

## Dependency Through Age Composition In Population Of The States In India – Projected Census Data

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**ABSTRACT:** The projected change in the demographic composition will result in excess or reduction of the work force compared to the elderly persons. The needs of children are mainly covered through transfers from the parents and the needs of elderly persons mainly through public transfers from the population which is active in the labour market. The relative sizes of these groups are surly extent of burden. The relative changes in the age-groups will act supply chain in the social structure. An increase in economic dependency will require more reallocation from workers to the dependent population. In the light of this, dependency ratio, age-specific dependency or support ratio has been calculated for the states in India for 2011, 2016, 2021, 2026, 2031 & 2036 years. The states have also been compared based on support ratio on projected population.

**KEYWORDS** – age specific dependency ratio, support ratio, age group, projected population

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### I. INTRODUCTION

About 70 million persons will reach age 60 between 2020 and 2029 in Europe ..(Loichinger *et al* 2015). This change in the age composition will result in a reduction of working force as compared to dependent persons. Dependency ratios are used as indicators with respect to economy. A large part of any population is usually economically dependent. The dependent population consists most notably of children and retired elderly persons. An increase in economic dependency will require more reallocation from working persons to the dependent population. Age-specific dependency ratio (ASDR) may be one of the indicators which is a particular case of support Ratio (Ghara 2020). Economic dependency ratios are a set of indicators which provide aggregate information on the degree of economic dependency. Demographic dependency ratios which are based on fixed threshold ages. The support ratios measure the capacity of the active population to provide for the dependent.

The dependency ratio is an age-population ratio of those typically not in the labor force (the dependent part ages 0 to 14 and 65+) and those typically in the labor force (the productive part ages 15 to 64). It is used to measure the pressure on the effective working population. The dependency ratio is essential for governments, economists, bankers, business, industry, universities and all other major economic segments which can benefit from understanding the impacts of changes in population structure. A higher ratio indicates more financial stress on working people, social security and possible political instability. While the strategies of increasing fertility and of allowing immigration especially of younger working age people have been formulas for lowering dependency ratios, future job reductions through automation may impact the effectiveness of those strategies. The inverse of the dependency ratio, the inverse dependency ratio measures indicator for one dependent person (pension & expenditure on children). Promotion to immigration of young people, optioning work for women will help decrease the dependency ratio. Dependency ratios are stochastic of unknown nature. Dependency ratios affect the global environment where social policy operates and the types of needs that it will be called to meet. Education is one of the indicators of life outcomes such as employment, income and social status and is a hard predictor of attitudes, employability and wellbeing. In this communication, it has been tried the way how dependency is changing and expected to change. It also determines where people switch from being dependent to independent and then again from independent to dependent, directly influencing the choice of policy responses. The large states of India have been compared based on dependency.

### II. DATA

Census data has been considered. Population projections for india and states 2011 – 2036 - report of the Technical Group on population projections (2020) has been taken as secondary data. All twenty two states of in India – Andhra Pradesh(AP), Assam(AS), Bihar(BI), Chhattishgarh(CG), Delhi(DEL), Gujarat(GUJ), Haryana(HAR), Himachal Pradesh(HP), Jharkhand(JH), Jammu & Kashmir(JK), Karnataka(KAR), Kerala(KE), Madhya Pradesh(MP), Maharashtra(MA), Orissa(OD), Punjab(PN), Rajasthan(RAJ), Telengana(TEL), Tamil

Nadu(TN), Uttar Pradesh(UP), Uttaranchal(UTK) and West Bengal(WB) have been considered. Data for Male, Female and Total for the ages 5 to 23 have been considered for all 22 states. For ASDR, the ages have been segregated into different age groups – 0-14, 15-59, 60+ and 5-9, 10-15(SE), 16-17(HS), 18-23(HE).

### III. RESULTS

Define  $Dep(X_i)$  assigns a value of one to individuals below a certain age (usually 14) and above a certain age (taken 60), and zero otherwise.

