financial access strands (Banked, Other formal, informal and excluded) were observed during the analysis with the application of the sample weight computed with the new EA frame.

The percentage difference between the sample weight application effects on 2018 and 2020 survey data is depicted in the graph below. Access to banks increased by 13% in both 2018 and 2020, while access to other formal institutions decreased by 11% in 2018 and 17% in 2020. In 2018 and 2020, the efficacy of access to the informal and excluded population declined by 13% and 21%, respectively.

*Figure 2: Percentage effect of sample weight computed using 2023 EA frame on 2018 and 2020 survey data*
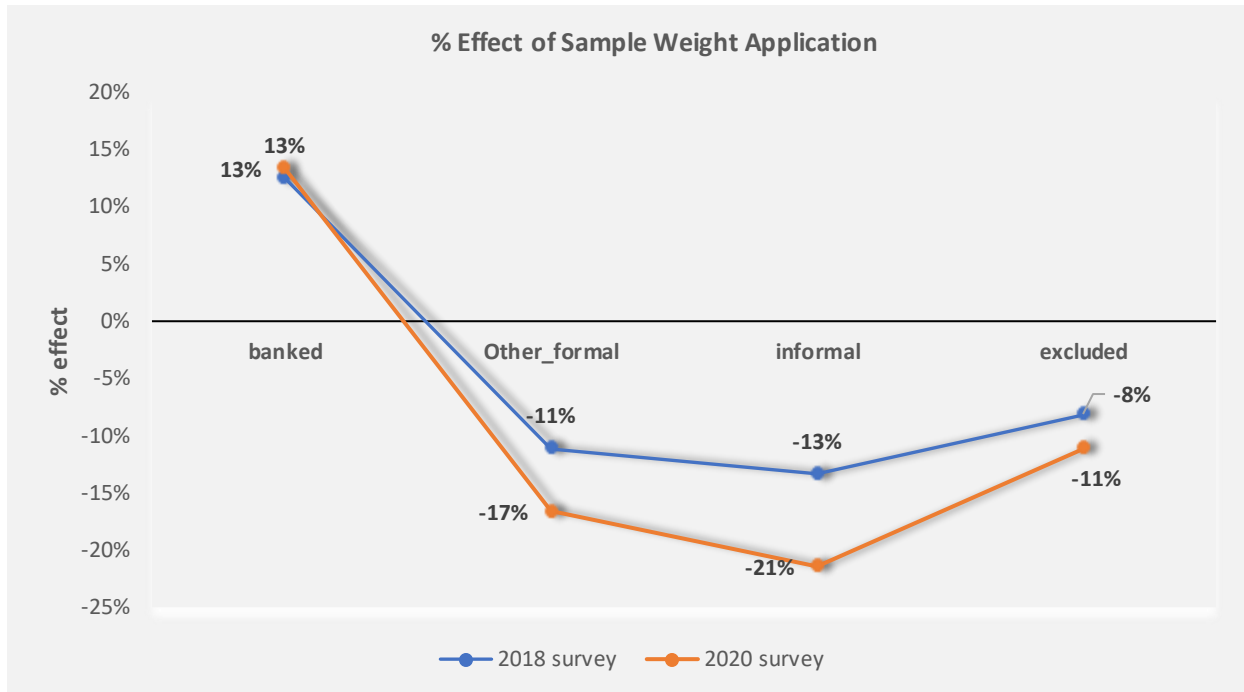
## 4.2 Effect of Weight Application using 2023 EA Frame on Financial Strand Indicators

The 2023 enumeration areas were used to re-calculate sample weight for the two last cycle of survey for financial access inclusion to determine the rate of effect on the selected project indicators.

### 4.2.1 Overall outcome for the 2018 survey data:

The application of sampling weight calculated using the 2023 EA frame to 2018 survey data for analysis reveals a substantial change in the performance of the study's indicators.

The graph below demonstrates a substantial disparity between the application of sample weight calculated using the 2006 EA frame and the 2023 Frame to 2018 survey data. Bank access has increased to 45% (44.8 million) from 40% (39.8 million) in the 2006 EA frame. Excluded individuals decreased from 37% (36.8 million) to 34% (33.8 million).

