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Family Planning Performance in India, 1992-2021

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Abstract

This paper measures family planning performance in India using a composite family planning performance index. Using the data available from different rounds of the National Family Health Survey, the paper concludes that although family planning performance in India has improved during since 1992-93, it remains poor and there is significant inter-state/Union Territory and inter-district variation in the performance. The paper also analyses the inequality in the performance of three dimensions of family planning performance – met demand for permanent methods, met demand for spacing methods and family planning methods mix.

Introduction

Planned family planning efforts in India are now 70 years old. They were conceived and implemented in the context of controlling population growth by reducing birth rate. Family planning, however, is only one of the many proximate determinants of fertility (Davis and Blake, 1956; Bongaarts, 1972). A decrease in fertility, therefore, is attributed to the combined effect of the change in its different proximate determinants. Family planning is now increasingly being recognised as a development strategy and not just an intervention to reduce fertility. There is evidence to suggest that family planning improves health, reduces poverty, and empower women (Bongaarts et al, 2012). It is one of the most cost-effective instruments of health and development (Bongaarts et al, 2012; Cleland et al, 2006). The United Nation 2030 Agenda for Sustainable Development (United Nations, 2015) recognises family planning as a cross-sectoral intervention that can hasten progress across the five themes of the agenda - People, Planet, Prosperity, Peace, and Partnership – in terms of its implications to human rights, gender equality, and empowerment, its impact on maternal, new born, child, and adolescent health, and its role in shaping economic development and environmental and political futures (Starbird et al, 2016). The progress in family planning is critical to achieving sustainable development goals. However, family planning needs of the people are very diverse and dynamic. This means that family planning performance should be analysed not in terms of fertility reduction but in terms of meeting the diverse and changing family planning needs of the people.

Family planning performance has traditionally been measured in terms of contraceptive prevalence rate (CPR) which is a crude measure similar to birth rate. The popularity of CPR as a measure of family planning performance is based on its strong inverse relationship with total fertility rate (TFR) (Bongaarts, 1978; Bongaarts and Potter, 1983; Ross and Mauldin, 1996; Jain, 1997; Tsui, 2001; Stover, 1998; United Nations, 2020). There are, however, studies that show inconsistency between CPR and TFR (United Nations, 2020). Srinivasan (1988) has observed that, as one goes down the level of aggregation, variation in CPR explains less and less of the variation in TFR. Srinivasan (1993) has also shown how TFR can be zero even if CPR is only 25 per cent or CPR may not affect TFR at all even if CPR is as high as 75 per cent. Using the below district-level data from Madhya Pradesh, India, Chaurasia (2004) has observed that variation in CPR explained only around 20 per cent of the variation in total marital fertility rate (TMFR).

CPR has many limitations a measure of family planning performance. It is a ratio, not rate or incidence of family planning practice. It does not consider variation in the use of different family planning methods by age. A scale to measure family planning performance based on CPR is difficult to establish as a substantial proportion of women may not be using any family planning method because they are either wanting a child, or pregnant, or they or their partner sterile. It has therefore been suggested that family planning performance should be measured in terms of the demand for family planning satisfied (Population Reference Bureau, 2016). The proportion of women aged 15-49 years who have their family planning needs satisfied by modern methods is also identified by United Nations as one of the indicators (indicator 3.7.1) to monitor the progress towards sustainable development goals.

The demand for family planning satisfied or the met demand of family planning can be divided further into the met demand of family planning for spacing births and met demand of family planning for limiting or stopping births. This distinction is important as the context of family planning for limiting births is different from the context of family planning for spacing births. Couples stop or limit births only when they have achieved the desired family size whereas couples space births to plan their family. It is therefore important that met demand for limiting births is treated separately from met demand for spacing births in analysing family planning performance.

It is also well-known that family planning needs are different in different phases of the family building process and are conditioned by such factors as personal circumstances, individual knowledge and changing childbearing preferences. Family planning needs are also influenced by the availability and accessibility of different family planning methods and their effectiveness. It has, therefore, important that family planning performance takes into consideration the range and types of family planning methods being used or the method-mix (United Nations, 2019). The method mix is also one of the elements of quality of family planning services (Bruce, 1990). It reflects both availability of different family planning methods and user preferences (Bertrand et al,

2020). Choice of family planning method is a key principle in both quality of care and rights-based approach to family planning. Method- mix has also been identified as one of the core set of indicators to monitor family planning progress (FP2020, nd).

Recently, Chaurasia () has developed a composite index to measure family planning performance which considers met demand of limiting, met demand of spacing, and method-mix as the three dimensions of family planning efforts. The index provides more rounded assessment of the performance of family planning efforts than CPR or met demand of family planning. The objective of the present paper is to analyse the performance of family planning efforts in India during 1992-2021 using the composite family planning performance index developed by Chaurasia (2023). In an earlier paper, Chaurasia (2021) has analysed the performance of family planning efforts during 1992-2016. This paper extends the analysis to the period 1992-2021 to include the most recent data on family planning use available through the National Family Health Survey.

The paper is organised as follows. The next section of the paper describes the composite family planning performance index. Section three describes the data source. Section four analyses family planning performance in India and in its constituent states/Union Territories and districts. Section five classifies districts in terms of the met need of permanent methods, met need of spacing methods and method mix. The last section of the paper summarises the findings of the analysis and their policy and programme relevance in the context of meeting the family planning needs of the people.

Composite Family Planning Performance Index

The rationale and the details of the construction of the composite family planning performance index used in this paper are discussed elsewhere (Chaurasia, 2023). If p denotes the composite family planning performance index, p_s denotes the performance index that reflects the met demand of modern spacing methods; p_p denotes the performance index that reflects the met demand of permanent methods; and p_q denotes the performance index that reflects the method-mix, then the index p is defined as

$$p = \frac{(\sqrt{p_s}*\sqrt{p_p})+(\sqrt{p_p}*\sqrt{p_q})+(\sqrt{p_q}*\sqrt{p_s})}{3} = \frac{p_{sp}+p_{pq}+p_{qs}}{3} \quad (1)$$

$$p_{sp} = \sqrt{p_s} * \sqrt{p_p} \quad (2)$$

$$p_{pq} = \sqrt{p_p} * \sqrt{p_q} \quad (3)$$

$$p_{qs} = \sqrt{p_q} * \sqrt{p_s} \quad (4)$$

The indexes p_s, p_p and p_q are defined as

$$p_s = \frac{c_s}{c_s+c_t+u_s} \quad (5)$$

$$p_p = \frac{c_p}{c_p + u_p} \tag{6}$$

$$p_q = 1 - \sqrt{\frac{\sum x_j^2 - \left(\frac{1}{n}\right)}{1 - \left(\frac{1}{n}\right)}} \; when\; n > 1 \; and \; s = 1 \; when \; n = 1; \; \sum_{j=1}^{n} x_j = 1 \tag{7}$$

Here c_s is the prevalence of modern spacing methods, c_p is the prevalence of permanent methods, c_t is the prevalence of traditional methods, u_s is the unmet need for spacing, u_p is the unmet need for limiting and x_j is the proportionate prevalence of family planning method j among n family planning methods. It may be noticed that the indexes p_s, p_p and p_q range between 0 and 1 and the higher the index the higher the performance. When $p_s = p_p = p_q = 0$, $p = 0$. Similarly, when $p_s = p_p = p_q = 1$, $p = 1$. When $p_s = p_p = p_q = v$ for any v, $p = v/3$. When $p_s \neq p_p \neq p_q$, $p < p_a$ so that the difference $p_i = (p_a - p)$ reflects performance inequality in three dimensions of family planning efforts, the larger the difference the larger the performance inequality.

