Demography India
Vol. 48, No. 1 (2019), pp. 63-73 ISSN 0970-454X

Estimation of District Level TFR of Eight EAG States and Assam from NFHS-4, 2015-16

A.A. Jayachandran*[1] and Faujdar Ram[2]

Abstract: Measuring district level total fertility rate is an important activity as the progress of district level health interventions need to be monitored from time to time. The third round of Annual Health Survey conducted in 2012-13 estimated the fertility rates for districts of eight EAG states and Assam and these estimates are the latest official fertility rates for districts available until now. This paper tried to address the information gap exist in the country by directly estimating district level total fertility rates in these states. Using the birth histories data of the latest round of NFHS-4 conducted in 2015-16, *and the STATA tfr 2* procedure we directly estimated district level fertility rate for eight EAG states and Assam and presented along with confidence interval. Results obtained in such exercise are likely to be useful for programme monitoring of Government sponsored flagship programmes like Mission Parivar Vikas implemented by Ministry of Health & Family Welfare and Aspirational Districts Programme implemented by NITI Aayog. The paper also suggests to consider these estimates as baseline levels and urge forthcoming series of NFHS to produce district level fertility rates.

Keywords: TFR, NFHS, MoHFW, Mission Parivar Vikas programme and EAG states.

Introduction

The Total Fertility Rate (TFR, number of children a woman would have by end of the reproductive age experiencing current fertility rate) is the most significant demographic indicator in the analysis of the impact of national population programmes in particular, family planning programmes, on reproductive behaviour. This indicator is one of the impact indicators in health sector and measuring its levels and trends helps policy makers and programme managers to take corrective measures when necessary. Lately, National health programmes were designed to take district level approach which purports measuring district level TFR (e.g., Mission Parivar Vikas initiative[3] by MoHFW and Aspirational Districts Programme by NITI Aayog).

Conventionally, TFR is measured using data from Civil Registration System (CRS) and Vital Statistics Systems (UNFPA, 2013). Data from CRS could provide the TFR even at district or below district level required for monitoring performance of local interventions. Further, TFR would be available on real time basis. In India, Sample Registration System (SRS) initiated in 1969-70 on full scale as stop gap arrangement until CRS improves, provides TFR at national level and for bigger states only on annual basis. Seldom we use CRS data to estimate TFRs because of its non-availability and data quality of coverage and completeness. Census is another source to estimate TFR, but it is available once in 10 years and its quality is also

* Corresponding author
[1] Senior Technical Advisor, Track20 Project, Avenir Health, New Delhi. E.Mail: preejayan@gmail.com
[2] Senior Adviser, Population Council, New Delhi

[3] Ministry of Health and Family Welfare, D.O. No. N. 11023/2/2016-FP issued by Mr Arun Kumar Panda, IAS, Additional Secretary, NHM, GoI on 10th November 2016 to all Principal Secretaries/Secretaries (Health and Family Welfare) of all States and UTs provides the details of this initiative. (Ref: http://www.nhmmp.gov.in/WebContent/FW/Scheme/Scheme2017/Mission_Parivar_Vikas.pdf).

suspected. Previously, researchers attempted to indirectly estimate district level TFRs using Indian Census data (Bhat, 1996; RGI, 1997; Drèze and Murthi, 2001; Guilmoto and Rajan, 2002; Satyanarayana and Kumar, 2012; Guilmoto and Rajan, 2013; Mohanty and Rajbhar, 2014; Akash and Ponnapalli, 2017; Ponnapalli and Soren, 2018). Indirect methods are developed under certain assumptions which may affect the estimates and that may be the reason for getting different estimates even when same data set is used.

This leaves us the only source to directly estimate TFRs at district level is surveys. Towards this, Annual Health Surveys – AHS (3 waves conducted between 2010 and 2013) provided TFRs continuously for three years at district level for eight Empowered Action Group (EAG) states (Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand) and Assam (ORGI, 2011). Third round of AHS conducted in the year 2012-13 was the last in the series in which district level estimates of TFRs are reported for these nine states. Since then TFRs at district level are not available for any state.

By considering district level sample sizes, the latest round of National Family Health Survey - NFHS - (IIPS and ICF, 2017) conducted in 2015-16 which could have provided a base line fertility level for all the districts has not provided fertility rate at district level in the district fact sheets. More importantly, the decision not to include the TFR and some other maternal and child health indicators in the NFHS-4 district fact sheets is not known but the sample size may be one of the reasons. All the indicators reported in the NFHS-4 district fact sheets have rural/urban classification to conform uniformity in reporting list of indicators. Certainly, smaller sample sizes in districts could be inadequate to estimate fertility rates separately for rural/urban or even for "total" in some states. Nonetheless, fertility rates for a district can be directly computed and point estimates with respective confidence intervals will be important elements in monitoring district level health programmes.

