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Fertility Transition of Tribal Women using Fertility Transition Index (FTI): Study on Kankabati Gram Panchayat, Paschim Medinipur, WestBengal

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Abstract:

Fertility trends exhibit much more spatial variation among the states of India, while some of states reaching total fertility rates below 2.0 even as others far behind from the levels above 3.0. Although our national policy has been took forwarded for controlling population growth as well as total fertility. As a result, fertility declining at a slower rate than the others countries in Asia likes China, Thailand etc. But it is also found that spatial variation of fertility trends in India depends also on caste, religion, economic status etc. This paper is an attempt to focus on the pace of fertility change (fertility transition) by using Fertility Transition Index (FTI) after Chaurasia (2013) in terms of possible combinations of different factors as explanations for the tribal community. It is an exploratory exercise.

Keywords: Fertility trends, fertility transition, total fertility, tribal community, Fertility Transition Index (FTI)

1.0 Introduction:

Fertility Transition is the stage of high fertility to low fertility in the nineteenth and early twentieth centuries found in most of the developed countries i.e. Europe & America due to long-run economic growth. It is long-standing declines in the number of children from four or more per woman to two or fewer **(Mason, 1997).** Fertility is an important component of population dynamics, which acting as a major role in the size and structure of a given population or community **(Lutz & Samir, 2010)**. High fertility unfavourably influenced the socio-economic, demographic and environmental development of a country and/or in community level **(Alene & Worku, 2008)**. Generally the female with high fertility rate having the children with low birth spacing and some time with higher order births. Uncontrolled fertility rate among female are directly influencing the depletion of maternal health as well as health status of the children (**Zakir & Wunnava, 1999)**. Studies have proved that rate of fertility and infant mortality is closely related **(Bhattacharya et al., 1995; Winegarden & Bracy, 1995)**. Thus high fertility is accountable for long term poor health upshot.

The fertility status of a population is influenced by socio-economic status, place of residence, education, age of marriage, religion, ethnicity, son preference, family type, contraception etc **(Lobao & Brown, 1998; Samir et al., 2010; Bollen et al., 2001; Zhang, 2008; Mutharayappa, 1994; Adhikari, 2010)**. Numbers of proximate determinants have been identified **(Davis and Blake, 1956)** for the birth performances of an individual woman are maternal age of the woman; practice of contraceptive methods; terminate a conception and the effects of breastfeeding that has already been taken place. These proximate determinants of average birth performance of individual women are influenced by social, economic, cultural and family factors that may vary in community level.

Most of the analyses of fertility transition in India, however, are measured in terms of the total fertility rate. The total fertility rate of India is declining and stands at 2.18 as of 2017 at a slower rate in compare to China and USA (Fig-1 and Table-1). But in case of West Bengal it is at very slow rate in compare to other states of India.

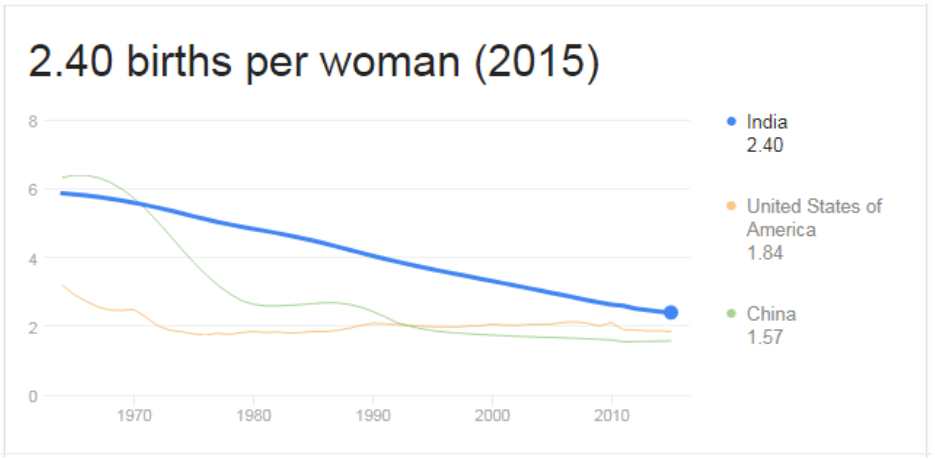

Fig-1: Change of Total Fertility rate of India

Table-1: Change of Fertility rate of India and Its states/ UTs (2004-2017)