$Sup(X_i)$  takes on the value of one if the age of individual  $i$  falls between those age boundaries, and zero otherwise.

$$Dependency\ Ratio\ (DR) = \frac{\sum Dep(X_i)}{\sum Sup(X_i)}$$

$$Inverse\ Dependency\ Ratio\ (IDR) = \frac{\sum Sup(X_i)}{\sum Dep(X_i)}$$

*DRi means DR for the year  $i = 2011, 2016, 2021, 2026, 2031, 2036$ .*

Likewise, Support Ratios are calculated by relating the ability to support others to total dependency:

$$Age\ Specific\ Dependent\ Ratio\ (ASDR) = \frac{\sum_2 Sup(X_i)}{\sum_1 Sup(X_i)}$$

where  $\sum_1$  and  $\sum_2$  are the present age-group and the previous age-group respectively.

A lower ratio could allow for better pensions and better health care for citizens. A higher ratio indicates more financial stress on working people and possible political instability. ASDR may be looked as stochastic in nature.

**Table -1** showing dependency ratio(DR) of the projected total population –the states in India for the years 2011, 2016, 2021, 2026, 2031 & 2036

STATE	DR11	DR16	DR21	DR26	DR31	DR36
AP	54.81	50.96	49.09	49.49	50.68	52.99
AS	64.62	58.09	53.65	51.39	52.14	53.31
BI	87.07	79.10	70.17	65.23	63.31	62.96
CG	65.79	60.76	57.73	56.60	54.88	54.08
DEL	51.86	47.27	44.98	45.15	46.39	48.52
GUJ	58.60	55.15	53.91	54.22	54.38	54.68
HAR	62.12	56.62	53.31	51.64	50.34	50.06
HP	56.96	52.90	50.62	50.14	51.73	54.65
JH	74.46	66.62	60.23	56.16	55.23	54.54
JK	69.71	58.73	49.43	42.59	45.27	49.68
KAR	55.78	52.32	50.44	50.09	50.45	52.45
KE	56.54	56.98	58.51	61.18	64.58	68.12
MA	57.90	52.95	50.01	48.61	49.41	51.05
MP	69.53	64.20	60.71	59.53	56.66	55.09
OD	61.62	56.99	54.09	53.40	54.42	56.06
PN	56.49	51.61	49.25	49.28	50.18	51.91
RAJ	72.09	65.39	60.72	58.17	55.14	53.47
TEL	56.89	51.26	48.24	47.53	48.27	50.03
TN	51.86	50.52	50.42	51.76	53.74	57.15
UP	76.62	67.71	61.85	59.14	54.43	51.17
UTK	66.49	57.58	52.37	50.09	50.35	50.70
WB	55.63	50.31	47.72	47.71	49.82	52.73

It is interesting to note that minimum DR in the state of Bihar for the years 2011, 2016, 2021 and Kerala for the years 2031 & 2036. The maximum DR are in the state of Delhi for the years 2011, 2016, 2021 & 2036 and Jammu –Kashmir for 2026 & 2031 respectively. The minimums are decreasing and then increasing during 2011 to 2036. The maximums are also decreasing and then increasing during the period 2011 to 2036. Therefore, social dependency are declining and it at most 42 per 100 employed/working and at least 64 per 100 employed. DR shifted from higher to lower during 2011 & 2036 in the states MP, RAJ & UP and increasing in

KE. In all other states DR is decreasing till 2026 or 2031 and then increasing. The states are not uniformly sustainable towards social stability and well-being, healthcare, etc.. The correlation are highly significant and more than 0.91 for the years.