Chaurasia (2023) has also shown that the change in the index p can be decomposed into the change in indexes p_s, p_p and p_q. If p^2 is the composite performance index at time t^2 and p^1 is the composite performance index at time t^1 then the difference $p^2 - p^2$ can be decomposed as

$$p^2 - p^1 = \nabla p = \partial p_s + \partial p_p + \partial p_q \tag{8}$$

where

$$\nabla p_s = \frac{1}{3}\left[\ln\left(\frac{\sqrt{p_s^2}}{\sqrt{p_s^1}}\right) * \frac{\left(LM_{sp} + LM_{qs}\right)}{3}\right] \tag{9}$$

$$\nabla p_p = \frac{1}{3}\left[\ln\left(\frac{\sqrt{p_p^2}}{\sqrt{p_p^1}}\right) * \frac{\left(LM_{sp} + LM_{pq}\right)}{3}\right] \tag{9}$$

$$\nabla p_q = \frac{1}{3}\left[\ln\left(\frac{\sqrt{p_q^2}}{\sqrt{p_q^1}}\right) * \frac{\left(LM_{pq} + LM_{qs}\right)}{3}\right] \tag{10}$$

where LM_{sp} is the logarithmic mean (Carlson, 1972) and is defined as

$$LM_{sp} = \frac{(p_{sp}^2 - p_{sp}^1)}{ln\left(\frac{p_{sp}^2}{p_{sp}^1}\right)} \tag{11}$$

Data Source

The analysis is based on the estimates of the prevalence of different family planning methods and the unmet need of spacing and unmet need of limiting available from District Level Household Survey (DLHS) and National Family Health Survey (NFHS).

NFHS was carried out in 1992-1993, 1998-1999, 2005-2006, 2015-2016 and 2019-2021. DLHS was carried out in 1998-1999, 2002-2004, 2007-2008 and is now discontinued. The first round (1992-1993) of NFHS provided estimates of the prevalence of different family planning methods and unmet need of spacing and limiting for the states only and not for the Union Territories and districts of the country. The second and third rounds provided estimates of prevalence rates and unmet needs of spacing and limiting for states and Union Territories but not for districts. The fourth and the fifth rounds, on the other hand, provided estimates of method-specific prevalence and unmet need of spacing and limiting for all states/Union Territories and districts of the country which permit family planning performance assessment up to the district level. Details of the NFHS and DLHS are given elsewhere and are not repeated here (Government of India, 2010; 2022).

Family Planning Performance in India

Organised family planning efforts in India date back to 1952 when the country launched the first official family planning programme of the world. Although, controlling population growth through reducing birth rate has always been the underlying rationale of the programme, yet, in its initial phase, the programme focussed on improving health and welfare of the family, especially children and women (Chaurasia and Singh, 2014). The programme adopted a target-based approach for its implementation. Programme performance, in this approach, was measured in terms of equivalent sterilisations and couples effectively protected (Chaurasia, 1985; Government of India, 1990). In 1969, the first nationally representative family planning survey was conducted which revealed that only 14 per cent of the currently married women aged 15-44 years in the country were using a family planning method while less than 10 per cent were using a modern family planning method (Operations Research Group, 1970). The second all India survey, conducted in 1980, revealed that family planning use among the currently married women aged 15-44 years was around 35 per cent while about 28 per cent women were using a modern family planning method (Khan and Prasad, 1980). The first round of the National Family Health Survey (NFHS) 1992-93 revealed that the proportion of currently married women aged 15-49 (MWRA) using a family planning method (CPR) was 40 per cent while the prevalence of modern family planning methods (mCPR) was 36 per cent (Government of India, 1995). In 1996, Government of India abolished the target-based approach of programme implementation and CPR and mCPR became the basis for measuring programme performance. The second round of NFHS (1998-1999) revealed that CPR had increased to 45 per cent (Government of India, 2000) while the third round (2005-2006) estimated a CPR of 55 per cent (Government of India, 2007). The fourth round (2015-2016), however, reported a decrease in CPR to 53 per cent while mCPR stagnated at around 48 per cent (Government of India, 2017). The fifth and the latest round of NFHS (2019-2201) suggests that CPR in the country has increased to 66.7 per cent while mCPR has increased to 56.5 per cent (Government of India, 2021).

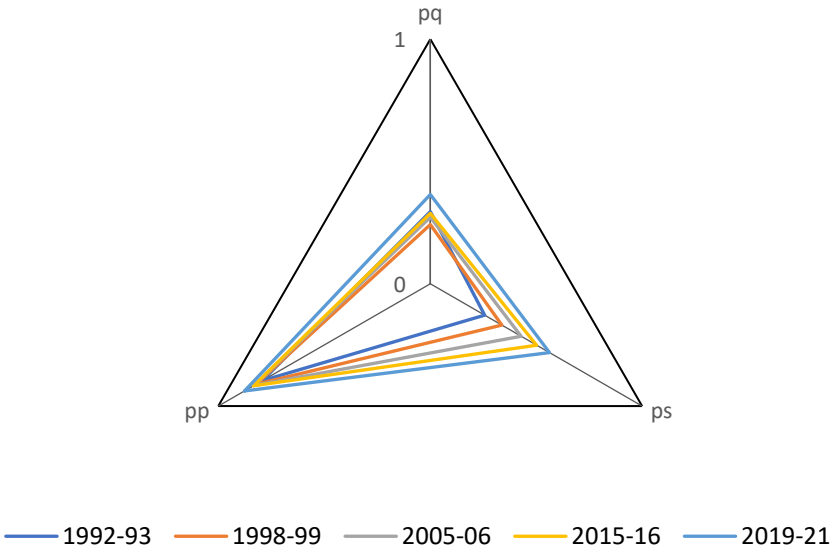


Figure 1: Family planning performance in India, 1992-2021
Source: Author

Estimates of method-specific prevalence of different family planning methods and unmet need for spacing and limiting available from different rounds of NFHS suggest that the composite performance index, *p*, increased from 0.403 in 1992-1993 to 0.574 in 2019-2201 in the country. The met demand of modern spacing methods increased from 25.7 per cent to 56.3 per cent while the met demand of permanent methods increased from 79.2 per cent to 87.6 per cent. At the same time, the index of method-mix increased from 0.295 to 0.365 (Table 1). Figure 1 depicts the family planning performance triangle in 1992-1993, 1998-1999, 2005-2006, 2015-2016 and 2019-2021. The trend in different indicators of family planning performance is depicted in figure 2.