Main objectives of this paper are: i) to present the results of district level TFR of eight EAG states and Assam that are directly estimated from NFHS-4 (2015-16) and ii) initiate a discussion among policy makers, health programme managers, researchers and academicians on the necessity to routinely publish district level TFR by the forthcoming rounds of NFHS.

Data and Methodology

We used NFHS-4 data of birth histories to directly estimate district level TFR and associated confidence intervals for districts of eight EAG states and Assam with the help of *STATA tfr2* procedure (Schoumaker, 2013). Stata command *tfr2* helps to analyze birth history data directly drawn from DHS types of surveys like World Fertility Surveys and Multi Indicator Cluster Surveys. This command is designed to be more flexible, versatile and user friendly rather than a software program. Its calculation involves three step – i) the computation of age-specific fertility rates and TFRs with respective standard errors, ii) the reconstruction of fertility trends and iii) the estimation of fertility differentials.

While estimating TFRs, in the present paper we used the DHS standard definition – "the average number of children a woman would have by the end of childbearing period if she bore children at the current age specific pattern of fertility rates. Age specific fertility rates are calculated for the three years preceding the survey, based on detailed birth histories provided by women". Fertility rates can also be estimated using births occurred during more than 36 months (3 years) preceding the survey, which are likely to be resulted in slightly higher fertility rates with shorter confidence intervals (CI). As a standard practice, any point estimates are to

be presented with CIs around it as they are important to consider when generalizing the results. Hence, district level TFRs are accompanied by corresponding 95% CIs are presented in this paper.

Additionally, we used Kenya DHS (2014) data to generate TFRs at the subnational level using *Statcompiler*, an online tool to generate tables from DHS datasets to establish the point that under similar scenarios, TFRs are published at subnational level elsewhere.

Results

District wise TFR with confidence intervals for all the districts of eight EAG states and Assam are shown in the Appendix Table 1. Current exercise indicates that it is possible to estimate district level TFR directly from the NFHS-4 data however, one needs to take associated confidence interval in consideration while interpreting the data.

We observe significant variations in district level fertility within state. Table 1 provides the details of minimum and maximum fertility rates at district level. Uttar Pradesh shows the maximum variation in fertility between districts as TFR in Lucknow is recorded at 1.58 while district Shrawasti measured TFR of 4.4. Districts in Odisha and Uttarakhand show the minimum difference in highest and lowest fertility rates. Table 1 and table in Appendix Table1 suggest that many districts in these eight EAG and Assam states have recorded less than replacement level of fertility (TFR=2.1) except for Bihar where the lowest TFR is estimated at 2.55 in Gopalganj district.

Table 1: Districts with lowest and highest TFRs in Nine States, NFHS-4, 2015-16

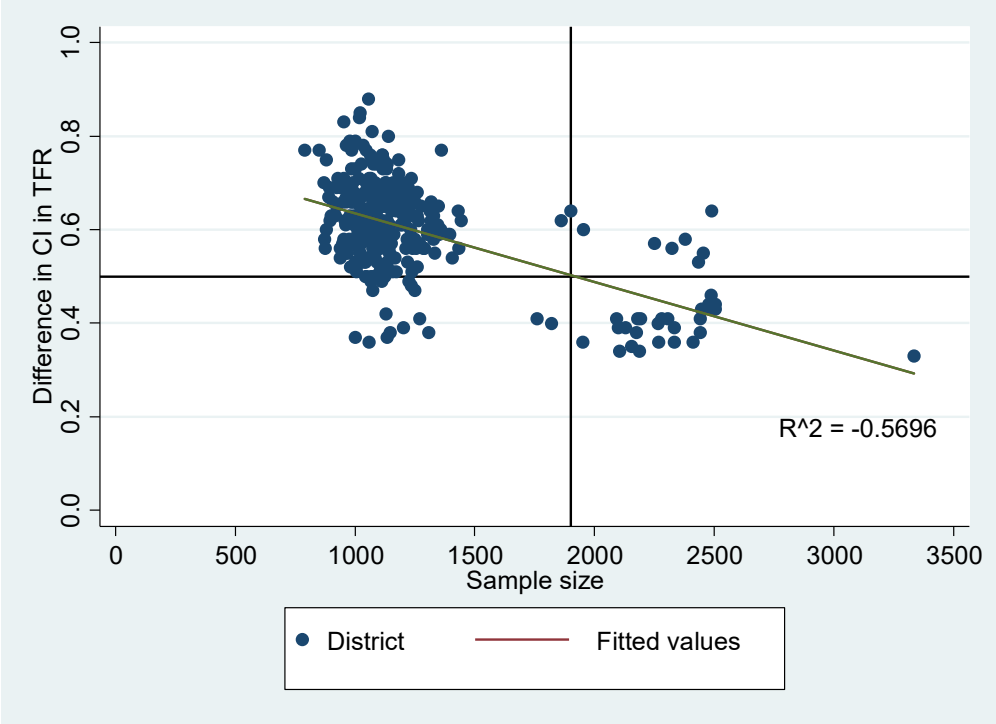
Sr No	State	District	TFR	District	TFR
1	Assam	Jorhat	1.57	Marigaon	2.97
2	Bihar	Gopalganj	2.55	Sheohar	4.27
3	Chhattisgarh	Janjgir-Champa	1.69	Bilaspur	2.71
4	Jharkhand	Purbi Singhbhum	1.65	Sahibganj	3.55
5	Madhya Pradesh	Seoni	1.79	Alirajpur	3.52
6	Odisha	Jharsuguda	1.56	Malkangiri	2.83
7	Rajasthan	Kota	1.72	Barmer	3.61
8	Uttar Pradesh	Lucknow	1.58	Shrawasti	4.40
9	Uttarakhand	Dehradun	1.49	Haridwar	2.78