**Table – 2** showing age-specific dependency ratios (ASDR) of total population for the states in India for the years 2011, 2016, 2021, 2026, 2031 & 2036

STATE	AGE	P11	M11	F11	P16	M16	F16	P21	M21	F21
AP	SE	131.53	131.88	131.09	135.05	135.67	134.21	124.16	121.51	127.14
AP	HS	34.32	34.28	34.36	35.94	36.07	35.75	36.32	36.49	36.14
AP	HE	299.58	294.04	305.34	306.88	306.72	307.74	321.47	322.96	319.90
AS	SE	117.39	118.07	116.63	122.84	123.57	122.24	133.30	129.38	137.53
AS	HS	31.16	31.09	31.25	33.07	33.33	32.80	34.06	34.24	33.94
AS	HE	284.07	278.02	290.26	279.84	278.97	281.06	295.08	296.83	292.66
BI	SE	108.16	110.49	105.63	117.94	119.75	115.99	121.96	118.23	126.16
BI	HS	27.07	27.65	26.42	31.48	32.09	30.84	33.10	33.50	32.67
BI	HE	253.87	249.60	258.98	243.12	248.78	236.57	276.46	283.23	269.25
CG	SE	121.40	121.38	121.35	124.49	124.35	124.44	113.23	111.97	114.48
CG	HS	31.89	31.79	32.01	34.17	34.13	34.22	34.37	34.36	34.38
CG	HE	276.70	276.12	277.48	287.19	285.96	288.99	306.40	304.86	307.99
DEL	SE	128.27	130.13	126.42	130.20	132.66	127.76	124.24	122.48	126.32
DEL	HS	34.39	34.64	34.27	36.45	36.11	36.75	36.50	36.31	36.57
DEL	HE	305.64	301.08	309.18	323.25	316.98	331.27	342.46	331.69	356.65
GUJ	SE	123.60	124.05	123.05	125.65	126.80	124.29	118.07	115.51	121.13
GUJ	HS	33.06	33.01	33.11	34.62	34.69	34.54	34.75	34.97	34.48
GUJ	HE	290.91	288.86	293.17	299.92	298.18	302.02	313.63	312.51	314.75
HAR	SE	125.97	126.89	124.89	127.00	128.01	125.80	118.37	117.88	118.86
HAR	HS	33.77	33.73	33.92	35.17	35.26	35.14	35.08	35.05	35.10
HAR	HE	288.67	283.87	294.17	307.06	302.87	311.75	320.62	317.38	324.31
HP	SE	127.70	127.88	127.50	128.60	129.01	127.65	134.47	135.50	133.90
HP	HS	34.13	33.58	34.45	35.10	35.19	35.01	35.17	35.21	35.13
HP	HE	295.74	291.04	304.07	305.58	303.76	307.63	314.41	316.80	312.61
JH	SE	114.75	116.00	113.43	120.98	121.88	120.21	131.19	127.29	135.70
JH	HS	29.39	29.71	29.03	33.06	33.29	32.76	33.83	33.94	33.69
JH	HE	266.52	263.15	270.70	266.10	267.97	264.36	294.88	296.70	292.99
JK	SE	115.24	113.78	116.90	116.25	114.71	118.36	188.27	195.10	179.86
JK	HS	31.19	30.88	31.54	32.59	32.35	32.95	32.55	32.24	32.95
JK	HE	279.40	279.62	279.17	279.85	277.54	281.32	291.52	288.81	294.21
KAR	SE	127.79	128.52	127.00	127.15	128.04	126.18	121.76	119.54	124.18
KAR	HS	34.52	34.65	34.36	35.08	35.26	34.89	34.79	34.96	34.58
KAR	HE	303.84	301.07	306.83	310.77	311.29	310.39	316.17	317.32	315.34
KE	SE	124.73	124.77	124.96	123.68	123.78	123.61	125.26	125.02	125.51
KE	HS	33.12	32.87	33.35	34.52	34.65	34.40	33.88	33.94	33.83
KE	HE	296.37	288.58	304.33	296.20	294.38	297.53	307.80	309.92	305.59
MA	SE	127.00	127.67	126.24	126.30	126.91	125.59	132.86	130.83	135.26
MA	HS	34.20	34.38	34.00	35.16	35.23	35.10	34.74	34.82	34.65