Family planning performance has been different in the rural areas of the country as compared to its urban areas as defined at the 2011 population census. In the rural areas of the country, the composite family planning performance index *p* increased from 0.335 in 1992-1993 to 0.552 in 2019-2201. In the urban areas, on the other hand, the index *p* increased from 0.522 in 1992-1993 to 0.576 in 2005-2006 but then decreased to 0.560 in 2015-2016 and further to 0.559 in 2019-2201. If the trend in the index *p* is any indication, then family planning performance in the urban areas of the country appears to have deteriorated after 2005-2006 whereas it has improved in the rural areas.

The difference between the simple average of indexes p_s, p_p and $p_{q\,\text{and}}$ the index *p* reflects the performance inequality in the three dimensions of family planning efforts. The average of the indexes p_s, p_p and p_q has always been higher than the index *p* which

implies that performance in the three dimensions of family planning efforts has not been the same. This difference has, however, decreased from 0.045 in 1992-1993 to 0.028 in 2019-2201, although it increased between 1992-1993 and 1998-1999. The decrease in the performance inequality has been particularly sharp during 2015-2021. This decrease is one of the welcome features of family planning performance in the country. Although, the performance inequality has always been higher in the rural areas as compared to that in the urban areas of the country, yet the decrease in the performance inequality across different dimensions of family planning has been consistent and sharp in the rural areas but inconsistent and marginal in the urban areas. Performance inequality in the urban areas increased between 1992-1993 and 1998-1999 and again between 2005-2006 and 2015-2016.

Table 2 decomposes the improvement in family planning performance measured in terms of the index p into the improvement attributed to the increase in the met demand of modern spacing methods (index p_s), increase in the met demand of permanent methods (p_p) and improvement in the method-mix (index p_q) in conjunction with equation (8). More than 70 per cent of the increase in the index p during 1992-1993 through 2019-2201 may be attributed to the increase in the met demand of modern spacing methods whereas the increase in the met demand of permanent methods accounted for an increase of only around 10 per cent. The improvement in the method-mix, on the other hand, accounted for an increase of around 18 per cent. In the urban areas of the country, the increase in the met demand of modern spacing methods accounted for more than 87 per cent of the increase in the index p whereas the met demand of permanent methods decreased, instead increased, during this period. On the other hand, improvement in the method-mix has very nearly been the same in both rural and urban areas of the country. It may also be seen from the table that the deterioration in family planning performance in the urban areas during 2005-2006 through 2015-2016 has been the result of the decrease in the met demand of permanent methods, a substantial increase in the skewness in the method-mix (decrease in the index p_q); and virtually little increase in the met demand of modern spacing methods. By comparison, the deterioration in family planning performance in the urban areas during 2015-2016 through 2019-2201 has been due to the decrease in the met demand of both modern spacing methods and permanent methods, although, there has been a decrease in the skewness in the method-mix.

Among constituent states and Union Territories of the country, family planning performance has varied widely currently and in the past. In 2019-2021, performance was relatively the best in Union Territory of Ladakh which is the only state/Union Territory where family planning performance can be rated as good as the index p is more than 0.700 (Table 3). On the other hand, there are 20 states/Union Territories where the index p ranges between 0.550 to 0.750 which implies that family planning performance, in these states/Union Territories, can be rated as average. By contrast, in 14 states/Union Territories, family planning performance may be rated as poor as the index p ranges between 0.300 and 0.550. This leaves only one state, Andhra Pradesh, where family planning performance may be rated as very poor as the index p is

estimated to be less than 0.300. Family planning use in Andhra Pradesh is characterised by very low met demand of modern spacing methods and very high met demand of permanent methods leading to very high degree of skewness in the method-mix.

The inequality in performance in the three dimensions of family planning also varies widely across states/Union Territories. Sikkim is the only state in the country where the performance in the three dimensions of family planning is nearly the same. The met demand of modern spacing methods in Sikkim is around 67 per cent while the met demand of permanent methods is almost 70 per cent. On the other hand, the index of method-mix is almost 0.687 so that the difference between the average of p_s, p_p, and p_q and p is negligible. In addition to Sikkim, there are 8 states/Union Territories where performance inequality across the three dimensions of family planning is low whereas, in six states/Union Territories where, performance inequality is high with the highest performance inequality in Andhra Pradesh followed by Telangana.

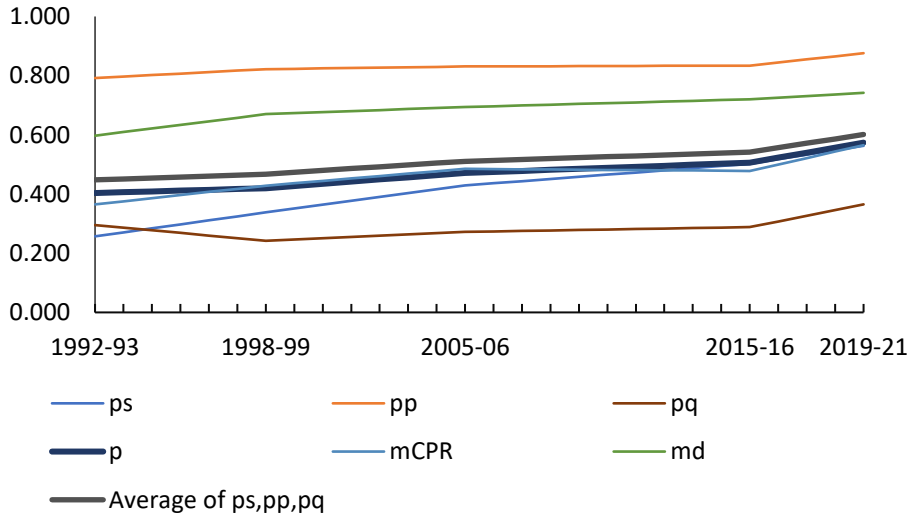


Figure 2: Trend in different indicators of family planning performance in India, 1992-2021
Source: Author

The performance in terms of the met demand of modern spacing methods and met demand of permanent methods has been contrastingly different in states and Union Territories (Figure 4). There is only one state/Union Territory where performance in terms of the met demand of modern spacing methods can be rated as good. There is no state/Union Territory where performance in meeting the demand of modern spacing methods can be rated as very good. By contrast, performance in meeting the demand of permanent methods is rated as very good in 7 states/Union Territories and good in 22 states/Union Territories. There is no state/Union Territory where

performance in terms of the met demand of permanent methods is very poor but there are 4 states/Union Territories where the met demand of modern spacing methods is very poor. Similarly, the method mix is either very highly or highly skewed in 30 states/Union Territories of the country.