TFR: Total fertility rate, expressed per woman. Rates are estimated for the period 1-36 months preceding the survey (approximately, 2013-15 for NFHS-4).
Source: Compiled from Appendix Table 1.

Sample size and width of 95% confidence intervals (CI) of estimated TFR

Figure 1 is a scatter diagram plotted between district sample size (on X-axis) and width of 95% CI of district TFR (on Y-axis). These two variables are modestly correlated with an R^2 value of -0.57. A large proportion of districts is clustered in the first quadrant with sample size ranges between 900 and 1500 with varying CI of TFR ranges between 0.4 and 0.9.

Figure 1 District level sample size and difference in CI in TFR for 8 EAG states, NFHS-4, 2015-16



Validation

Demographic and Health Survey (DHS) Program has collected, analysed and disseminated accurate and representative data on population, health, HIV, and nutrition through more than 300 surveys in over 90 countries, including India series of NFHS. In few countries DHS has published TFR estimates with smaller sample size. For example, the Kenya 2014 DHS has published TFR estimates at regional and county levels (Appendix Table 2) with a sample size and TFR that are quite similar to most of the district level sample size and TFR in EAG states of India. Fertility rates in Counties representing the Central Region of Kenya are found to be matched with the fertility rates of districts of most of the EAG states and these fertility rates are estimated and officially published in the DHS report for Kenya. This validates that even with a smaller or similar sample sizes, it is possible to estimate TFR from NFHS-4 data set at district level with reasonably smaller confidence interval.

Discussion and conclusion

Real-time monitoring is now the essence of most of the Government sponsored flagship programmes. Monitoring at district level has become priority as most of the health and other developmental programmes are now being implemented with district focus approach, e.g., MPV programme by the Ministry of Health and Family Welfare and "Transformation of Aspirational Districts" programme, which is recently launched and implemented by NITI Aayog[4].

[4] For this programme, 115 districts are identified covering 28 states in India. This programme was launched in January 2018. More details are available on: *https://niti.gov.in/content/about-aspirational-districts-programme*

The main purpose of this article is to highlight the paucity of data in estimating district level TFR, the last being reported six years ago by AHS-3 in 2012-13 in the country and increasingly important as different Government agencies are shown interest to measure the progress of the programmes in recent years. Kenya results show that DHS publishes TFRs for subnational geographic units with near-similar sample sizes and fertility levels compared with many districts of nine EAG states and Assam, presented here in this paper. NFHS-4 provides good opportunity to explore direct estimation of district level TFR with reasonably good confidence interval which can be considered now as the baseline TFR and would be able to measure the changes in fertility levels at districts when NFHS-5 results are available in two years from now. Thus, it is highly appropriate that forthcoming rounds of NFHS report district level TFR to assist MoHFW in monitoring the progress of various health programmes.

Acknowledgment

We would like to acknowledge John Stover, Avenir Health, USA and Fred Arnold, ICF, USA who encouraged us to use NFHS-4 data to estimate district level TFRs by focussing on confidence intervals in the districts with a relatively small number of female respondents while interpreting the results.

References

Akash K. and Ponnapalli, K.M., 2017, Reverse Survival Estimation of the TFR Overtime: India, States and Districts, *Janasamkhya*, XXXV: 80-98.

Bhat P. N.M., 1996, Contours of fertility decline in India: A district level study based on the 1991 Census," in K Srinivasan (ed), *Population Policy and Reproductive Health*, New Delhi: Hindustan Publishing Corporation.

Drěze, Jean and Murthi, Mamta, 2001, Fertility, Education, and Development: Evidence from India, *Population and Development Review*, 27(1): 33-63.