*Figure 3: Outcome of 2018 survey indicators as a result of application of sample weight using 2006 vs 2023 EA frame*
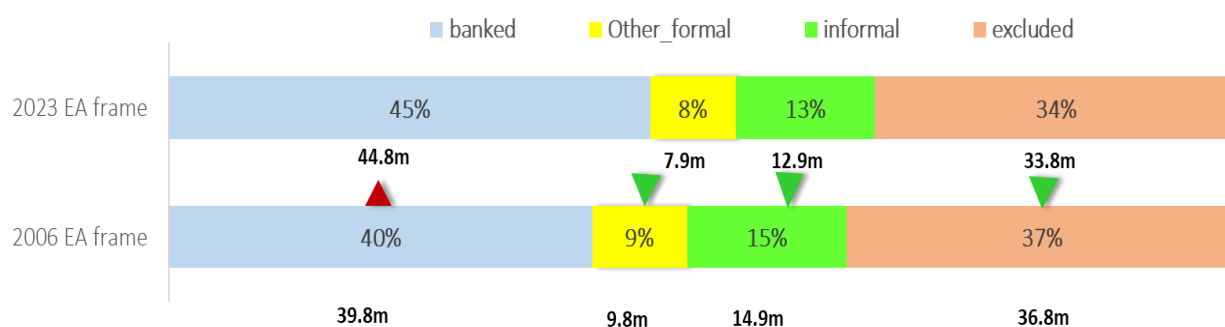
## 4.2.2 Outcome for the 2018 survey data for urban and rural split:

Based on the impact of applying sample weight utilizing 2023 enumeration areas, table 1 below revealed the differences between the urban and rural split. The red arrowhead denotes a decline in the indicator's value, while the green arrowhead denotes a rise.

*Table 1: Effect of 2023 EAs frame on Urban and Rural Split for 2018 Survey Data*

| | Financial Access Strands | | 2006 EA frame | | 2023 EA frame |
|---|---|---|---|---|---|
| **Urban** | banked | ▲ | 61% | ▼ | 60% |
| | Other_formal | ▲ | 6% | ▲ | 6% |
| | informal | ▲ | 12% | ▼ | 11% |
| | excluded | ▲ | 22% | ▲ | 22% |
| **Rural** | banked | ▲ | 28% | ▼ | 23% |
| | Other_formal | ▲ | 11% | ▼ | 10% |
| | informal | ▲ | 16% | ▲ | 16% |
| | excluded | ▼ | 46% | ▲ | 50% |

**Urban indicators:** According to the use of the sample weight derived using the 2023 EA frame, the access to banked decreases by 1 point, from 61% to 60%, in the preceding table. With the exception of excluded from access and other formal banking, which maintained their respective values of 6% and 22%, access to informal banking likewise decreased by a point.

**Rural Indicators:** According to the application of weight using the 2023 EA frame, there were considerable changes in access to banks, which went from 28% to 23%. Access to other formal banking also decreased by 1%, from 11% to 10%. The percentage of exclusion from the banking industry rose from 46% to 50%.

## The outcome of 2020 survey data:

Figure 3 shows a clear disparity between the application of sample weight using 2023 and 2006 EA frames on the 2020 survey data. Banke access moved to 51% (54.2 million) from 45% (47.7 million), and access to informal banking also changed from 14% (14.8) to 11% (11.6 million)

*Figure 4: Outcome of 2020 survey indicators as a result of application of sample weight using 2006 vs 2023 EA frame*
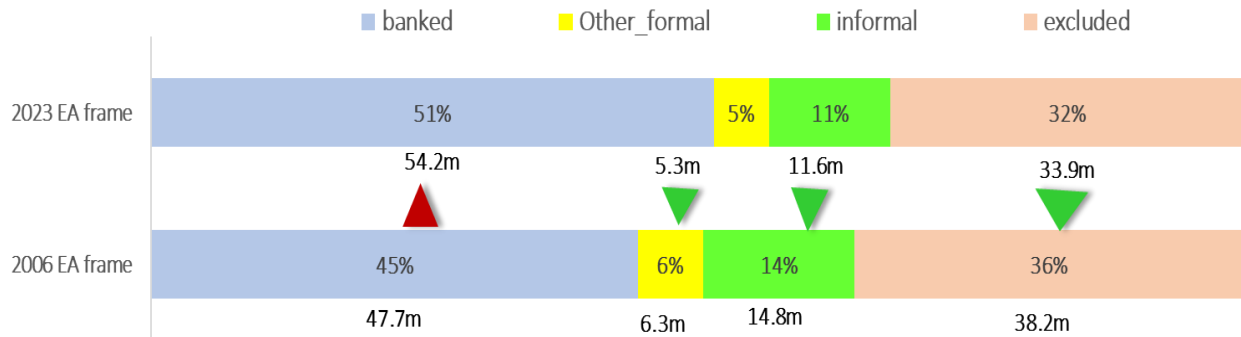
Outcome for the 2020 survey data for urban and rural split:

*Table 2: Effect of 2023 EAs frame on Urban and Rural Split for 2020 Survey Data*

| | Financial Access Strands | | 2006 EA frame | | 2023 EA frame |
|---|---|---|---|---|---|
| **Urban** | banked | ▼ | 66% | ▲ | 67% |
| | Other_formal | ▲ | 5% | ▼ | 4% |
| | informal | ▲ | 9% | ▲ | 9% |
| | excluded | ▲ | 20% | ▲ | 20% |
| **Rural** | banked | ▲ | 34% | ▼ | 29% |
| | Other_formal | ▲ | 6% | ▲ | 6% |
| | informal | ▲ | 16% | ▼ | 15% |
| | excluded | ▼ | 44% | ▲ | 50% |

**Urban:** According to the table above, there are no significant changes on the performance of financial strands indicators based on the application of sample weight computed using 2006 and 2023 EA frame. Access to banking increase by 1% from 66% to 67%, this also include access to other-formal banking which also dropped by 1% from 5% to 4%. Other indicators such as access to informal banking and excluded are stable at 9% and 20%.

**Rural:** Access to banking dropped from 34% to 29% with the application of sample weight using 2006 and 2023 EA frame. Access to other formal banking maintained 6% for both application of sample weight. Access to formal declined by 1% and excluded from financial banking increased by 6% from 44% to 50%.

Figure 5: Effect of sample weight using 2023 EA frame on wealth quintiles vs Financial Access Strand Indicators
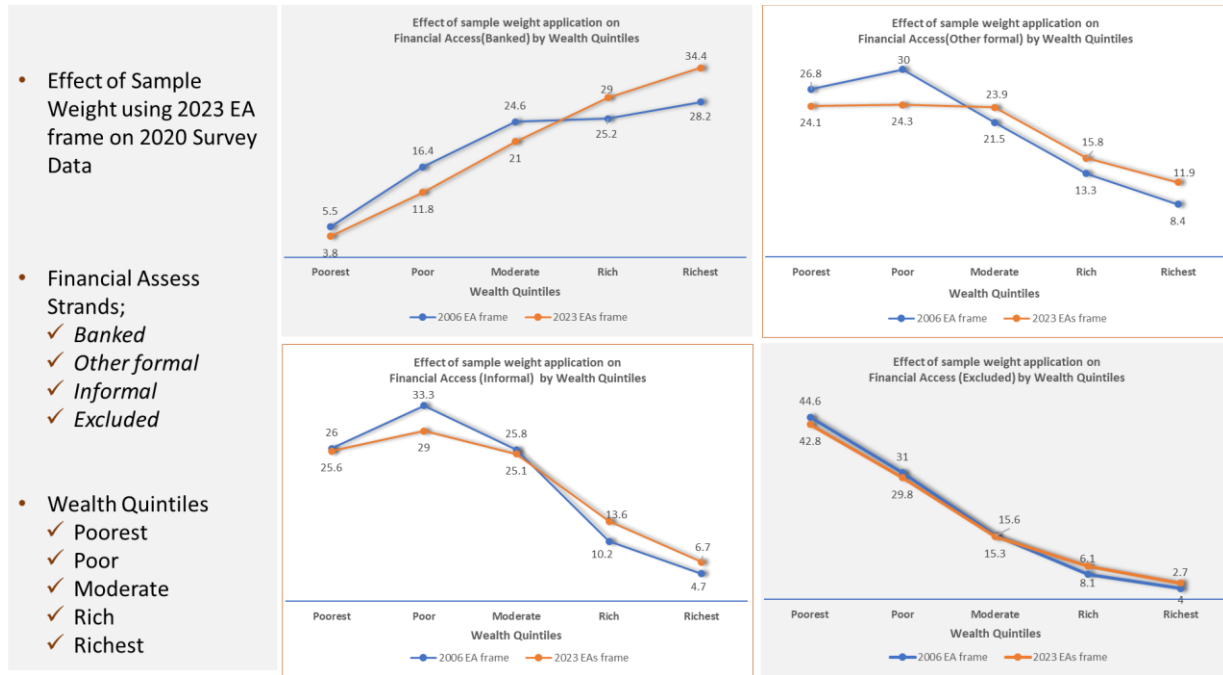
Table 3: Out of effect of sample weight application Financial Strand Indicators - Kaduna deep dive 2020 survey data