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MA	HE	300.25	298.35	302.57	310.01	309.90	310.02	319.18	317.93	320.31
MP	SE	120.08	120.91	119.19	124.90	125.99	123.76	108.59	107.08	110.17
MP	HS	31.26	31.60	30.89	33.88	34.04	33.68	34.43	34.71	34.14
MP	HE	272.42	272.14	272.80	279.86	282.70	276.81	301.59	303.35	299.61
OD	SE	123.53	122.43	124.65	126.95	125.98	127.97	128.26	127.73	128.77
OD	HS	32.24	31.98	32.54	34.48	34.32	34.68	34.75	34.57	34.91
OD	HE	286.42	284.20	288.67	288.55	286.42	290.39	307.07	305.93	308.52
PN	SE	132.38	133.79	130.52	134.48	136.30	132.18	126.71	129.27	124.01
PN	HS	35.31	35.07	35.61	36.17	36.49	35.70	36.45	36.76	36.13
PN	HE	297.74	290.02	307.27	318.39	314.29	323.81	327.93	328.33	326.68
RAJ	SE	120.38	120.53	120.21	124.51	124.45	124.63	114.74	111.88	118.05
RAJ	HS	31.25	31.27	31.24	33.97	34.02	33.89	34.31	34.32	34.33
RAJ	HE	268.42	266.92	270.07	279.81	279.96	279.51	302.54	303.07	301.75
TEL	SE	131.44	131.14	131.70	134.19	134.18	134.20	128.05	124.95	131.54
TEL	HS	33.74	33.65	33.90	36.08	36.07	36.09	36.09	36.09	36.06
TEL	HE	296.28	291.21	301.02	301.89	300.99	303.15	322.28	322.57	322.00
TN	SE	129.01	129.19	128.87	128.18	128.29	128.02	123.69	121.17	126.47
TN	HS	34.42	34.19	34.66	35.27	35.42	35.12	34.81	34.82	34.84
TN	HE	306.66	299.84	313.73	308.58	306.13	311.29	316.13	317.05	314.79
UP	SE	123.15	123.78	122.41	132.53	133.30	131.72	108.47	106.15	111.16
UP	HS	30.83	31.00	30.64	34.73	34.91	34.53	36.04	36.24	35.82
UP	HE	255.40	254.70	256.16	273.54	275.68	271.11	306.35	308.98	303.38
UTK	SE	127.84	127.26	128.74	131.88	131.58	132.23	135.76	132.07	139.59
UTK	HS	33.11	32.77	33.49	35.71	35.41	35.89	35.85	35.78	36.00
UTK	HE	273.65	267.53	280.28	297.14	294.56	301.40	321.56	319.20	325.25
WB	SE	129.82	130.36	129.23	131.86	132.70	131.01	134.04	131.99	136.18
WB	HS	33.87	33.93	33.79	35.65	35.81	35.49	35.65	35.84	35.47
WB	HE	290.99	289.01	293.31	302.88	303.35	302.26	318.85	320.35	317.28

STATE	AGE	P26	M26	F26	P31	M31	F31	P36	M36	F36
AP	SE	127.27	127.56	127.01	132.88	133.62	132.09	133.05	133.77	132.26
AP	HS	33.50	32.81	34.24	35.00	35.26	34.67	36.06	36.20	35.90
AP	HE	325.99	327.84	324.20	302.15	296.83	308.47	313.01	315.34	310.32
AS	SE	121.52	121.51	121.51	123.58	124.18	122.94	123.54	124.18	122.79
AS	HS	36.42	35.40	37.49	32.81	33.10	32.43	34.19	34.34	34.04
AS	HE	303.95	305.69	302.46	324.83	316.67	334.48	295.91	298.04	293.61
BI	SE	123.47	122.96	124.04	112.52	112.51	112.51	116.66	116.57	116.76
BI	HS	33.64	32.65	34.73	33.81	34.03	33.57	30.88	30.95	30.80
BI	HE	291.57	297.10	285.83	296.96	290.91	303.76	298.45	301.93	294.55
CG	SE	122.35	121.91	122.82	127.76	127.53	127.82	128.03	127.63	128.35
CG	HS	31.40	31.06	31.76	34.48	34.41	34.58	35.15	35.05	35.25
CG	HE	309.89	308.43	311.20	285.94	282.22	289.87	309.56	308.14	311.07
DEL	SE	126.48	128.03	124.64	121.31	123.62	118.94	122.78	124.94	120.03
DEL	HS	35.10	34.03	36.51	36.12	35.93	36.31	34.77	34.52	35.10