Guilmoto, Christophe Z and Rajan, S. Irudaya, 2002, District level estimates of fertility from India's 2001 Census, *Economic and Political Weekly*, 37(7): 713-738.

Guilmoto, Christophe Z and Rajan, S. Irudaya, 2013, Fertility at the district level in India, *Economic and Political* Weekly, 48(23): 59-70.

International Institute for Population Sciences (IIPS) and ICF, 2017, National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS.

Satyanarayana, K.M. and Kumar, Sanjay, 2012, District-level estimates of fertility and implied sex ratio at birth in India, *Economic and Political Weekly*, 47(33): 66-72.

Mohanty, Sanjay K and Rajbhar, Mamta, 2014, Fertility transition and adverse child sex ratio in districts of India, *Journal of Biosocial Science*, 46(6): 753-771.

Office of Registrar General, India, 2011, Annual Health Survey (AHS) in 8 EAG States and Assam – Release of AHS Bulletin: 2010-11, *Press Release*, Ministry of Home Affairs, New Delhi. weblink: *http://www.censusindia.gov.in/vital_statistics/AHSBulletins/files/AHSpr.pdf.*

Ponnapalli, K.M. and Soren, R.K., 2018, Indirect Estimation of Selected Measures of Fertility and Marital Fertility from Information on CWR (0-9): An Application to India/States/Districts", *Momona Ethiopian Journal of Science,* 10 (1): 89 - 108.

Registrar General of India, 1997, District level estimates of fertility and child mortality for 1991 and their interrelations with other variables, Occasional paper No 1 of 1997, New Delhi: Controller of Publications.

Schoumaker, Bruno, 2013, A State module for computing fertility rates and TFRs from birth histories: tfr2, *Demographic Research*, 28(38): 1093-1144.

UNFPA, 2013, The UNFPA Strategic Plan, 2014−2017, Report of the Executive Director, United Nations Fund for Population Activities, New York.

Appendix Table 1: District level total fertility rate directly estimated from NFHS-4 with associated confidence intervals and sample size (*number of female respondents*)

1. Assam

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Baksa	2.02	1.76	2.29	1,044
2	Barpeta	2.36	2.07	2.66	1,092
3	Bongaigaon	2.21	1.92	2.50	1,005
4	Cachar	2.29	1.99	2.59	1,044
5	Chirang	2.53	2.22	2.85	996
6	Darrang	2.38	2.07	2.68	1,087
7	Dhemaji	2.29	2.01	2.57	1,106
8	Dhubri	2.80	2.47	3.13	994
9	Dibrugarh	1.71	1.46	1.96	1,093
10	Goalpara	2.81	2.48	3.14	984
11	Golaghat	1.73	1.48	1.98	1,043
12	Hailakandi	2.64	2.31	2.96	1,089
13	Jorhat	1.57	1.33	1.80	1,073
14	Kamrup	1.74	1.50	1.99	1,112
	Kamrup				
15	Metropolitan	1.59	1.32	1.86	1,085
16	Karbi Anglong	2.25	1.95	2.55	881
17	Karimganj	2.78	2.47	3.09	1,014
18	Kokrajhar	2.18	1.89	2.48	1,141
19	Lakhimpur	2.16	1.87	2.44	980
20	Marigaon	2.97	2.64	3.31	1,065
21	Nagaon	2.83	2.49	3.17	1,073
22	Nalbari	1.89	1.63	2.15	1,006
	North Cachar				
23	Hills	2.59	2.26	2.93	1,103
24	Sibsagar	1.89	1.62	2.16	1,054
25	Sonitpur	1.70	1.45	1.95	1,073
26	Tinsukia	1.96	1.70	2.22	1,127
27	Udalguri	2.12	1.83	2.40	1,083