|  | 2006 Frame | 2023 Frame |
|---|---|---|
| excluded | 55.2 | 55.1 |
| informal | 6.6 | 6.1 |
| other_formal | 5.1 | 5.2 |
| banked | 33.1 | 33.6 |

Effect of Sample Weight Application using 2023 EA Frame on Financial Strand Indicators – Kaduna deep dive 2020. The outcome of the analysis shows no significant different observed on effect of sample weight application Financial Access Strands performance recorded.

*Figure 6: Effect of Weight Application using 2023 EA Frame on Financial Strand Indicators-Urban/Rural Split*

### Effect of Sample weight on Urban split



|  | banked | other_formal | informal | excluded |
|---|---|---|---|---|
| urban-2006 frame | 48.6 | 4.7 | 6.0 | 40.8 |
| urban_2023 frame | 45.9 | 4.9 | 5.9 | 43.3 |

urban-2006 frame    urban_2023 frame
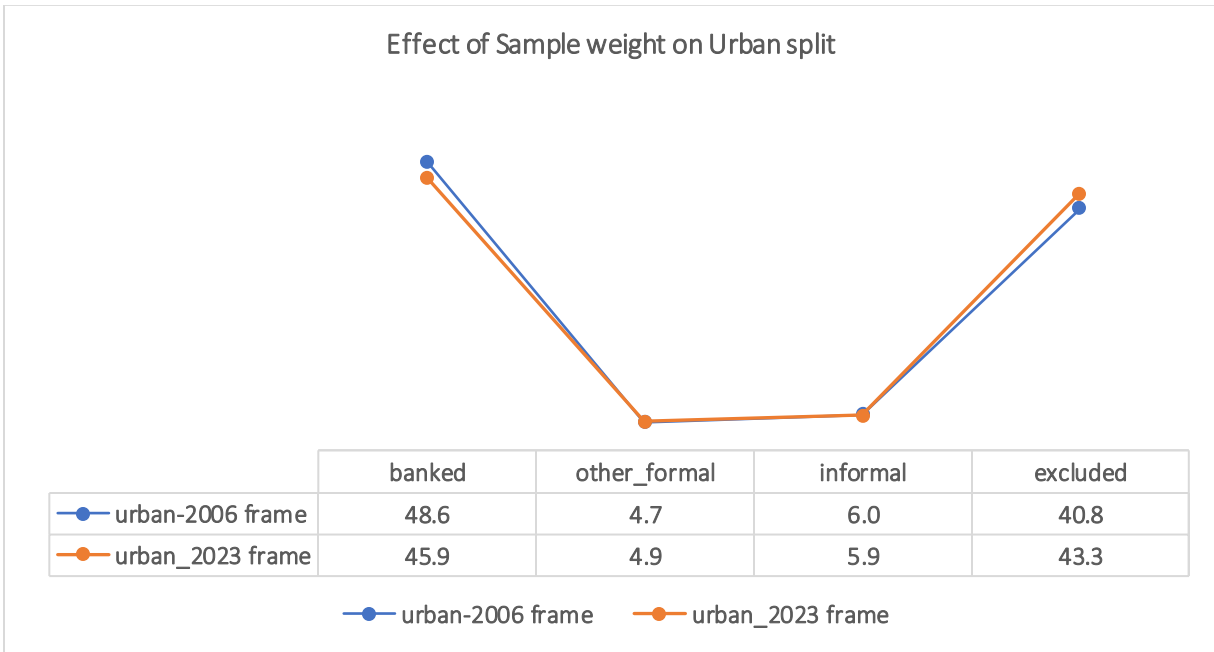
The chart shows the effect of sample weight application on 2020 survey data deep dive using 2006 and 2023 EA frames. It was observed that, there is significant change in access to banking institutions with 2.7% drop from 48.6% to 45.9%, financial exclusion increased by 2.5% from 40.8% to 43.3%.