Rank	State/UT	Fertility rate 2017	Fertility rate 2016	Fertility rate 2013	Change (2013-16)	Fertility rate 2004	Change (2004-16)
1	Sikkim	1.24	1.24	1.45	▼0.25	2.06	▼0.86
2	Andaman & Nicobar	1.51	1.55	1.73	▼0.23	2.25	▼0.75
3	Punjab	1.61	1.64	1.85	▼0.25	2.29	▼0.69
4	Kerala	1.63	1.66	1.81	▼0.21	1.75	▼0.15
5	Chandigarh	1.63	1.67	1.79	▼0.19	2.37	▼0.77
6	Tamil Nadu	1.67	1.70	1.77	▼0.07	1.82	▼0.12
7	Delhi	1.72	1.74	1.78	▼0.08	2.36	▼0.66
8	Tripura	1.73	1.75	1.88	▼0.18	–	-
9	Daman & Diu	1.75	1.75	2.03	▼0.33	2.66	▼0.96
10	Goa	1.74	1.76	1.85	▼0.15	1.91	▼0.21
11	Puduchery	1.75	1.77	1.86	▼0.16	1.93	▼0.23
12	Telangana	1.78	1.80	1.98	▼0.18	2.53	▼0.73
13	**West Bengal**	**1.79**	**1.81**	**1.64**	**▲0.18**	**2.25**	**▼0.12**
14	Lakshadweep	1.80	1.82	1.94	▼0.14	2.46	▼0.66
15	Andhra Pradesh	1.80	1.83	2.05	▼0.22	2.85	▼1.05
16	Karnataka	1.84	1.86	1.93	▼0.13	2.38	▼0.58
17	Himachal Pradesh	1.87	1.91	1.99	▼0.09	2.13	▼0.23
18	Maharashtra	1.91	1.92	1.86	▲0.04	2.23	▼0.33
19	Jammu and Kashmir	1.97	2.01	1.98	▲0.02	2.45	▼0.45
20	Gujarat	1.94	2.04	2.37	▼0.37	2.84	▼0.84
21	Odisha	2.07	2.12	2.18	▼0.08	2.65	▼0.55
22	Uttarakhand	2.11	2.13	2.27	▼0.17	–	–
23	Haryana	2.12	2.13	2.24	▼0.14	3.02	▼0.92
24	Arunachal Pradesh	2.11	2.14	2.18	▼0.08	–	–
25	Assam	2.17	2.20	2.36	▼0.16	2.95	▼0.75
26	Chhattisgarh	2.21	2.23	2.63	▼0.46	3.33	▼1.13

27	Madhya Pradesh	2.24	2.29	2.93	▼0.63	3.75	▼1.45
28	Dadra Nagar Haveli	2.31	2.35	2.39	▼0.09	2.55	▼0.25
29	Mizoram	2.33	2.38	2.65	▼0.35	3.22	▼0.92
30	Rajasthan	2.34	2.40	2.86	▼0.46	3.70	▼1.30
31	Jharkhand	2.53	2.57	2.77	▼0.17	3.50	▼0.90
32	Manipur	2.55	2.60	2.62	▼0.02	–	–
33	Nagaland	2.64	2.68	2.71	▼0.01	–	–
34	Uttar Pradesh	2.64	2.72	3.16	▼0.46	4.46	▼1.76
35	Meghalaya	2.91	3.04	3.12	▼0.12	4.05	▼1.05
36	Bihar	3.34	3.37	3.40	–	4.35	▼0.95
	India	2.18	2.23	2.34	▼0.14	2.94	▼0.74

▼Positive decrease, ▲ Negative increase – Steady

(Source: *The Indian Express*, *2017* from wikipedia)