2. Bihar

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Araria	3.93	3.56	4.30	1,133
2	Arwal	3.26	2.94	3.59	1,275
3	Aurangabad	2.66	2.36	2.97	1,194
4	Banka	3.36	3.01	3.70	1,174
5	Begusarai	3.28	2.95	3.62	1,203
6	Bhagalpur	3.45	3.11	3.79	1,203
7	Bhojpur	2.82	2.53	3.12	1,397
8	Buxar	2.92	2.62	3.22	1,303
9	Darbhanga	3.73	3.36	4.10	1,126
10	Gaya	3.35	3.04	3.66	1,443
11	Gopalganj	2.55	2.27	2.83	1,286
12	Jamui	3.65	3.30	4.00	1,199
13	Jehanabad	2.96	2.63	3.29	1,107
14	Kaimur (Bhabua)	3.43	3.08	3.77	1,175
15	Katihar	3.65	3.26	4.05	1,001
16	Khagaria	3.89	3.53	4.26	1,131
17	Kishanganj	3.78	3.41	4.16	1,183
18	Lakhisarai	3.36	3.03	3.70	1,210
19	Madhepura	3.93	3.57	4.30	1,116
20	Madhubani	3.44	3.09	3.79	1,126
21	Munger	3.13	2.78	3.48	1,045
22	Muzaffarpur	3.15	2.80	3.50	1,084
23	Nalanda	3.21	2.85	3.56	1,066
24	Nawada	3.06	2.73	3.38	1,228
	Pashchim				
25	Champaran	3.91	3.50	4.33	952
26	Patna	2.68	2.48	2.89	2,441
	Purba				
27	Champaran	4.16	3.76	4.57	1,072
28	Purnia	3.91	3.53	4.29	1,114
29	Rohtas	2.88	2.59	3.18	1,390
30	Saharsa	4.24	3.84	4.64	1,139
31	Samastipur	3.72	3.33	4.11	1,034
32	Saran	3.26	2.91	3.61	1,130
33	Sheikhpura	3.62	3.27	3.96	1,222
34	Sheohar	4.27	3.85	4.69	1,019
35	Sitamarhi	3.73	3.36	4.11	1,118
36	Siwan	2.77	2.48	3.07	1,350
37	Supaul	3.99	3.63	4.35	1,181
38	Vaishali	3.21	2.89	3.52	1,242

3. Chhattisgarh

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Bastar	2.40	2.12	2.69	1,153
2	Bijapur	2.58	2.29	2.86	1,269
3	Bilaspur	2.71	2.41	3.01	1,232
4	Dantewada	2.20	1.93	2.48	1,144
5	Dhamtari	1.70	1.46	1.93	1,251
6	Durg	1.85	1.67	2.03	2,269
7	Janjgir-Champa	1.69	1.44	1.95	1,134
8	Jashpur	2.57	2.25	2.90	924
9	Kanker	1.80	1.54	2.05	1,126
10	Kawardha	2.36	2.07	2.65	2,378
11	Korba	2.19	2.00	2.39	2,131
12	Koriya	2.34	2.13	2.55	1,130
13	Mahasamund	2.15	1.87	2.43	1,434
14	Narayanpur	2.57	2.30	2.85	967
15	Raigarh	2.01	1.72	2.29	2,251
16	Raipur	2.07	1.88	2.26	1,309
17	Rajnandgaon	2.67	2.39	2.95	938
18	Surguja	2.59	2.26	2.92	1,132

4. Jharkhand

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Bokaro	2.11	1.91	2.32	2,092
2	Chatra	3.30	2.96	3.64	1,040
3	Deoghar	2.94	2.62	3.26	1,064
4	Dhanbad	2.11	1.91	2.32	2,181
5	Dumka	2.58	2.25	2.91	951
6	Garhwa	3.40	3.04	3.77	985
7	Giridih	3.01	2.69	3.34	1,119
8	Godda	3.13	2.75	3.52	850
9	Gumla	2.45	2.13	2.76	1,045
10	Hazaribagh	2.37	2.09	2.65	1,142
11	Jamtara	3.00	2.67	3.32	1,094
12	Khunti	2.29	1.98	2.59	996
13	Kodarma	3.04	2.71	3.37	1,083
14	Latehar	2.80	2.45	3.16	953
15	Lohardaga	2.62	2.29	2.96	962
16	Pakaur	3.12	2.76	3.47	1,059
17	Palamu	3.04	2.69	3.40	928
18	Pashchimi Singhbhum	2.76	2.42	3.11	939
19	Purbi Singhbhum	1.65	1.47	1.83	1,952
20	Ramgarh	2.06	1.86	2.25	2,100
21	Ranchi	1.91	1.71	2.12	1,761
22	Sahibganj	3.55	3.16	3.95	979
23	Saraikela Kharsawan	2.64	2.30	2.97	890
24	Simdega	2.86	2.48	3.23	881