**Effect of Sample weight on Rural split**

|  | banked | other_formal | informal | excluded |
|---|---|---|---|---|
| rural_2006 frame | 26.0 | 5.2 | 6.9 | 61.9 |
| rural_2023 frame | 25.5 | 5.4 | 6.2 | 62.9 |

rural_2006 frame     rural_2023 frame
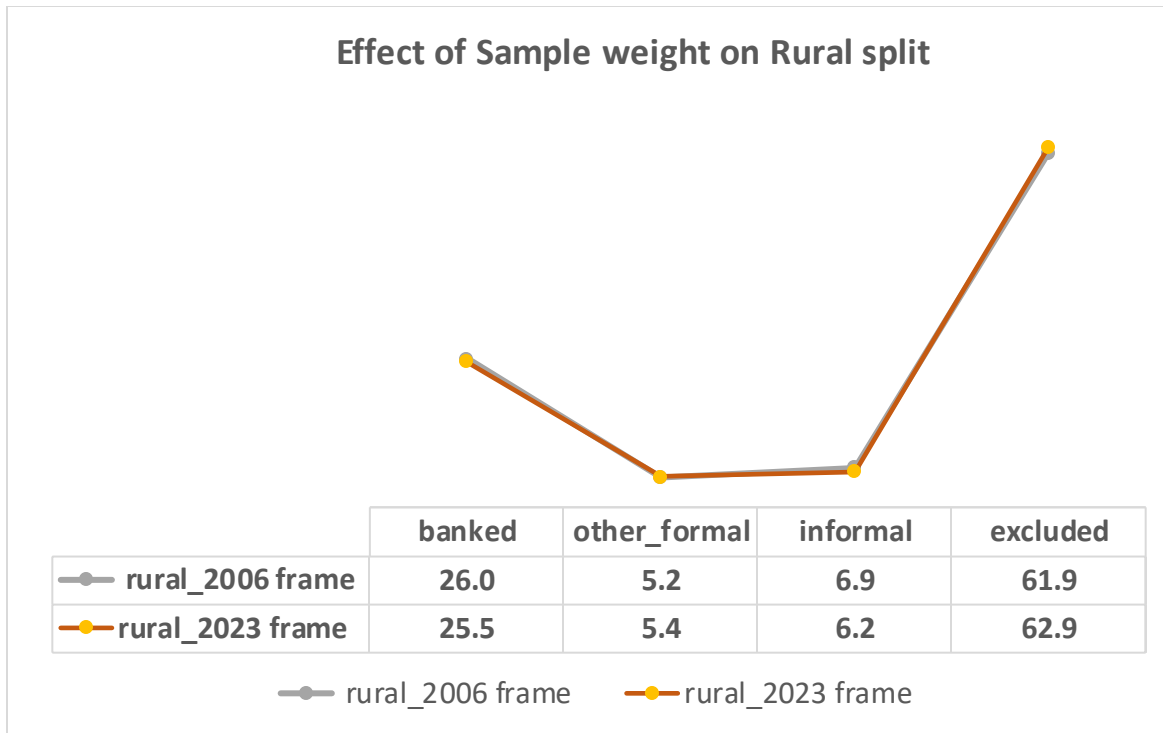
The above shows that, there is no significant change in financial access strand indicators based on the application of sample weight calculated using 2023 EA frame on rural split.

## 5. 0 Conclusion

The 2023 sample frame ensures that we can accurately measure the progress of our financial inclusion initiatives, allowing us to track our success and adjust strategies as needed. This makes the data appropriate for decision-making.