Improvement in family planning performance has also been different in different states/Union Territories (Table 4). There are 20 states for which data are available for 1992-1993 and 2019-2021. Among these 20 states, performance of family planning efforts appears to have deteriorated in Delhi, Kerala, Manipur, and Punjab. On the other hand, improvement in the performance has been the most rapid in West Bengal. In Goa, Nagaland, Odisha, and Rajasthan also, improvement in the performance has also been remarkable. In Himachal Pradesh, Maharashtra, Meghalaya, Tamil Nadu, and Tripura, improvement in performance has been marginal. In Delhi and Manipur, performance in the met demand of modern spacing methods decreased whereas in 9 states, performance in the met demand of permanent methods decreased in 2019-2021 compared to that in 1992-1993. The skewness in method-mix increased in Assam, Delhi, Himachal Pradesh, Perala, Maharashtra, Nagaland, Tamil Nadu, and Tripura. Between 2015-2016 and 2019-2021, family planning performance deteriorated in four states. Performance in met demand of modern spacing methods deteriorated in 11 states whereas performance in met demand of permanent methods deteriorated in 8 states while skewness in method-mix increased in 6 states/Union Territories.

District-level estimates of prevalence of different family planning methods and unmet need for spacing and limiting are available from District Level Household Survey (DLHS) 2002-04 (Government of India, 2006) and 2007-08 (Government of India, 2010) and from NFHS for 2015-16 and 2019-21. District level analysis of family planning performance is important as family planning efforts are conceptualised the national level, customized at state/Union Territory level and implemented at district level. Table 5 presents distribution of districts in the index p. During 2002-04, performance was very poor ($p<0.300$) in more than 25 per cent of 593 districts; poor ($0.300\leq p<0.550$) in more than 60 per cent districts. There was only one district in which the performance was good ($p\geq 0.750$). In 2007-08, performance was very poor ($p<0.300$) in 19 per cent of 600 districts, poor ($0.300\leq p<0.550$) in 57 per cent districts and good ($0.750\leq p<0.900$) in only one district. In 2015-16, performance was very poor ($p<0.300$) in around 18 per cent of 640 districts, and poor ($0.300\leq p<0.550$) in more than 57 per cent districts. There was no district in which performance was either good or very good. Finally, in 2019-21, performance was very poor in only about 4 per cent of 707 districts but was poor in around 51 per cent districts, average in around 44 per cent districts and good in only 9 districts. In Prakasam district of Andhra Pradesh, performance was the poorest among all districts in 2019-21 while performance was the best in district Badgam in Jammu and Kashmir. Table 5 suggests that, although, there is improvement in family planning performance at the district level, yet there are only a few districts where performance may be termed as good even in 2019-21. There is still no district where performance is very good. The good sign, however, is that there are now only a few districts where the performance is very poor.

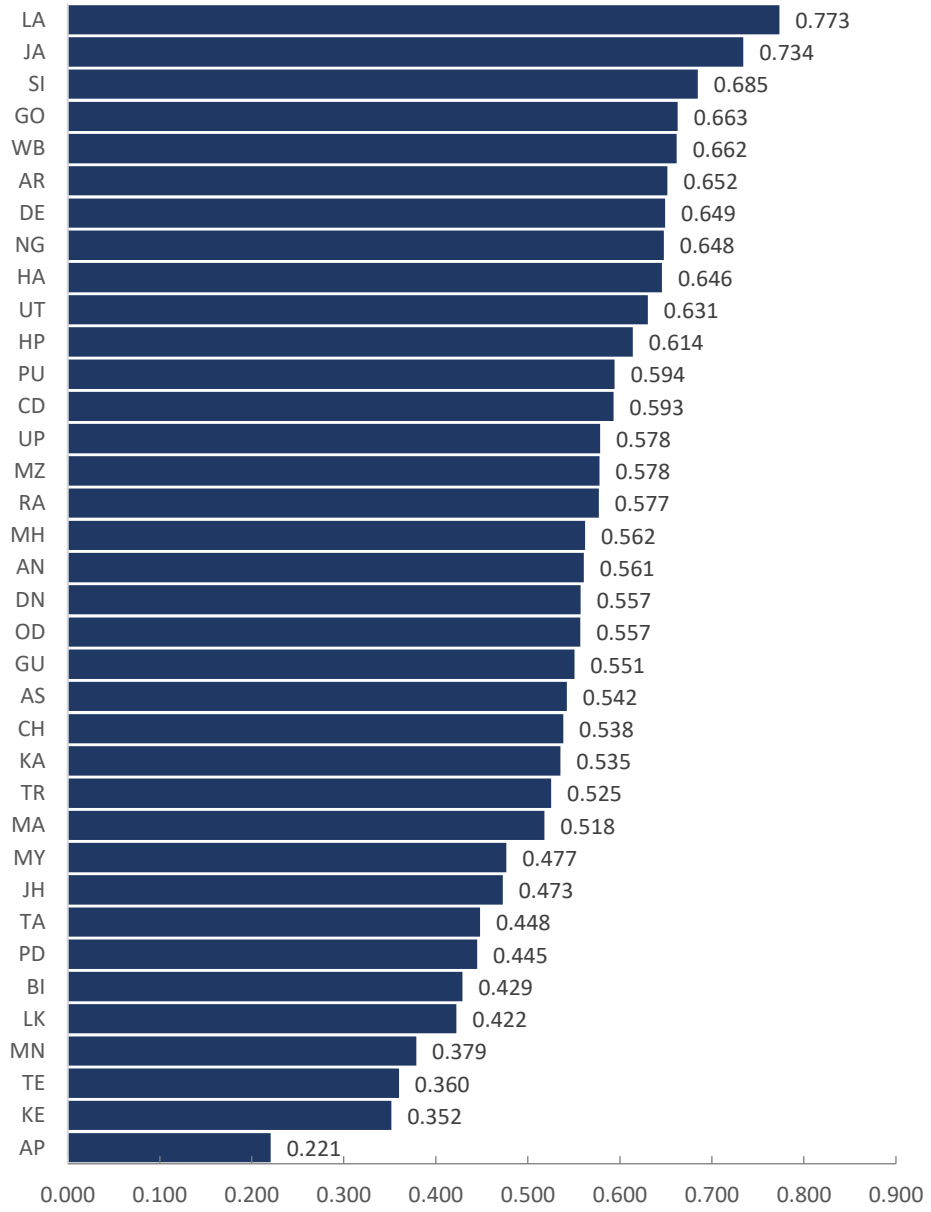
Table 1: Family planning performance indexes in India, 1992-2021