The measures of total fertility rate do not reflect transition in birth planning, rather it is reflects on the transition in the birth limitation dimension of fertility **(Chaurasia, 2013).** Fertility transitions occur when a group of the population adopts birth-prevention measures under a multiplicity of institutional, cultural, socio-economic and environmental conditions. Within a given geographic/cultural region, fertility limitation or fertility transition is likely to undergo changes of environmental, cultural and/or socio-economic structure (Fig-2) different from others regions in the same country **(Mason, 1997)**. In India Tribals constitute 8.61% of the total population of the country, numbering 104.28 million (2011 Census) and cover about 15% area of the country. It is also remarkable that total tribal population of India is more than the population of some countries like Germany or the combined population of France and Australia (**Singh & Singh, 2012**). The fertility level of kankabati Gram Panchayat is unacceptably high. Scheduled Tribe women bearing more than two children are probably two times more than that of the women belonging to other castes (**Das Gupta, 2011**). Therefore, tribal women are more vulnerable than the non-tribal women. Lack of knowledge about contraception, male sterilization, other birth spacing methods and poor access of modern techniques due to economic, demographic, social, psychological barrier etc (**Nagdeve, 2012**) is the main cause of high fertility among tribal population.

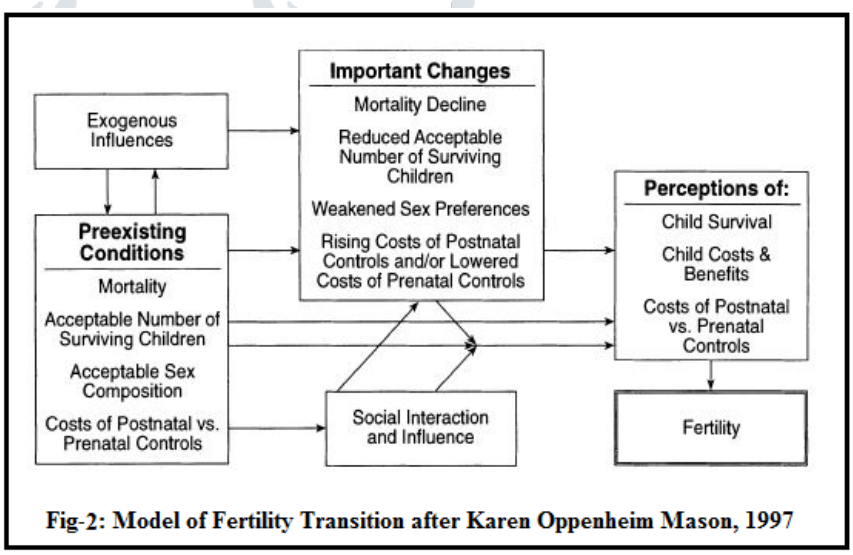

Fig-2: Model of Fertility Transition after Karen Oppenheim Mason, 1997

It is observed that the tribal women of Kankabati Gram Panchayat, Paschim Medinipur district, West Bengal work shoulder to shoulder with their men in most of economic pursuits i.e. agriculture and allied occupations such as agricultural labour, animal rearing, road laborers, wood cutters etc. The women are also prepared fodder for the cattle and leaves collected from forest. Tribal women are now promoted to do service and they themselves are aware to get empowered through different programmes taken by Govt. of India and West Bengal. Nonetheless, there are no changes of fertility transition as well as their culture. In this background, the present study focus on the pace of fertility change (fertility transition) and the determinants of fertility transition among the tribal women living in Kankabati Gram Panchayat.

1.1 Objectives:

The objective of the present study area:

1. To focus on the pace of fertility change (fertility transition) among the women of tribal community in the study area.
2. To identify the determinants of fertility transition among the women in the study area.

1.2 Data & Methods:

We use information available through the Panchayet level household survey. Survey was carried out all over the Kankabati Gram Panchyet and covered around 200 tribal households. The households surveyed were selected through a simple random sampling procedure and structured questionnaire. During the survey, information about all births was collected from all currently married tribal females in the reproductive age group included in the sample within 10 days. For each reported birth during the survey, information about the age of the woman at the time of the birth, order of birth, reason behind birth order, use of modern birth controlling techniques and family background etc. was collected. Data are summarised through the use of SPSS-20 software. Two methods are applied for the understanding of fertility transition and underlying factors of the tribal women. One method is Fertility Transition Index (FTI) after **Chaurasia (2013)** for the pace of fertility change. After Chaurasia (2013), the Fertility Transition Index (FTI) is define as

$$\mathbf{FTI = 1 - (b_{1.} + b_{.2})\ldots\ldots\ldots (1)}$$

$$\mathbf{FTI = 1 - (b_{11} + b_{12} + b_{.2})\ldots\ldots\ldots (2)}$$

Where

b_{21} = proportion of births to women aged 20-49 years and birth order less than 3.