5. Madhya Pradesh

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Alirajpur	3.52	3.20	3.84	1,430
2	Anuppur	2.27	1.98	2.56	1,102
3	Ashoknagar	2.56	2.25	2.87	1,083
4	Balaghat	2.15	1.87	2.43	1,074
5	Barwani	3.08	2.78	3.38	1,332
6	Betul	1.81	1.56	2.06	1,067
7	Bhind	2.62	2.31	2.92	1,049
8	Bhopal	1.85	1.60	2.11	1,104
9	Burhanpur	2.60	2.40	2.81	2,307
10	Chhatarpur	2.76	2.43	3.09	1,000
11	Chhindwara	1.93	1.68	2.19	1,157
12	Damoh	2.15	1.87	2.43	1,015
13	Datia	2.44	2.15	2.73	1,121
14	Dewas	2.45	2.16	2.74	1,136
15	Dhar	2.23	1.97	2.48	1,237
16	Dindori	2.22	1.93	2.51	1,039
17	East Nimar - Khandwa	2.47	2.19	2.75	1,256
18	Guna	2.50	2.22	2.78	2,325
19	Gwalior	2.20	2.01	2.40	1,202
20	Harda	2.20	1.93	2.46	2,435
21	Hoshangabad	2.08	1.90	2.26	2,412
22	Indore	1.90	1.73	2.07	2,106
23	Jabalpur	1.85	1.67	2.04	1,001
24	Jhabua	3.52	3.14	3.89	1,072
25	Katni	2.14	1.85	2.43	1,250
26	Mandla	1.95	1.68	2.23	1,333
27	Mandsaur	2.11	1.85	2.37	982
28	Morena	2.64	2.34	2.95	1,210
29	Narsimhapur	1.82	1.57	2.07	1,125
30	Neemuch	1.97	1.71	2.24	1,091
31	Panna	2.51	2.18	2.84	1,186
32	Raisen	2.45	2.16	2.74	954
33	Rajgarh	2.68	2.36	3.00	1,171
34	Ratlam	2.27	1.98	2.55	1,025
35	Rewa	2.44	2.14	2.73	1,088
36	Sagar	2.76	2.44	3.09	1,092
37	Satna	2.29	1.98	2.59	960
38	Sehore	2.47	2.17	2.77	1,010
39	Seoni	1.79	1.54	2.05	1,104
40	Shahdol	2.09	1.79	2.38	1,109
41	Shajapur	2.25	1.96	2.54	975
42	Sheopur	2.85	2.53	3.18	1,098
43	Shivpuri	2.47	2.18	2.77	1,098
44	Sidhi	3.02	2.68	3.37	1,132
45	Singrauli	3.09	2.77	3.42	1,068
46	Tikamgarh	2.07	1.80	2.33	1,221
47	Ujjain	2.13	1.95	2.31	1,060
48	Umaria	2.51	2.19	2.83	2,489
49	Vidisha	2.80	2.46	3.14	973
50	West Nimar - Khargone	2.23	1.96	2.50	937

6. Odisha

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Anugul	1.98	1.72	2.25	1,135
2	Balangir	2.35	2.04	2.66	1,047
3	Baleshwar	1.82	1.55	2.08	1,012
4	Bargarh	1.80	1.55	2.06	1,007
5	Baudh	2.23	1.93	2.53	1,050
6	Bhadrak	1.83	1.57	2.10	1,017
7	Cuttack	1.73	1.45	2.01	876
8	Debagarh	2.37	2.05	2.68	917
9	Dhenkanal	1.83	1.57	2.10	1,000
10	Gajapati	2.36	2.04	2.67	978
11	Ganjam	1.93	1.64	2.21	948
12	Jagatsinghapur	1.58	1.33	1.83	1,049
13	Jajapur	2.00	1.72	2.28	1,085
14	Jharsuguda	1.56	1.39	1.73	2,189
15	Kalahandi	2.49	2.14	2.83	892
16	Kandhamal	2.44	2.13	2.75	1,133
17	Kendrapara	2.00	1.73	2.28	1,021
18	Kendujhar	2.36	2.05	2.67	973
19	Khordha	1.79	1.59	1.99	1,822
20	Koraput	2.57	2.24	2.90	963
21	Malkangiri	2.83	2.51	3.16	1,022
22	Mayurbhanj	2.28	1.97	2.59	957
23	Nabarangapur	2.68	2.38	2.99	1,191
24	Nayagarh	1.89	1.61	2.18	975
25	Nuapada	2.58	2.26	2.90	1,092
26	Puri	1.81	1.55	2.07	1,135
27	Rayagada	2.39	2.07	2.70	1,030
28	Sambalpur	1.85	1.58	2.13	963
29	Sonepur (Subarnapur)	1.71	1.47	1.96	1,067
30	Sundargarh	1.87	1.68	2.06	2,175