Performance indexes	Period				
	1992-93	1998-99	2005-06	2015-16	2019-21
	Combined population				
Composite index of family planning performance (p)	0.403	0.420	0.471	0.506	0.574
Met demand of modern spacing methods (p_s)	0.257	0.338	0.429	0.502	0.563
Met demand of permanent methods (p_p)	0.792	0.822	0.831	0.834	0.876
Contraceptive method-mix index (p_q)	0.259	0.242	0.272	0.288	0.365
Simple arithmetic mean of p_s, p_p and p_q (p_a)	0.448	0.467	0.511	0.541	0.601
Performance inequality (PI)	0.045	0.048	0.039	0.036	0.028
Met demand of modern family planning methods (p_m)	0.600	0.670	0.694	0.720	0.742
Modern contraceptive methods prevalence	0.365	0.428	0.485	0.478	0.565
	Rural population				
Composite index of family planning performance (p)	0.335	0.356	0.406	0.470	0.552
Met demand of modern spacing methods (p_s)	0.169	0.253	0.340	0.453	0.534
Met demand of permanent methods (p_p)	0.787	0.814	0.819	0.833	0.874
Contraceptive method-mix index (p_q)	0.244	0.191	0.215	0.252	0.340
Simple arithmetic mean of p_s, p_p and p_q (p_a)	0.400	0.419	0.458	0.513	0.583
Performance inequality (PI)	0.065	0.063	0.052	0.042	0.031
Met demand of modern family planning methods (p_m)	0.573	0.651	0.669	0.709	0.755
Modern contraceptive methods prevalence	0.333	0.399	0.453	0.460	0.555
	Urban population				
Composite index of family planning performance (p)	0.522	0.536	0.576	0.560	0.559
Met demand of modern spacing methods (p_s)	0.440	0.502	0.579	0.580	0.529
Met demand of permanent methods (p_p)	0.806	0.846	0.855	0.837	0.793
Contraceptive method-mix index (p_q)	0.386	0.346	0.369	0.345	0.404

Performance indexes	Period				
	1992-93	1998-99	2005-06	2015-16	2019-21
Simple arithmetic mean of p_s, p_p and p_q (p_a)	0.544	0.565	0.601	0.587	0.575
Performance inequality (*PI*)	0.022	0.028	0.025	0.027	0.017
Met demand of modern family planning methods (p_m)	0.663	0.717	0.747	0.740	0.668
Modern contraceptive methods prevalence	0.453	0.512	0.558	0.512	0.585

Source: Author

Figure 4: Family planning performance in states and Union Territories



Source: Author

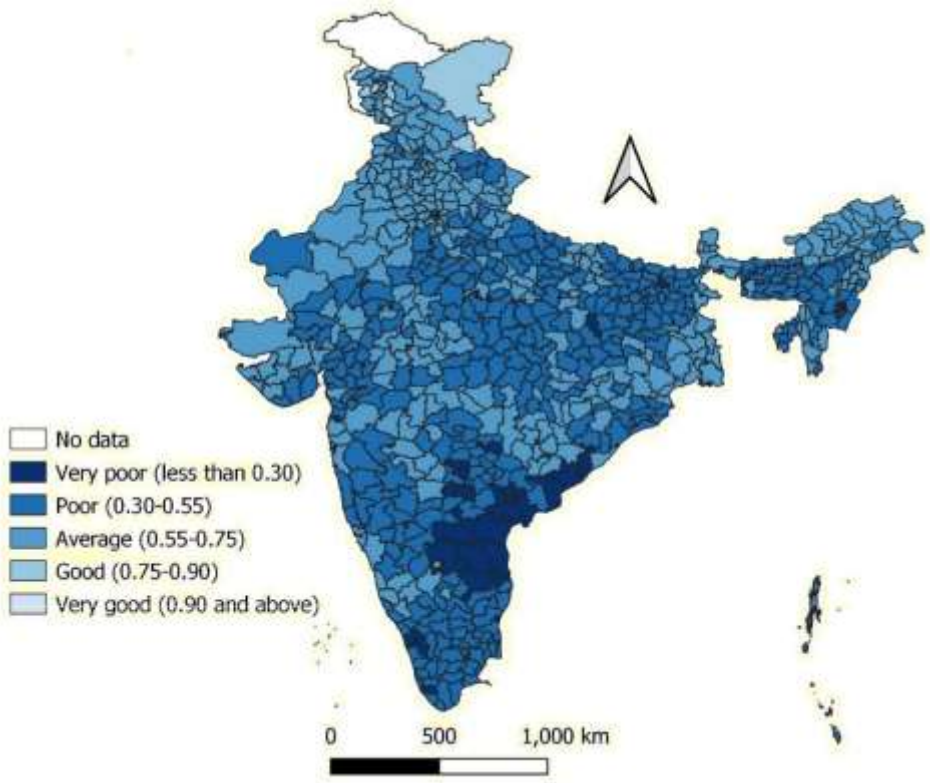


Figure 5: Family planning performance in districts of India, 2019-21.
Source: Author

The inequality in the performance in the three dimensions of family planning has also varied widely across the districts as reflected through the inter-district coefficient of variation in the difference between the average of the indexes p_s, p_p and p_q and the index p (Table 6). In 2019-2021, there were almost 17 per cent districts in the country where the inequality in performance the three dimensions of family planning is very low whereas this inequality is high or very high in almost 11 per cent districts as they existed at the time of the survey. In more than two-third districts of the country, however, the inequality in the performance in the three dimensions of family planning remains either low or very low. There has been very rapid increase in the proportion of districts in which the inequality in performance in the three dimensions of family planning is either high or very high between 2002-2004 and 2007-2008. However, after 2007-2008, this proportion appears to have decreased. At the same time, the proportion of districts where inequality in performance in the three dimensions of family planning has been either low or very low has also increased after 2007-2008. Reducing the inequality in performance in different dimensions of family planning contributes to improving family planning performance.

Table 2: Decomposition of the change in the index p in India during 1992-21

Index	Period				
	1992-93 to 1998-99	1998-99 to 2005-06	2005-06 to 2015-16	2015-16 to 2019-21	1992-93 to 2019-21
			Combined population		
∇p	0.016	0.051	0.035	0.068	0.171
∂p_s	0.035	0.034	0.026	0.021	0.121
∂p_p	0.006	0.002	0.001	0.010	0.018
∂p_q	-0.025	0.015	0.008	0.037	0.031
			Rural population		
∇p	0.021	0.050	0.065	0.081	0.216
∂p_s	0.041	0.036	0.042	0.028	0.155
∂p_p	0.005	0.001	0.003	0.009	0.018
∂p_q	-0.025	0.013	0.020	0.044	0.044
			Urban population		
∇p	0.015	0.039	-0.016	-0.002	0.037
∂p_s	0.023	0.027	0.000	-0.017	0.032
∂p_p	0.009	0.002	-0.004	-0.011	-0.003
∂p_q	-0.017	0.011	-0.012	0.027	0.008