$b_{1.}$ = proportion of births to women aged 15-19 years

$b_{.2}$ = proportion of 3rd and higher order births

b_{12} = proportion of 3rd and higher order births to women aged 15-19 years.

B_{11} = proportion of births to women aged 15-19 years and birth order less than 3.

According to **Chaurasia (2013),** total number of live births during a given year or any reference period distributed by the age of the woman and the order of the birth in the following matrix (Table-2):

Table-2: Fertility Transition Matrix (after Chaurasia, 2013)

Age of woman (Years)	Birth order		
	1-2	>=3	Total
15-19	B_{11}	B_{12}	$B_{1.}$
20-49	B_{21}	B_{22}	$B_{2.}$
Total	$B._1$	$B._2$	B..

We use only equation (1) which is based on two indicators - proportion of 3rd and higher order births ($B._2$) and the proportion of births to women aged less than 20 years ($B_{1.}$). $\boldsymbol{B_{1.}}$ is calculated as total number of live

births in the age of less than 20 years divided by total sample women and **$B._2$** is calculated as total number of 3rd and higher order births in the age within 15-49 years divided by total sample women in terms of percentage. According to Chaurasia (2013), population is characterised by different stages of fertility transition (Table-3) based on FTI, given as-

Table-3: Stages of Fertility Transition based on FTI (After Chaurasia, 2013)

FTI	Stages of Fertility Transition	Remarks
0	Fertility transition is not complete	3rd and higher order births confined to women less than 20 years of age
<0.30	Very early stage of fertility transition	
0.30 - ≤0.50	An early stage of transition	
0.50 - ≤0.70	Middle stage of transition	
0.70 - ≤0.90	Advanced stage of transition	
>0.90	Very advance stage of transition	
1.00	Fertility transition is complete	Universal adoption of the "small" family norm

It is also remarkable that the rate of increase in FTI reveals the pace of fertility transition. Second method is cross tabulation by using SPSS software. Cross tabulation helps to identify different factors as well as correlation among the factors.

1.3 Fertility Transition of the Study area:

In India, Percentage of live births to women aged less than 20 years decreased from 8.7 to 6.4 as well as proportion of 3rd and higher order births from 48.8 to 31.6 resulting FTI increased from 0.425 to 0.619 from 1991 to 2011 as a whole (Table-4). This entails that the fertility transition of India has shifted from early to middle stage from 1991 to 2011. It is also remarkable that percentage of live births to women aged less than 20 years is decreased at a slow rate in the rural area and remain same from 1991 to 2011(Table-4). In case of West Bengal, Percentage of live births to women aged less than 20 years increased from 12.3 to 13.4, but proportion of 3rd and higher order births is decreased from 45.9 to 23.5 mostly in rural and urban areas

Table- 4 : Fertility transition in India , 1991-2001 After A.R Chaurasia, 2013

Country	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
	Total population								
India	0.425	0.469	0.619	0.087	0.066	0.064	0.488	0.466	0.316
Rural	0.408	0.439	0.587	0.090	0.070	0.070	0.503	0.491	0.343
Urban	0.494	0.575	0.708	0.076	0.051	0.049	0.430	0.374	0.243

Table- 5 : Fertility Transition of West Bengal, 1991-2011 after A.R Chaurasia, 2013

Country/State/Union Territory	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
West Bengal	0.418	0.499	0.630	0.123	0.113	0.134	0.459	0.388	0.235
Rural	0.399	0.474	0.606	0.126	0.121	0.149	0.475	0.404	0.245
Urban	0.519	0.605	0.700	0.107	0.078	0.093	0.374	0.317	0.207

Table- 7 :Distribution of districts by fertility transition index in West Bengal after Chaurasia, 2013

State/Country	Fertility Transition Index (FTI)					
	Very low <0.20	Low 0.20-0.40	Average 0.40-0.60	High 0.60-0.80	Very high ≥0.80	Total
West Bengal	0	4	13	2	0	19

resulting FTI increased from 0.418 to 0.630 from 1991 to 2011 as a whole (Table-5). This entails that the fertility transition of West Bengal has shifted from early to middle stage from 1991 to 2011. Fertility transition was the most advanced in Hugli and Kolkata District (0.639 & 0.608) but very early stages in Uttar Dinajpur (0.297) in 2007-08 (Table-6), while most of the districts were early to middle stage of fertility transition (Table-7). It is noteworthy that 9-15 districts were under 20-30 percent of live births, 3rd and higher order births to women aged less than 20 years in 2007-08 (Table-8).