7. Rajasthan

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Ajmer	2.14	1.95	2.34	2,335
2	Alwar	2.52	2.22	2.83	1,113
3	Banswara	2.51	2.22	2.81	1,100
4	Baran	1.97	1.72	2.23	1,173
5	Barmer	3.61	3.22	4.00	963
6	Bharatpur	3.54	3.17	3.91	1,077
7	Bhilwara	2.22	1.93	2.52	1,011
8	Bikaner	2.31	2.04	2.59	2,456
9	Bundi	2.52	2.19	2.85	985
10	Chittaurgarh	1.91	1.62	2.20	872
11	Churu	2.31	2.04	2.59	1,144
12	Dausa	2.32	2.03	2.61	1,097
13	Dhaulpur	3.12	2.79	3.46	1,142
14	Dungarpur	2.90	2.57	3.23	1,087
15	Ganganagar	1.88	1.63	2.12	1,225
16	Hanumangarh	1.84	1.59	2.09	1,122
17	Jaipur	2.03	1.85	2.21	2,334
18	Jaisalmer	3.22	2.87	3.58	1,017
19	Jalor	3.08	2.75	3.42	1,122
20	Jhalawar	1.87	1.60	2.13	1,038
21	Jhunjhunun	1.84	1.60	2.08	1,234
22	Jodhpur	2.35	2.15	2.55	2,265
23	Karauli	2.99	2.65	3.33	1,100
24	Kota	1.72	1.55	1.90	2,156
25	Nagaur	2.14	1.87	2.41	1,167
26	Pali	2.21	1.91	2.50	1,061
27	Pratapgarh	2.59	2.27	2.90	1,063
28	Rajsamand	2.76	2.42	3.10	1,060
29	Sawai Madhopur	2.69	2.38	3.00	1,115
30	Sikar	2.22	1.96	2.48	1,261
31	Sirohi	3.00	2.66	3.34	996
32	Tonk	2.20	1.91	2.49	1,084
33	Udaipur	2.84	2.49	3.19	990

8. Uttarakhand

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Almora	2.39	2.08	2.71	931
2	Bageshwar	2.03	1.75	2.31	1,072
3	Chamoli	1.94	1.65	2.23	849
4	Champawat	2.07	1.77	2.36	996
5	Dehradun	1.49	1.32	1.65	2,032
6	Haridwar	2.78	2.55	3.01	939
7	Nainital	1.96	1.77	2.15	2,321
8	Pauri Garhwal	1.98	1.67	2.29	2,170
9	Pithoragarh	2.06	1.75	2.37	862
10	Rudraprayag	2.00	1.70	2.30	905
11	Tehri Garhwal	1.95	1.68	2.22	984
12	Udham Singh Nagar	2.17	1.98	2.36	2,245
13	Uttarkashi	2.09	1.81	2.38	994

9. Uttar Pradesh

Sr No	Districts	TFR	Lower bound	Upper bound	Sample size	Sr Sr No	Districts	TFR	Lower bound	Upper bound	Sample size
1	Agra	2.80	2.58	3.01	2,448	61	Saharanpur	2.72	2.51	2.94	2,487
2	Aligarh	2.85	2.63	3.07	2,477		Sant Kabir				
3	Allahabad	2.46	2.16	2.75	1,162	62	Nagar	3.05	2.72	3.37	1,349
	Ambedkar						Sant Ravi				
4	Nagar	2.36	2.09	2.63	1,407		Nagar				
5	Auraiya	2.60	2.27	2.94	971	63	(Bhadohi)	3.00	2.69	3.31	1,317
6	Azamgarh	2.45	2.16	2.75	1,303	64	Shahjahanpur	3.48	3.10	3.86	1,064
7	Baghpat	2.24	1.96	2.52	1,239	65	Shrawasti	4.40	3.96	4.84	1,055
8	Bahraich	4.22	3.80	4.65	1,021		Siddharthnaga				
9	Ballia	2.84	2.53	3.16	1,329	66	r	3.41	3.05	3.76	1,236
10	Balrampur	3.38	3.04	3.72	1,260	67	Sitapur	3.32	2.94	3.71	985
11	Banda	2.67	2.29	3.06	789	68	Sonbhadra	2.83	2.50	3.17	1,027
12	Barabanki	2.60	2.27	2.94	987	69	Sultanpur	2.74	2.41	3.07	1,151
13	Bareilly	2.52	2.31	2.74	2,506	70	Unnao	2.74	2.41	3.07	1,097
14	Basti	3.01	2.68	3.35	1,243	71	Varanasi	2.22	2.03	2.41	2,442
15	Bijnor	2.74	2.43	3.05	1,265						
16	Budaun	3.73	3.35	4.11	1,113						
17	Bulandshahar	2.92	2.61	3.24	1,259						
18	Chandauli	2.75	2.46	3.04	1,328						
19	Chitrakoot	3.36	2.99	3.73	1,089						
20	Deoria	2.43	2.15	2.71	1,289						
21	Etah	3.02	2.69	3.36	1,163						
22	Etawah	2.51	2.21	2.82	1,145						
23	Faizabad	2.63	2.31	2.94	1,202						
24	Farrukhabad	3.24	2.89	3.59	1,159						
25	Fatehpur	2.32	1.98	2.67	923						
26	Firozabad	2.78	2.56	3.00	2,506						
	Gautam										
27	Buddha Nagar	2.61	2.40	2.81	2,194						
28	Ghaziabad	2.42	2.21	2.62	2,281						
29	Ghazipur	2.80	2.48	3.13	1,223						
30	Gonda	3.31	2.97	3.66	1,216						
31	Gorakhpur	2.38	2.10	2.66	1,212						
32	Hamirpur	2.34	1.99	2.69	871						
33	Hardoi	3.03	2.66	3.39	1,000						
	Hathras										
34	(mahamaya)	2.74	2.43	3.05	894						
35	J P Nagar	2.95	2.62	3.28	1,318						
36	Jalaun	2.00	1.70	2.30	1,955						
37	Jhansi	2.05	1.84	2.25	1,271						
38	Juanpur	2.72	2.43	3.02	1,134						
39	Kannauj	3.06	2.72	3.41	965						
40	Kanpur Dehat	2.54	2.22	2.86	1,901						
41	Kanpur Nagar	1.64	1.45	1.83	1,146						
	Kanshiram										
42	nagar	3.50	3.13	3.87	1,026						
43	Kaushambi	3.27	2.88	3.65	1,046						
44	Kheri	3.38	2.99	3.76	1,360						
45	Kushinagar	3.00	2.69	3.32	900						
46	Lalitpur	2.31	2.00	2.62	1,862						
47	Lucknow	1.58	1.39	1.76	1,135						
48	Mahoba	2.43	2.10	2.76	908						
49	Mahrajganj	2.82	2.51	3.12	1,346						
50	Mainpuri	2.69	2.37	3.02	1,137						
51	Mathura	2.88	2.56	3.20	1,220						
52	Mau	2.66	2.36	2.96	1,359						
53	Meerut	2.27	2.10	2.43	3,334						
54	Mirzapur	2.91	2.59	3.24	1,113						
55	Moradabad	2.95	2.72	3.18	2,487						
56	Muzaffarnagar	3.10	2.77	3.43	1,251						
57	Pilibhit	2.73	2.41	3.05	1,152						
58	Pratapgarh	2.30	2.01	2.59	1,216						
59	Rae Bareli	2.48	2.15	2.80	1,123						
60	Rampur	2.94	2.62	3.26	1,312						