Source: Author

Classification of Districts

Family planning performance, as measured by the index p, is contingent upon the met demand of modern spacing methods, the met demand of permanent methods and the skewness in the method-mix. We have used the classification modelling approach to classify districts in terms of family planning performance with respect to indexes p_s, p_p, and p_q. The classification and regression tree (CRT) methodology was used for the purpose. CRT classifies districts into mutually exclusive groups in such a manner that variation in performance in districts of the same group is the minimum. The exercise suggests 707 districts of the country, as they existed in 2019-2021 can be grouped into 14 mutually exclusive clusters and performance of family planning efforts in different clusters is different (Table 6, Figure 7). Performance is the poorest in cluster 7 comprising of 15 districts. The average index p in this cluster is 0.189 ± 0.071. This cluster is characterised by very poor performance in meeting the demand of modern spacing methods and very high degree of skewness in method-mix. The performance is the best in cluster 26 comprising of 26 districts. The average index p in this cluster is 0.748 ± 0.032. The met demand of modern spacing methods is the highest in this cluster while the method-mix is the most balanced. In 7 of the 14 clusters, comprising of 326, performance is poor while in 6 clusters, comprising of 366 districts, performance is average. This leaves only one cluster, comprising of 15 districts, in which performance is good. Most of the districts in this cluster are geographically contiguous.

Table 3: Family planning performance indexes in states/Union Territories, 2019-21

State/Union Territory	p	p_s	p_p	p_q	p_a	PI	p_m	$mCPR$
Andaman and Nicobar Islands	0.561	0.563	0.842	0.355	0.587	0.026	0.728	0.577
Andhra Pradesh	0.221	0.216	0.971	0.020	0.402	0.182	0.934	0.708
Arunachal Pradesh	0.652	0.605	0.768	0.592	0.655	0.004	0.659	0.472
Assam	0.542	0.649	0.569	0.427	0.548	0.006	0.631	0.453
Bihar	0.429	0.352	0.823	0.249	0.475	0.046	0.640	0.444
Chandigarh	0.593	0.599	0.814	0.416	0.610	0.017	0.660	0.556
Chhattisgarh	0.538	0.585	0.908	0.266	0.586	0.048	0.811	0.617
Dadra & Nagar Haveli and Daman & Diu	0.649	0.656	0.816	0.503	0.589	0.031	0.699	0.577
Delhi	0.557	0.571	0.864	0.331	0.659	0.009	0.748	0.598
Goa	0.663	0.719	0.872	0.451	0.681	0.018	0.788	0.601
Gujarat	0.551	0.519	0.862	0.355	0.579	0.028	0.709	0.536
Haryana	0.646	0.632	0.885	0.470	0.662	0.016	0.750	0.605
Himachal Pradesh	0.614	0.622	0.889	0.402	0.638	0.024	0.772	0.634
Jammu and Kashmir	0.734	0.735	0.846	0.633	0.738	0.004	0.777	0.525
Jharkhand	0.473	0.410	0.849	0.282	0.513	0.041	0.676	0.495
Karnataka	0.535	0.715	0.955	0.183	0.618	0.082	0.907	0.682
Kerala	0.352	0.290	0.895	0.135	0.440	0.088	0.721	0.528
Ladakh	0.773	0.809	0.814	0.701	0.775	0.001	0.811	0.480
Lakshadweep	0.422	0.236	0.828	0.350	0.471	0.049	0.464	0.301
Madhya Pradesh	0.518	0.561	0.933	0.235	0.576	0.058	0.825	0.655
Maharashtra	0.562	0.694	0.897	0.254	0.615	0.053	0.842	0.638
Manipur	0.379	0.233	0.330	0.660	0408	0.029	0.248	0.182
Meghalaya	0.477	0.421	0.394	0.641	0.486	0.009	0.414	0.225
Mizoram	0.578	0.574	0.681	0.490	0.582	0.004	0.615	0.308

State/Union Territory	p	p_s	p_p	p_q	p_a	PI	p_m	$mCPR$
Nagaland	0.648	0.651	0.758	0.548	0.652	0.004	0.681	0.453
Odisha	0.557	0.424	0.858	0.458	0.580	0.023	0.600	0.488
Puducherry	0.445	0.530	0.881	0.153	0.521	0.076	0.812	0.621
Punjab	0.594	0.579	0.790	0.450	0.606	0.012	0.660	0.505
Rajasthan	0.577	0.583	0.916	0.338	0.612	0.035	0.777	0.621
Sikkim	0.685	0.670	0.698	0.687	0.685	0.000	0.678	0.549
Tamil Nadu	0.448	0.555	0.928	0.135	0.539	0.091	0.861	0.655
Telangana	0.360	0.400	0.947	0.084	0.477	0.117	0.895	0.667
Tripura	0.525	0.611	0.648	0.356	0.538	0.013	0.618	0.491
Uttar Pradesh	0.578	0.548	0.677	0.519	0.581	0.003	0.591	0.445
Uttarakhand	0.631	0.658	0.827	0.450	0.645	0.014	0.726	0.578
West Bengal	0.662	0.651	0.881	0.495	0.676	0.014	0.746	0.607

Source: Author

Table 4: Decomposition of the improvement in family planning performance in states/Union Territories, 1992-2021.

States/Union Territories	1992-2021				2015-2021			
	∇p	∂p_s	∂p_p	∂p_q	∇p	∂p_s	∂p_p	∂p_q
Andaman and Nicobar Islands					0.118	0.040	0.000	0.078
Andhra Pradesh					0.037	0.037	-0.001	0.001
Arunachal Pradesh	0.196	0.117	0.049	0.029	0.132	0.051	0.063	0.018
Assam	0.198	0.207	-0.001	-0.007	0.032	0.025	0.011	-0.005
Bihar					0.157	0.061	0.034	0.061
Chandigarh					-0.072	-0.025	-0.004	-0.044
Chhattisgarh					0.091	0.037	0.004	0.051
Dadra & Nagar Haveli and Daman & Diu					0.182	0.088	0.028	0.066
Delhi	-0.031	-0.015	0.020	-0.036	0.016	-0.022	0.048	-0.010
Goa	0.264	0.162	0.016	0.086	0.189	0.084	0.062	0.042
Gujarat	0.112	0.059	-0.006	0.058	0.085	0.015	0.022	0.048
Haryana	0.137	0.087	0.014	0.036	0.004	-0.028	0.003	0.030
Himachal Pradesh	0.069	0.085	-0.001	-0.015	0.050	0.004	0.030	0.016
Jammu & Kashmir					0.082	0.024	0.010	0.048
Jharkhand					0.082	0.025	0.016	0.041
Karnataka	0.186	0.156	0.015	0.015	0.240	0.136	0.007	0.098
Kerala	-0.068	0.012	-0.005	-0.075	0.023	0.003	0.000	0.021
Ladakh					0.060	-0.012	0.008	0.063
Lakshadweep					0.071	0.043	0.022	0.006
Madhya Pradesh					0.077	0.026	0.013	0.037
Maharashtra	0.089	0.101	0.002	-0.014	0.035	0.017	-0.002	0.020
Manipur	-0.103	-0.035	-0.086	0.018	0.057	-0.023	0.079	0.001
Meghalaya	0.088	0.116	-0.088	0.060	-0.016	-0.017	-0.040	0.041