Table-6: Fertility Transition Index of West Bengal, 2007-08 after A. R. Chaurasia, 2013

State	District	Births to women aged <20 years (Per cent)	3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
West Bengal	Uttar Dinajpur	20.43	49.85	0.297
	Bankura	25.24	22.01	0.528
	Barddhaman	27.53	21.25	0.512
	Birbhum	32.02	28.57	0.394
	Dakshin Dinajpur	31.77	24.55	0.437
	Darjiling	17.15	23.01	0.598
	Haora	15.03	25.17	0.598
	Hugli	21.72	14.34	0.639
	Jalpaiguri	18.33	32.48	0.492
	Koch Bihar	28.72	31.23	0.401
	Kolkata	14.56	24.68	0.608
	Maldah	25.37	42.29	0.323
	Murshidabad	31.91	34.15	0.339
	Nadia	27.39	21.58	0.510
	North Twenty Four Parganas	23.62	23.62	0.528
	Paschim Medinipur	33.22	22.37	0.444
	Purab Medinipur	20.62	20.06	0.593
	Puruliya	24.74	34.90	0.404
	South Twenty Four Parganas	22.38	28.67	0.490

Table-8: Distribution of districts by the proportion of 3rd and higher order births and the proportion of births to women aged less than 20 years in India and states.

Country/ State	3rd and higher order births (Per cent)	Births to women aged less than 20 years (Per cent)					
		<5	5-10	10-15	15-20	>=20	Total
West Bengal	<10						
	10-20			0	0	1	1
	20-30			1	2	9	12
	30-40			0	1	3	4
	>=40			0	0	2	2
	Total			1	3	15	19

FTI of Paschim Medinipur district was 0.444 in 2007-08 indicating early stages of fertility transition i.e. proportion of live births to women aged less than 20 years, 3rd and higher order births were high in 2007-08. In this context, we calculate FTI of the tribal women of Kankabati Gram Panchayat, Paschim Medinipur using collected survey data (Table-9 & 10) and FTI equation (1) after Chaurasia as follow:

Table-9: Age of Women and Birth order			
Age of Women (Years)	Birth Order (population)		
	1-2	>=3	Total
15-19	**108 (B_{11})**	**2 (B_{12})**	**110 ($B_{1.}$)**
20-49	**(B_{21})**	**44 (B_{22})**	**($B_{2.}$)**
Total	**($B_{.1}$)**	**46 ($B_{.2}$)**	**200 ($B_{..}$)**
Source: Survey dada & Author Calculation			

Table-10: Proportion of birth and Age of Women			
Age of Women (Years)	Birth Order (proportion)		
	1-2	>=3	Total
15-19	**0.54 (B_{11})**	**0.01 (B_{12})**	**0.55 ($B_{1.}$)**
20-49	**(B_{21})**	**0.22 (B_{22})**	**($B_{2.}$)**
Total	**($B_{.1}$)**	**0.23 ($B_{.2}$)**	**($B_{..}$)**
Source: Author Calculation			

