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Research Paper

RAIPUR AS A NEW CAPITAL: IMPACT ON POPULATION

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As a city Raipur has been given a Capital status, a new urban centre is coming up near old settlement, the existing city is going through major structural and functional changes, which have tremendous impact on the population growth and it effects the overall housing scenario such as additional housing demands, changes in housing typology and occupancy rate, increased land value, emergence of slums, etc. Hence there was a tremendous pressure on the urban planners and different development authorities to manage the systematic growth of the city. The paper aims at finding out the probable growth of population of the city, if it had not been declared as the capital city of the state of Chhattisgarh. The paper also looks into the growth of population of the city after it has been declared as a Capital city. This paper analyses how the population change takes place when the status of the city is changed. Further, the future population growth as expected is also found out by various methods using mathematical and Graphical models.

Keywords: Capital, Urban centre, Settlement, Impact, Housing scenario, Housing demand, Housing typology, Occupancy rate, Land value, Slums

INTRODUCTION

First we mould our cities and then our cities mould us.

– **Winston Churchill**

Constantinos Apostolou Doxiadis, an eminent architect and planner, said the greatest problem of cities was the problem of managing growth; he argued with the city planners and said inadequate provisions for urban growth, resulted city growth like cancer. The inner core affected

the surrounding neighborhoods and outer edges gobble up the natural landscapes. He proposed several solutions for the rapidly growing cities, one of which was for city planners, to leave room for the expansion of the city core, along a predetermined axis so that most urban expansion would be channeled in the single direction.

The Raipur city derived its name from its creator, the *Kalchuri* King *Brahmdev Rai* who established it as the capital of his kingdom in the

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early fifteenth century. (Sandarbh Chhattisgarh, 2000) It is the largest urban centre of the Chhattisgarh region, and was the second important commercial centre after Indore when it was a part of erstwhile state of Madhya Pradesh. (Raipur Development Plan, 2011) Now the importance and significance of the city have increased many times due to its new capital status, and coming up of new urban center (capital complex) near the existing city, so it has to shoulder two responsibilities, i.e., administrative and as economic capital of the State. Therefore the pressure of development on Raipur city can easily be predicted in the near future.

Raipur was a growing city even before it was given Capital status because of its commercial, industrial and agricultural activities. It has other factors of importance such as abundant natural resources, availability of critical infrastructure-surplus power and opportunities in infrastructure provisions. The production factors such as low cost of land, peaceful industrial workforce are available here.

After declaring Raipur as a state capital on 1st November 2000, its importance has increased instantly and the State Government took various initiative measures to portray Raipur in national and international scenario. The state Government prepared an Industrial friendly policy and giving incentives to attract large investments in core sectors and downstream Industries, and a rapid work is going on transportation and infrastructure developments. At the same time the state government decided to build a prestigious and beautiful capital city for the state. The prime objective of the city is to be economically viable with least financial burden on state government.

So it is expected that there will certainly be an impact on the existing Raipur city and there will

be a major structural and functional change within the city and ample of employment opportunities will be generated due to the large investment in different sectors. This will result in a huge population growth particularly in the existing city. It is predicted that this additional growth in population is due to the people coming from outside of Raipur. It would create tremendous pressure on housing which may cause many undesirable situations. Thus it becomes imperative to develop necessary policy guidelines, proposals, recommendations, to deal with the future growth of population in the existing city Raipur.

MATERIALS AND METHODS

There are basically two types of projections, mathematical and graphical, although the two types are somewhat interchangeable because mathematical methods can be plotted and graphical data can be described, mathematically.

Data Sources

Some common sources of population information are:

- Census of India.
- State, regional, county, and city planning agencies.
- Municipal records.
- Births, deaths, other records.
- Master plans (Development plans).
- Water billing records.
- Electricity billing records.

The various methods to compute population projections, few of the computing major factors of growth dynamics of any settlement is 'Population Projection Method', 'Graphical method' etc.

Population Projection Methods

Projections are an extrapolation of historical data (population versus time) into the future. The accuracy of population projections is generally considered directly proportional to the size of the existing population and the historical rate of growth, and inversely proportional to the length of the time projection.

In order to compute population change, the first step is to compute the rate of change. This requires having populations for two time periods. These can be any two points in time since the rate of change will be based on the number of years between the two time periods.

$$\text{Rate of Change } \Delta P = \left(\frac{P_{t_2}}{P_{t_1}} - 1 \right)$$

$$\text{Percentage Rate of Change } \Delta P = \left(\frac{P_{t_2}}{P_{t_1}} - 1 \right) \times 100\%$$

When computing rates of change and population projections, there are 2 key assumptions. First, the rate of change over 10 years is assumed to be equally divided across each of the 10 years, and second, the population is assumed to continue to grow at the same rate as it has in the past, using both the geometric and exponential projections.