States/Union Territories	1992-2021				2015-2021			
	∇p	∂p_s	∂p_p	∂p_q	∇p	∂p_s	∂p_p	∂p_q
Mizoram	0.128	0.047	-0.063	0.144	-0.004	-0.005	-0.005	0.005
Nagaland	0.264	0.131	0.144	-0.011	0.170	0.080	0.096	-0.006
Odisha	0.243	0.125	0.017	0.100	0.014	-0.031	0.024	0.021
Puducherry					0.092	0.038	-0.011	0.065
Punjab	0.000	0.010	-0.014	0.004	-0.076	-0.042	-0.031	-0.002
Rajasthan	0.247	0.157	0.030	0.060	0.069	0.023	0.013	0.034
Sikkim					0.010	-0.016	0.026	0.000
Tamil Nadu	0.055	0.085	0.012	-0.042	0.115	0.057	0.004	0.053
Telangana					0.090	0.065	0.001	0.024
Tripura	0.097	0.150	-0.014	-0.040	0.005	0.025	-0.008	-0.011
Uttar Pradesh					0.095	0.050	0.020	0.025
Uttarakhand					0.016	-0.012	0.027	0.001
West Bengal	0.272	0.194	0.019	0.058	0.023	0.011	0.003	0.009

Source: Author

Table 5: Inter-district variation in family planning performance

Performance	2002-04		2007-08		2015-16		2019-21	
	Number	%	Number	%	Number	%	Number	%
	Frequency distribution							
Very poor ($p<0.300$)	149	25.1	115	19.2	116	18.1	26	3.7
Poor ($0.300\leq p<0.550$)	361	60.9	342	57.0	368	57.5	364	51.5
Average ($0.550\leq p<0.750$)	82	13.8	142	23.7	156	24.4	308	43.6
Good ($0.750\leq p<0.900$)	1	0.2	1	0.2	0	0	9	1.3
Very good (≥ 0.900)	0		0	0	0	0	0	0
N	593		600		640		707	
	Summary statistics of inter-district distribution							
Minimum	0.080		0.059		0.000		0.000	
Q1	0.299		0.325		0.344		0.452	
Median	0.396		0.440		0.447		0.523	
Q3	0.479		0.540		0.548		0.601	
Maximum	0.786		0.763		0.760		0.829	
IQR	0.180		0.215		0.203		0.149	
Coefficient of variation	0.320		0.326		0.320		0.221	
Skewness	0.228		0.012		-0.153		-0.542	
Excess kurtosis	-0.425		-0.660		-0.483		0.777	

Source: Author

Table 6: Performance inequality across three dimensions of family planning

Performance	2002-04		2007-08		2015-16		2019-21	
	Number	%	Number	%	Number	%	Number	%
	Frequency distribution							
Very low ($p<0.010$)	173	29.2	40	6.7	119	19.0	118	16.7
Low ($0.010\leq p<0.050$)	294	49.6	264	44.0	247	39.4	350	49.5
Medium ($0.050\leq p<0.100$)	89	15.0	189	31.5	172	27.4	161	22.8
Good ($0.100\leq p<0.200$)	37	6.2	103	17.2	89	14.2	72	10.2
Very good (≥ 0.200)	0	0.0	4	0.67	0	0.0	6	0.8
N	593		600		640		707	
	Summary statistics of inter-district distribution							
Minimum	0.000		0.002		0.000		0.000	
Q1	0.008		0.023		0.014		0.015	
Median	0.020		0.050		0.037		0.030	
Q3	0.045		0.086		0.077		0.065	
Maximum	0.180		0.271		0.330		0.318	
IQR	0.036		0.062		0.064		0.051	
Coefficient of variation	1.053		0.748		0.963		0.942	
Skewness	1.732		1.056		1.596		1.741	
Excess kurtosis	-3.064		1.001		3.197		4.277	

Source: Author

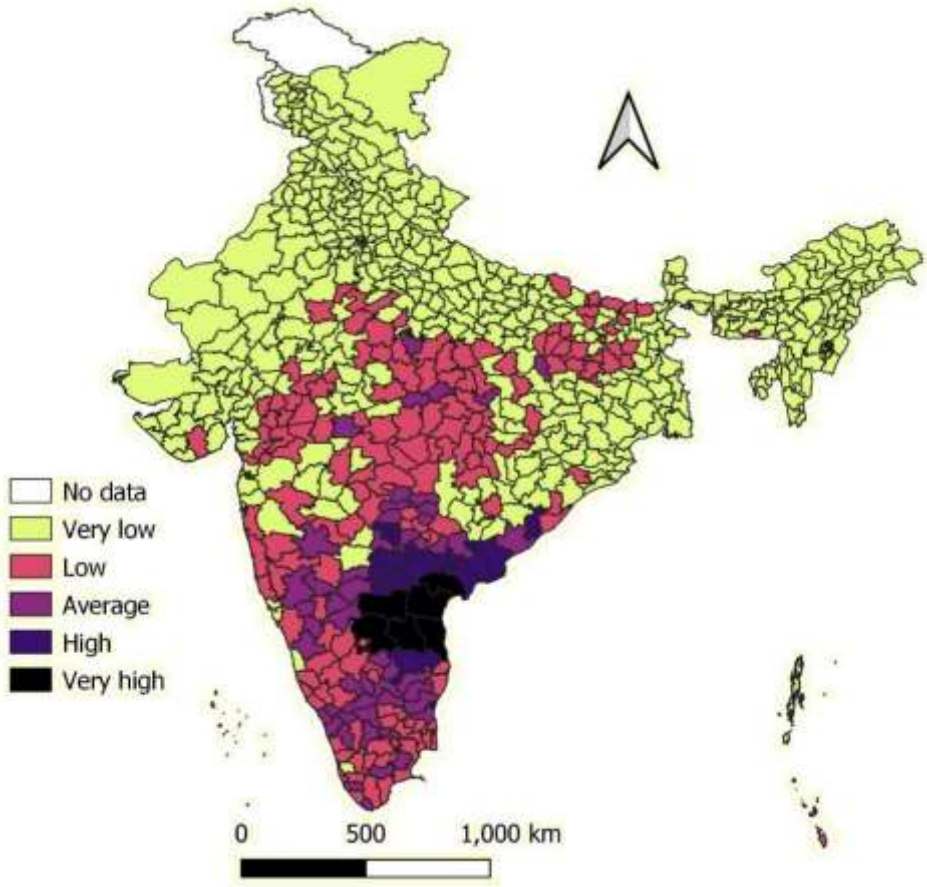


Figure 6: Inequality in family planning performance in districts of India, 2019-20
Source: Author