$$FTI = 1 - (b_{1.} + b_{.2})$$
$$=1-(0.55+0.23)$$
$$=1-0.78$$
$$=0.22$$

FTI of the tribal women of Kankabati Gram Panchayat is **0.22**. This implies that fertility transition of that area under very early stage (very low) i.e. reduction in the 3rd and higher order births resulting concentration of births in very young women (aged less than 20 years). Therefore, fertility transition is almost confined to the dimension of birth limitation only **(Chaurasia, 2013)**. The reason is that women are likely to limit their family size while higher order births would become more infrequent because proportion of 3rd and higher order births is linearly correlated to the total fertility rate (**Prasartakul et al. 1987, Srinivasan et al. 1992, Singh 2002)**. The stage of fertility also depends on rising age at marriage and the age at first birth **(Westoff, 1992)**. The age at first birth and age at marriage of the tribal women is proportionally high (Table-11). A declining proportion of births to women aged less than 20 years are also an indication of increasing interval between births **(Chaurasia, 2013)**. The tribal women having less than two years interval between two successive births is 40.76%, indicating increasing proportion of births to women aged less than 20 years in the study area. It has been observed that the age at first birth helps to declining the fertility **(Sivakumar, 2000)**. The study found that the inverse relationship between maternal age at first birth and proportion of 3rd & higher order births of the tribal women (Table-13). Furthermore, the knowledge and adoption of contraception can

Table-11: Births at age of Marriage			
Age at Marriage (Years)	Children ever born (%)		
	1-2	3-4	>4
<18	73.6	24.8	1.6
18-21	83.3	16.7	0
>21	83.3	16.7	0
Source: Field Survey			

Table-12: Interval between successive births	
Birth interval (Years)	Percentage of Women
<2	40.76
2-4	41.40
>4	17.83
Source: Field Survey	

change the fertility within marriage **(Sivakumar, 2000)**. The study reveals that 75% tribal women don'thave any knowledge about use of contraception and only 95.65% women used pill for the birth controlling practice prescribed by local physician doctors.

Table-13: Maternal age at first birth & Children ever born

Maternal age at first birth (Years)	Children ever born (%)		
	1-2	3-4	>4
<19	76.6	22.3	1.1
19-22	71.4	26.8	1.8
23-26	90	10	0
>26	80	20	0

Further, the studies of differential fertility by education, monthly income and nearest healthcare centre have clearly influence on the decline in fertility for some groups **(Pathak, K.B.; Singh, B.S., 1995)**. The study found that monthly family income, education of the tribal women and adjacent healthcare centre has a greater role in the controlling of higher order birth as well as decline in fertility (Table-14).

Table-14: Determinants of Fertility Transition

Determinants		Children ever born (%)		
		1-2	3-4	>4
Monthly average family income (Rs.)	<2100	68.4	28.9	2.6
	2101-2550	73.2	25.4	1.4
	2551-3000	78.6	21.4	0
	3001-3450	75	25	0
	>3450	100	0	0
Educational qualification of the women	Illiterate	72.1	25.6	2.3
	Primary	78.9	21.1	0
	Secondary	87.5	12.5	0
Nearest health care centre (distance in Km.)	1-2	73.7	25.5	0.7
	3-4	88.9	7.4	3.7

Conclusion:

The fertility transition index (FTI) is a useful method for monitoring the impact of fertility regulation programmes and interventions **(Bertrand, Magnani and Knowles, 1994)** of a nation as well as at the community level. Fertility Transition is one of important markers for the public health awareness, public health system, government policy and its implication in this population. It also helps to implementation of specific programmes for the specific groups of community. The fertility rate of the tribal women in this study area is high over and above fertility stage is also low. The higher the fertility of women, the more the risk associated with each birth. The reproductive role on top of the productive function of women put her in a poor social and economic status. The education level, socioeconomic status of the women can play a major role on the fertility status, birth interval and contraceptive used etc. of the tribal population in the remote areas of West Bengal. Female education may assist in achieving the planned number of births, especially by facilitating knowledge and access to contraception by enhancing women's haggle power within the family. The importance of education as a weapon to health and socio-economic independents should also be emphasised. Family planning program, healthcare facility should be more intensified among the Kankabati

gram panchayat areas. Programmes should also be designed to improve women's economic independence in general, although there has been launched SHGs programme, need to be intensified. Programmes to this effect should include those that will sensitize the consequences of early sexual debut, marriage and child bearing.

Acknowledgement:

The human participants of my study were the two hundred tribal (Santhal) women of Kankabati grampanchyat of Paschim Medinipur district. I have not included the non-tribal group and other tribal population for this study; it is one of the limitations of this study. The other limitation is that I have represented the fertility scenario of a single grampanchayat of a district in the Jangalmahal areas. A large scale study including a large population size may be helpful for better understanding of the socio-demographic interaction with fertility transition effectively.

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