**Appendix**

| Sampling Error Estimate for 2020 survey with application of 2006 EA frame for Sample weight | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Standard | 95% Confidence Interval | | Coefficient of | Design | | Unweighted |
| | Estimate | Error | Lower | Upper | Variation | Effect | Population Size | Count |
| **Overall** | | | | | | | | |
| banked | 0.45 | 0.003 | 0.44 | 0.46 | 0.01 | 1.327 | 106,191,482 | 27938 |
| Other_formal | 0.06 | 0.002 | 0.05 | 0.06 | 0.03 | 1.571 | 106,191,482 | 27938 |
| informal | 0.14 | 0.002 | 0.13 | 0.14 | 0.02 | 1.324 | 106,191,482 | 27938 |
| excluded | 0.36 | 0.003 | 0.35 | 0.37 | 0.01 | 1.249 | 106,191,482 | 27938 |
| **Urban** | | | | | | | | |
| banked | 0.66 | 0.007 | 0.65 | 0.68 | 0.01 | 1.896 | 36,489,341 | 7641 |
| Other_formal | 0.05 | 0.003 | 0.04 | 0.05 | 0.07 | 2.038 | 36,489,341 | 7641 |
| informal | 0.09 | 0.004 | 0.09 | 0.1 | 0.04 | 1.829 | 36,489,341 | 7641 |
| excluded | 0.2 | 0.006 | 0.19 | 0.21 | 0.03 | 1.852 | 36,489,341 | 7641 |
| **Rural** | | | | | | | | |
| banked | 0.34 | 0.004 | 0.33 | 0.34 | 0.01 | 1.149 | 69,702,141 | 20297 |
| Other_formal | 0.06 | 0.002 | 0.06 | 0.07 | 0.03 | 1.393 | 69,702,141 | 20297 |
| informal | 0.16 | 0.003 | 0.15 | 0.16 | 0.02 | 1.169 | 69,702,141 | 20297 |
| excluded | 0.44 | 0.004 | 0.43 | 0.45 | 0.01 | 1.142 | 69,702,141 | 20297 |

| Sampling Error Estimate for 2020 survey with application of 2023 EA frame for Sample weight | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Standard | 95% Confidence Interval | | Coefficient of | Design | Population | Unweighted |
| | Estimate | Error | Lower | Upper | Variation | Effect | Size | Count |
| **Overall** | | | | | | | | |
| banked | 0.51 | 0.005 | 0.5 | 0.52 | 0.01 | 2.774 | 106,220,779 | 27938 |
| Other_formal | 0.05 | 0.002 | 0.05 | 0.06 | 0.04 | 2.877 | 106,220,779 | 27938 |
| informal | 0.11 | 0.003 | 0.11 | 0.12 | 0.03 | 2.144 | 106,220,779 | 27938 |
| excluded | 0.32 | 0.004 | 0.31 | 0.33 | 0.01 | 2.35 | 106,220,779 | 27938 |
| **Urban** | | | | | | | | |
| banked | 0.67 | 0.007 | 0.66 | 0.69 | 0.01 | 4.131 | 62,367,033 | 7641 |
| Other_formal | 0.04 | 0.003 | 0.04 | 0.05 | 0.08 | 4.558 | 62,367,033 | 7641 |
| informal | 0.09 | 0.004 | 0.08 | 0.1 | 0.05 | 3.521 | 62,367,033 | 7641 |
| excluded | 0.2 | 0.006 | 0.18 | 0.21 | 0.03 | 4.069 | 62,367,033 | 7641 |
| **Rural** | | | | | | | | |
| banked | 0.29 | 0.004 | 0.28 | 0.3 | 0.01 | 0.979 | 43,853,747 | 20297 |
| Other_formal | 0.06 | 0.002 | 0.06 | 0.07 | 0.04 | 1.19 | 43,853,747 | 20297 |
| informal | 0.15 | 0.003 | 0.14 | 0.15 | 0.02 | 0.883 | 43,853,747 | 20297 |
| excluded | 0.5 | 0.005 | 0.49 | 0.51 | 0.01 | 0.981 | 43,853,747 | 20297 |