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DEL	HE	347.09	334.83	359.87	337.27	316.93	361.51	346.08	331.56	362.65
GUJ	SE	120.10	121.20	118.85	125.58	127.32	123.47	128.17	130.13	125.95
GUJ	HS	32.79	32.00	33.70	33.80	34.21	33.35	35.00	35.27	34.69
GUJ	HE	316.25	316.72	316.00	300.58	292.88	309.82	307.83	308.91	306.54
HAR	SE	122.87	124.32	121.07	130.18	132.44	127.89	128.81	130.84	126.08
HAR	HS	32.92	32.61	33.41	34.64	34.84	34.43	36.10	36.31	35.89
HAR	HE	321.73	317.59	325.71	304.52	297.36	312.50	317.66	315.01	321.19
HP	SE	130.04	132.51	129.41	129.13	130.26	126.79	128.85	130.52	127.04
HP	HS	36.63	36.34	36.01	35.17	35.35	35.09	35.10	35.25	34.94
HP	HE	314.86	318.80	317.48	327.27	330.48	325.81	317.84	321.43	313.79
JH	SE	120.23	120.18	120.28	120.77	121.25	120.37	122.90	123.33	122.45
JH	HS	36.15	35.08	37.31	32.72	32.92	32.45	33.65	33.72	33.62
JH	HE	303.30	303.89	302.70	324.12	314.73	334.92	297.02	296.92	296.26
JK	SE	138.42	139.77	137.06	116.88	117.31	116.67	114.80	114.98	114.39
JK	HS	49.96	51.75	48.09	33.10	33.01	33.33	31.99	32.18	32.05
JK	HE	292.19	289.39	295.47	458.79	476.47	437.27	309.54	309.52	307.59
KAR	SE	129.90	130.09	129.68	130.68	131.31	130.04	128.15	128.80	127.51
KAR	HS	33.48	32.88	34.14	35.88	36.10	35.67	35.51	35.62	35.39
KAR	HE	314.37	315.59	313.29	303.69	298.13	309.67	322.98	323.82	322.05
KE	SE	125.86	125.81	125.80	122.86	123.13	122.69	123.42	123.55	123.39
KE	HS	34.37	34.41	34.32	34.39	34.46	34.32	33.62	33.70	33.51
KE	HE	303.31	305.29	301.44	307.25	308.81	305.82	307.50	309.89	304.98
MA	SE	126.52	127.33	125.67	129.95	131.08	128.53	128.90	130.05	127.51
MA	HS	36.49	35.86	37.22	34.51	34.75	34.23	35.85	35.99	35.72
MA	HE	316.65	315.55	317.88	331.75	324.60	340.32	316.55	315.84	317.37
MP	SE	122.25	122.54	121.90	125.95	126.67	125.24	129.07	129.71	128.40
MP	HS	30.03	29.62	30.47	34.66	34.88	34.44	34.51	34.67	34.34
MP	HE	307.95	310.73	305.28	272.57	269.73	275.52	307.69	309.54	305.68
OD	SE	124.64	124.69	124.52	124.78	124.67	124.89	126.57	126.62	126.60
OD	HS	34.94	34.95	35.03	33.98	34.00	33.91	34.25	34.28	34.23
OD	HE	310.89	309.40	311.60	312.63	312.76	312.80	304.33	305.38	303.54
PN	SE	127.87	129.01	126.91	130.56	131.15	129.73	130.81	131.68	129.51
PN	HS	34.45	34.84	33.99	35.29	35.31	35.27	35.75	35.84	35.75
PN	HE	331.76	331.85	330.81	315.13	316.81	313.45	321.54	319.35	323.47
RAJ	SE	123.74	123.88	123.60	126.95	127.57	126.29	129.04	129.71	128.37
RAJ	HS	31.66	30.92	32.46	34.63	34.87	34.36	34.74	34.87	34.60
RAJ	HE	307.11	307.49	307.27	285.71	279.87	292.16	308.51	310.26	306.54
TEL	SE	124.31	124.91	123.76	132.30	133.61	130.97	133.60	134.83	132.36
TEL	HS	34.52	33.81	35.32	34.01	34.36	33.60	36.14	36.47	35.90
TEL	HE	323.92	324.43	323.75	310.70	304.82	317.54	305.46	308.18	301.84
TN	SE	131.55	132.08	131.01	131.21	132.19	130.15	130.04	130.91	129.05
TN	HS	33.80	33.14	34.51	36.04	36.33	35.72	35.40	35.58	35.20
TN	HE	312.89	313.12	312.66	304.09	298.89	310.07	322.44	324.53	320.16
UP	SE	121.69	121.95	121.40	132.07	132.79	131.24	134.42	135.10	133.65