Geometric Growth

The formula for geometric growth is:

$$P_{t+n} = P_t (1+r)^n$$

where P_{t+n} is the year we are projecting to, in this case, 2010; and

P_t = The ending point for computing the rate of change, in this case, 2000;

r = The rate of change computed above; and

n = The number of time periods you are projecting forward.

In this case, it has been computed a ten-years rate of change and are computing a projection for 10 years later, so $n = 1$. If we were using the same rate of change (2000-2010) to compute a projected population for 2030, 'n' would equal 3 (3 ten-year time periods).

Exponential Growth

Exponential growth is a bit more complex because it uses "e." "e" is a constant with a value of approximately 2.71828. The formula for computing exponential growth is:

$$P_{t+n} = P_t e^{r*n}$$

where P_{t+n} is the year we are projecting to, in this case, 2010; and

P_t is the ending point for computing the rate of change, in this case, 2000; and

r is the rate of change computed above; and

n is the number of time periods we are projecting forward.

Existing Scenario of Population (Literature Survey)

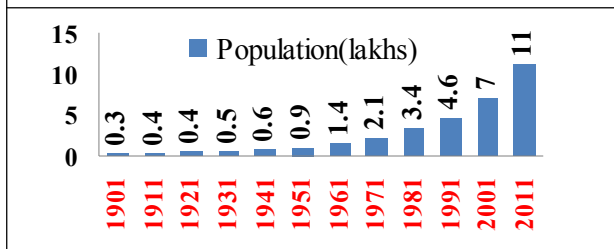
For finding out the existing population scenario of Raipur, the data has been collected from secondary sources (Literature survey). According to Literature survey population and growth trends are hereunder.

As per 2011 Census, the population of Raipur was 6.97 lakhs in 2001, 4.63 lakhs in 1991 and an average decadal growth rate was 50.54% when it was not a capital city. The table of decadal population growth trends of Raipur is given below (Table 3.1) (Chart 3.1).

Table 3.1: As per 2011 Census, the Population of Raipur Population and Growth Trends is Hereunder

Year	Population (in lakhs)	Decadal Variation (%)
1901	0.32	0
1911	0.35	10.00
1921	0.38	8.57
1931	0.45	18.39
1941	0.63	39.82
1951	0.89	41.5
1961	1.39	53.66
1971	2.06	47.35
1981	3.38	64.21
1991	4.63	36.54
2001	6.97	50.54
2011	11.23	61.12

Chart 3.1: The Chart Shows Population Growth Trends From The Year 1901 to 2011



RESULTS AND DISCUSSION

Scenario-A: Population Projection, If Raipur Was Not Declared As Capital

The future population based on the secondary data has been predicted as under:

In order to derive the growth rate of the city for the next 10 years, the growth rate of the last three decades has to be studied. During 1971-81, the settled refugees from Bangladesh had abnormally increased the growth rate up to 64.2%. Hence the consideration of this growth

rate may erroneous. Again, the growth in the last decade (50.54%) was much due to the declaration of Raipur as the capital of the new state of Chhattisgarh. The growth in the next decade will fall back to the normal, which can be taken as the average of the decadal growth rate of the last two decades, i.e., 43.54%. The population has been calculated using three methods described below. The final population data are based on all the three results.

The methods are given below.

Method-1

Geometric rate of change:

$$P_{t+n} = P_t(1+r)^n$$

$$= 2011,$$

$$= 6.97 \text{ lakhs (in 2001),}$$

$$r = 0.44, n = 1$$

$$P_{t+n} = P_t(1+r)^n$$

$$P_{2011} = 6.97 (1 + 10.1065 \text{ lakhs})$$

$$\text{Similarly, } P_{2021} = 10.11 (1 + = 14.5584 \text{ lakhs})$$

$$\text{And, } P_{2031} = 14.56 (1 + = 20.9664 \text{ lakhs})$$

Method-2

Exponential rate of change:

$$P_{t+n} = P_t e^{r*n}$$

$$P_{2011} = 6.97 = 10.82 \text{ lakhs.}$$

$$\text{Similarly, } P_{2021} = 10.82 = 16.800 \text{ lakhs}$$

$$\text{And, } P_{2031} = 16.80 = 26.085 \text{ lakhs}$$

Method-3

Graphical method showing the population projection: (Chart 4.1) and following (Table 4.1) shows the average population projection from mathematical and graphical methods (Scenario-A).