Discussions and Conclusions

The present analysis reveals that family planning performance in India remains far from satisfactory in terms of meeting the diverse and dynamic family planning needs of the people, although the performance has improved over time. Family planning efforts in India continue be primarily limited to meeting the demand of permanent methods of family planning or towards birth limitation. There is substantive scope of improving the performance in terms of meeting the demand of modern spacing methods. Another concern is that the method-mix continues to be heavily skewed towards permanent methods, particularly, female sterilisation despite improvement in the met demand of modern spacing methods. The analysis also suggests that the scope

of further improving the met demand of permanent methods in the country is limited so that further improvement in family planning performance is contingent upon improvement in meeting the demand of modern spacing methods and reducing the skewness in method-mix. The vision 2020 of the Government of India anoints family planning as a critical intervention to reduce maternal and child mortality and morbidity beyond the simple strategy for achieving population stabilisation (Government of India, 2014). In this context, the present analysis suggests that there is a need to substantially reinvigorate official family planning efforts towards improving the performance in meeting the needs of modern spacing methods as the official family planning efforts continue to be the mainstay of the family planning movement in India. However, the latest available evidence available from the latest round of NFHS suggests that progress in this direction remains lethargic. The inability of the organised family planning efforts in effectively meeting the demand of modern spacing methods is also reflected in the increase in the prevalence of traditional methods from around 5 per cent in 2015-2016 to more than 10 per cent in 2019-2021.

Table 7: Results of the classification modelling exercise.

SN	Cluster number	p_s	p_p	p_q	p		Number of districts
					Mean	SD	
1	7	≤0.456		≤0.031	0.189	0.071	15
2	8	≤0.456		>0.031, ≤0.132	0.324	0.039	38
3	9	≤0.331		>0.132	0.394	0.042	48
4	15	>0.331, ≤0.456		>0.132, ≤0.280	0.439	0.026	48
5	11	>0.456		≤0.165	0.442	0.041	60
6	17	>0.456	≤0.908	>0.165, ≤0.327	0.449	0.044	51
7	19	>0.456	≤0.504	>0.327	0.492	0.048	25
8	16	>0.331, ≤0.456		>0.280	0.502	0.044	56
9	18	>0.456	>0.908	>0.165, ≤0.327	0.552	0.042	78
10	20	>0.456	>0.504, ≤0.733	>0.327	0.576	0.041	65
11	23	>0.456, ≤0.683	>0.733	>0.327, ≤0.459	0.589	0.029	102
12	24	>0.456, ≤0.683	>0.733	>0.459	0.644	0.031	61
13	25	>0.683	>0.733	>0.328, ≤0.542	0.669	0.027	36
14	26	>0.683	>0.733	>0.542	0.748	0.032	24

Source: Author

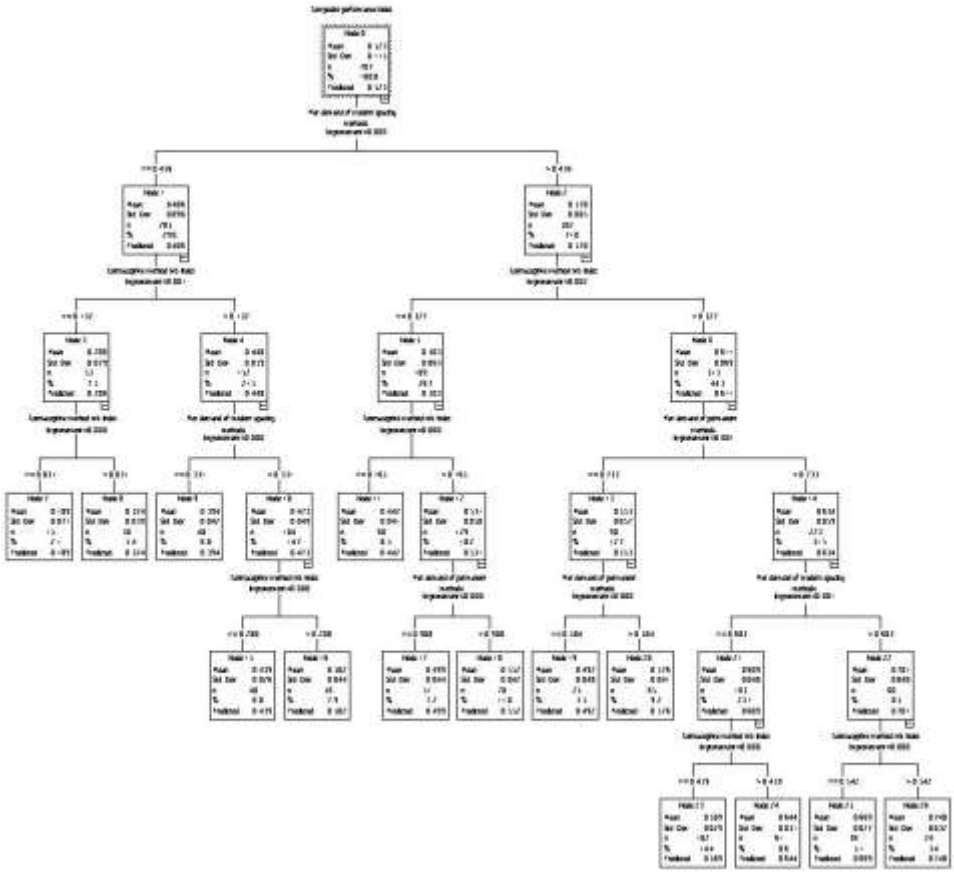


Figure 7: The classification tree
Source: Author

The latest NFHS 2019-2021 suggests that fertility in India has now decreased to below the replacement level so that fertility reduction imperative of family planning is now largely irrelevant. It is now the opportune time that family planning in India is pursued as a development strategy rather than just an intervention to limit births and reduce fertility. Potential benefits of family planning as the development strategy include economic development, improvement in maternal and child health, educational advancement, empowerment of women, and protection of the environment (Bongaarts et al, 2012; Cleland et al, 2006). Family planning has also been found to be a proven, cost-effective intervention for preventing mother-to-child transmission of HIV (Reynolds et al, 2005; Reynolds et al, 2006; Reynolds et al, 2008) and can protect against both unintended pregnancy and sexual transmission of HIV (Wilcher et al, 2009).

Benefits of family planning impact all the 17 Sustainable Development Goals (Starbird et al, 2016). It is estimated that 'every dollar invested in family planning saves four dollars in other health and development areas" (Toure et al, 2012; Frost et al, 2008). Reinvigorating family planning, especially, official family planning efforts, therefore, is the need of the time for India in its quest towards rapid social and economic development.

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