UP	HS	29.46	28.85	30.15	34.48	34.77	34.17	35.95	36.14	35.73
UP	HE	320.11	323.32	316.68	266.46	262.98	270.42	303.57	306.84	299.83
UTK	SE	121.65	122.88	119.95	123.85	125.93	121.72	126.28	128.18	124.09
UTK	HS	36.72	35.86	37.84	33.11	33.51	32.57	34.66	34.95	34.24
UTK	HE	325.38	322.60	329.67	334.10	324.48	345.86	303.91	305.15	302.44
WB	SE	129.72	129.51	129.90	126.82	126.95	126.65	128.22	128.33	128.19
WB	HS	36.13	35.59	36.70	34.91	35.02	34.80	34.51	34.53	34.46
WB	HE	320.14	322.05	318.09	324.56	320.20	329.06	314.19	315.10	313.23

Note : P, M, F mean total, male, female respectively

ASDR of the SE for total projected population is minimum in the state BI, JK, UP, GUJ, BI & JK for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state PN, AP, JK, JK, AP & UP for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; ASDR of the SE for male projected population is minimum in the state BI, JK, UP, JH, BI & JK for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state PN, PN, JK, JK, AP & UP for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively. ASDR of the SE for female projected population is minimum in the state BI, BI, MP, GUJ, BI & JK for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state TEL, AS, JK, JK, AP & UP for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively. The average for India is around 126.0 with sd as nearly 6.8.

ASDR of the HS for total projected population is minimum in the state BI, BI, JK, UP, JH & BI for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state PN, DEL, DEL, JK, DEL & TEL for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; ASDR of the HS for male projected population is minimum in the state BI, BI, JK, UP, JH & BI for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state PN, PN, PN, JK, TN & TEL for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively. ASDR of the HS for female projected population is minimum in the state BI, BI, BI, UP, AS & BI for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state PN, DEL, DEL, JK, DEL & TEL for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively. The average for India is around 34.3 with sd as nearly 1.7.

ASDR of the HE for total projected population is minimum in the state BI, BI, BI, BI, UP & AS for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state TN, DEL, DEL, DEL, JK & DEL for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; ASDR of the HE for male projected population is minimum in the state BI, BI, BI, JK, UP & JH for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state DEL, DEL, DEL, DEL, KAR & DEL for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively. ASDR of the HE for female projected population is minimum in the state UP, BI, BI, BI, UP & AS for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively; maximum in the state TN, DEL, DEL, DEL, JK & DEL for the years 2011, 2016, 2021, 2026, 2031 & 2036 respectively. The average for India is around 305.4 with sd as nearly 18.1.

## REMARKS

The states in India have been compared based on age specific dependency ratio or support ratio. Bihar, Jammu & Kashmir were the worse states in the past and forth coming census and stronger states in India with respect to support ratio for all 3 census years are Punjab, Delhi, Tamil Nadu & Telengana. It is to note that social security in terms of better preparing the social structure for employable and earning work force for next generation are more in the states like Punjab, Delhi, Tamil Nadu & Telengana for total and/or male and/or female population upto 2036.

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