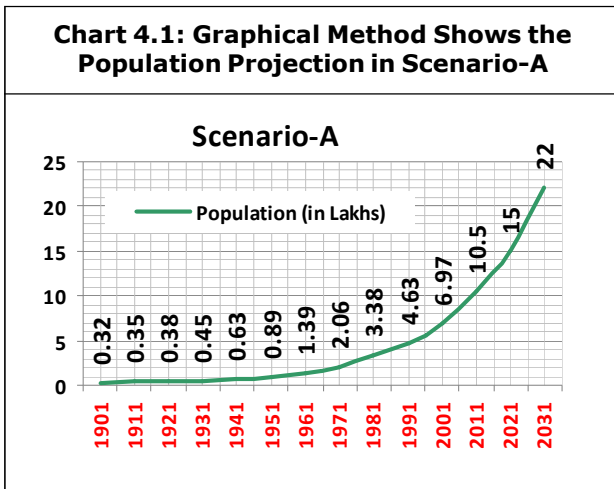


Table 4.1: Average Population Projection From Mathematical and Graphical Methods (Scenario-A)

Year	Population (in lakhs)	Decadal Variation (%)
2001	6.97	50.54
2011	10.46	50.07
2021	15.45	47.70
2031	23.02	48.99

Scenario-B

Population Projection, After Raipur Has Been Declared as Capital For 2011

As per Census 2011, the population of Raipur is 11.23 lakhs in 2011. This population includes the impacts on population, as state capital. The projected population in 2021 and 2031 is to be computed by both Mathematical and Graphical methods.

Method-1

Geometric rate of change:

$$P_{t+n} = P_t(1+r)^n$$

= 2021,
 = 11.23 (in 2011, as per census 2011),
 r = 0.61, n = 1

$$P_{t+n} = P_t(1+r)^n$$

$$P_{2021} = 11.23 (1 + 0.61) = 18.0803 \text{ lakhs}$$

$$\text{Similarly, } P_{2031} = 18.08 (1 + 0.61) = 29.1092 \text{ lakhs}$$

Method-2

Exponential rate of change:

$$P_{t+n} = P_t e^{r*n}$$

$$P_{2021} = 11.23 e^{0.61} = 20.6680 \text{ lakhs.}$$

$$\text{Similarly, } P_{2031} = 20.67 e^{0.61} = 30.0417 \text{ lakhs}$$

Method-3

Graphical method showing the population projection: (Chart 4.2) and following (Table 4.2) shows average population projection from Mathematical and Graphical methods: (Scenario-B).

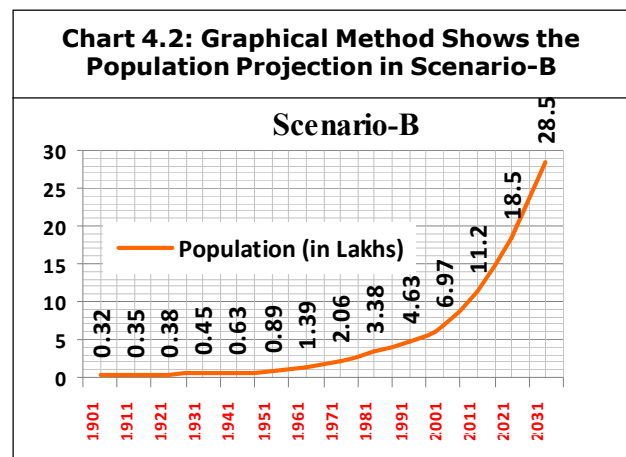


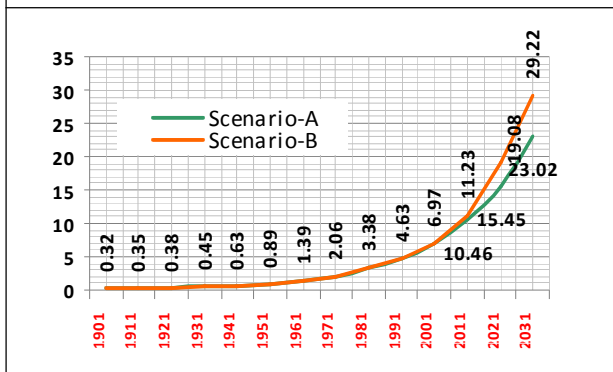
Table 4.2: Average Population Projection from Mathematical and Graphical Methods: (Scenario-B)

Year	Population (in lakhs)	Decadal Variation (%)
2011	11.23	61.12
2021	19.08	69.90
2031	29.22	53.14

CONCLUSION

Comparative (Chart 5.1) shows the average results of both the methods, i.e., Graphical and

Chart 5.1: Comparative Shows the Average Results of Both the Methods, i.e., Graphical and Mathematical Methods



mathematical methods. The difference of growth rate showed in Scenario-A and Scenario-B. After computing the population projection, it has been concluded that in scenario-A, population for the year 2011 = 10.46 lakhs, 2021 = 15.45 lakhs, and 2031 will be 23.02 lakhs and population growth rate for four decades are 49.33%. But in scenario-B, population projection for the year 2011 = 11.23 lakhs, 2021 = 19.08 lakhs, and 2031 = 29.22 and population growth rate is 61.38%. The difference in the both the growth rate is approximate 12%.

So this is concluded that 12% extra impact of population has to face the city than the natural growth. . This data also help to the urban planners and different development authorities to manage the systematic growth of the city and the provision for future expansion.

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