Appendix Table 2: Total fertility rate for the three years preceding the survey and sample implementation, Kenya 2014

Regions & counties	TFR	Sample size
Total	**3.9**	**32,172**
Region : Nairobi	**2.7**	**1,096**
Region : Coast	**4.3**	**4,047**
Region : ..Mombasa	3.2	628
Region : ..Kwale	4.7	692
Region : ..Kilifi	5.1	850
Region : ..Tana River	5.8	713
Region : ..Lamu	4.3	622
Region : ..Taita Taveta	3.2	542
Region : North Eastern	**6.4**	**1,748**
Region : ..Garissa	6.1	627
Region : ..Wajir	7.8	591
Region : ..Mandera	5.2	530
Region : Eastern	**3.4**	**5,364**
Region : ..Marsabit	5.0	584
Region : ..Isiolo	4.9	634
Region : ..Meru	3.1	692
Region : ..Tharaka-Nithi	3.4	546
Region : ..Embu	3.1	654
Region : ..Kitui	3.9	760
Region : ..Machakos	3.4	727
Region : ..Makueni	3.3	767
Region : Central	**2.8**	**3,254**
Region : ..Nyandarua	3.5	581
Region : ..Nyeri	2.7	716
Region : ..Kirinyaga	2.3	579
Region : ..Murang'a	3.0	654
Region : ..Kiambu	2.7	724
Region : Rift Valley	**4.5**	**9,389**
Region : ..Turkana	6.9	532
Region : ..West Pokot	7.2	569
Region : ..Samburu	6.3	588
Region : ..Trans-Nzoia	5.2	735
Region : ..Uasin Gishu	3.6	712
Region : ..Elgeyo Marakwet	4.1	640
Region : ..Nandi	4.0	754
Region : ..Baringo	4.8	621
Region : ..Laikipia	3.7	645
Region : ..Nakuru	3.7	757
Region : ..Narok	6.0	716
Region : ..Kajiado	4.5	673
Region : ..Kericho	4.0	721
Region : ..Bomet	4.3	726
Region : Western	**4.7**	**2,898**
Region : ..Kakamega	4.4	730
Region : ..Vihiga	4.5	648
Region : ..Bungoma	5.0	829
Region : ..Busia	4.7	691
Region : Nyanza	**4.3**	**4,376**
Region : ..Siaya	4.2	671
Region : ..Kisumu	3.6	716
Region : ..Homa Bay	5.2	743
Region : ..Migori	5.3	791
Region : ..Kisii	3.7	815
Region : ..Nyamira	3.5	640

Notes:

TFR: Total fertility rate 15-49; Total fertility rate for the three years preceding the survey for age group 15-49 expressed per woman

Sample size: Eligible women completed; Source: ICF, 2015. The DHS Program STATcompiler. Funded by USAID. http://www.statcompiler.com. October 20 2018