### Sampling Error Estimate for 2018 survey with application of 2006 EA frame for Sample weight

| | Estimated value | Standard Error | 95% Confidence Interval | | Coefficient of Variation | Design Effect | Population Size | Unweighted Count |
|---|---|---|---|---|---|---|---|---|
| | | | Lower | Upper | | | | |
| **Overall** | | | | | | | | |
| banked | 0.40 | 0.005 | 0.39 | 0.41 | 0.012 | 2.402 | 99,653,461 | 27,470 |
| Other_formal | 0.09 | 0.003 | 0.08 | 0.09 | 0.03 | 2.366 | 99,653,461 | 27,470 |
| informal | 0.15 | 0.003 | 0.14 | 0.15 | 0.023 | 2.489 | 99,653,461 | 27,470 |
| excluded | 0.37 | 0.004 | 0.36 | 0.38 | 0.012 | 2.125 | 99,653,461 | 27,470 |
| **Urban** | | | | | | | | |
| banked | 0.61 | 0.009 | 0.59 | 0.62 | 0.015 | 3.656 | 36,561,859 | 7,617 |
| Other_formal | 0.06 | 0.005 | 0.05 | 0.07 | 0.082 | 4.171 | 36,561,859 | 7,617 |
| informal | 0.12 | 0.006 | 0.11 | 0.13 | 0.053 | 3.886 | 36,561,859 | 7,617 |
| excluded | 0.22 | 0.008 | 0.2 | 0.23 | 0.036 | 3.523 | 36,561,859 | 7,617 |
| **Rural** | | | | | | | | |
| banked | 0.28 | 0.004 | 0.27 | 0.28 | 0.016 | 1.739 | 63,091,602 | 19,853 |
| Other_formal | 0.11 | 0.003 | 0.1 | 0.11 | 0.029 | 1.791 | 63,091,602 | 19,853 |
| informal | 0.16 | 0.004 | 0.15 | 0.17 | 0.024 | 1.853 | 63,091,602 | 19,853 |
| excluded | 0.46 | 0.005 | 0.45 | 0.47 | 0.011 | 1.651 | 63,091,602 | 19,853 |

### Sampling Error Estimate for 2018 survey with application of 2023 EA frame for Sample weight

| | Estimate | Standard Error | 95% Confidence Interval | | Coefficient of Variation | Design Effect | Population Size | Unweighted Count |
|---|---|---|---|---|---|---|---|---|
| | | | Lower | Upper | | | | |
| **Overall** | | | | | | | | |
| banked | 0.45 | 0.006 | 0.44 | 0.46 | 0.013 | 3.787 | 99,646,298 | 27470 |
| Other_formal | 0.08 | 0.003 | 0.07 | 0.09 | 0.038 | 3.465 | 99,646,298 | 27470 |
| informal | 0.13 | 0.004 | 0.13 | 0.14 | 0.03 | 3.833 | 99,646,298 | 27470 |
| excluded | 0.34 | 0.005 | 0.33 | 0.35 | 0.016 | 3.482 | 99,646,298 | 27470 |
| **Urban** | | | | | | | | |
| banked | 0.6 | 0.009 | 0.58 | 0.62 | 0.015 | 5.306 | 58,453,524 | 7617 |
| Other_formal | 0.06 | 0.005 | 0.05 | 0.07 | 0.076 | 6.113 | 58,453,524 | 7617 |
| informal | 0.11 | 0.006 | 0.1 | 0.13 | 0.052 | 5.642 | 58,453,524 | 7617 |
| excluded | 0.22 | 0.007 | 0.21 | 0.24 | 0.033 | 5.126 | 58,453,524 | 7617 |
| **Rural** | | | | | | | | |
| banked | 0.23 | 0.004 | 0.22 | 0.24 | 0.019 | 1.285 | 41,192,773 | 19853 |
| Other_formal | 0.1 | 0.003 | 0.1 | 0.11 | 0.03 | 1.209 | 41,192,773 | 19853 |
| informal | 0.16 | 0.005 | 0.15 | 0.17 | 0.03 | 1.942 | 41,192,773 | 19853 |
| excluded | 0.5 | 0.006 | 0.49 | 0.51 | 0.013 | 1.788 | 41,192,773 | 19853 |