Increasing the schools level of education in Thanjavur District, Tamilnadu - 1998-2020 to apply the geographical information system

T. Sangeetha and R. Baskaran

Department of Industrial and Earthsciences, Tamiluniversity, Thanjavur, Tamilnadu

ABSTRACT

In this study I have used an increase the number schools project model to estimate the population growth for Thanjavur district, Tamil nadu. Until the years 2021 and to calculate the current and future needs elements in increasing the schools of the Thanjavur district. For urbanizations, I have employed GIS arc Info to digitize the maps and GIS-arc view to process the data combining with other analytical measurements to display the result.

Keywords: schools (general and professional) education students’ strength of Thanjavur district, Geographical information system, Statistical forecasting method.

INTRODUCTION

A population growth is a condition where an organism's numbers exceed the carrying capacity of its habitat. In common parlance, the term usually refers to the relationship between the human population and its environment, the Earth. Population growth does not depend only on the size or density of the population, but on the ratio of population to available sustainable resources. The overpopulated include clean water, clean air, food, shelter, warmth, and other resources necessary to sustain life. If the quality of human life is addressed, there may be additional resources considered, such as medical care, education, proper sewage treatment and waste disposal. Tamil Nadu has performed reasonably well in terms of literacy growth during the decade 1991-2001. The state's literacy rate increased from 62.66% in 1991 to 73.47% in 2001. which is above the national average. A survey conducted by the Industry body Assocham ranks Tamil Nadu top among Indian states with about 100% Gross Enrollment Ratio (GER) in primary and upper primary education

To find out the increasing the school’s students in the year of 2020-2021Thanjavur district, Tamilnadu in the from these 9 years statistical data’s.
MATERIALS AND METHODS

- To collect the 9 years schools (general and professional) education students strength data’s, statistical data’s from the statistical department.
- Schools (general and professional) education students’ strength data’s in 8 Taluk of Thanjavur district, Tamil nadu.
- From these data’s to put the statistical forecast method, to find out in the future situation of Thanjavur district schools (general and professional) education.
- Then to apply the GIS software from these final forecasts data’s.

Study area:
Thanjavur is located at10°48′N 79°09′E / 10.8°N 79.15°E 10.8; 79.15 approximately in the centre of the Indian state of Tamil Nadu. The town is located in the centre of the Cauvery delta, about 320 kilometers’ from the state capital Chennai and 56 kilometers from Tiruchirapalli. Thanjavur, situated in the eastern part of Tamil Nadu, was the capital of the Cholas, Kayaks and Marathas. It is surrounded by Perambalur, Tiruchirapalli, Tiruvarur, Nagapattinam and Pudukkottai districts.

The languages spoken are Tamil, Marathi and English. Thanjavur District covers an area of 3,396 sq km, and has a population of over 2.2 million. Cauvery is the main river. Agriculture is the major occupation of the people. Paddy, sugarcane, coconut and plantain are the chief crops. It receives an annual rainfall of 845 mm. The temperature varies from 22o C to 36o C. Divided into two distinct divisions, viz the Deltaic region and the Non-deltaic region, it spreads over an area of about 3396 sq km. The municipality has an area of about 36 km2. The township and its exterior suburbs extend for an area of about 100 km2. The town has an elevation of 57 meters above mean sea level. It is drained by the rivers Vadavar and Vennar in the north. (Thanjavur district statistical office book-2006-07).

Thanjavur is the eleventh largest city in Tamil Nadu with a population of 221,185 (est. 2008). Males constitute 50% of the population and females 50%. Thanjavur has an average literacy rate of 80%, higher than the national average of 59.5%; male literacy is 85%, and female literacy is 76%. In Thanjavur, 9% of the population is under 6 years of age. In Thanjavur district growth of population of the area. The demographics of Thanjavur provide comprehensive and detailed information on the population growth, sex ratio and literacy rate of the ancient city of Tamil Nadu. According to the census data of the year of 2001, the total population of Thanjavur is 22,16,138, out of which 10, 91,557 are males and 11, 13,375 are females. Thanjavur population comprises of 14, 57,204 rural inhabitants and 7, 48,171 urban inhabitants. Among the rural population, 7, 21,677 are men and 7, 35,527 are women. The urban population encompasses 3, 69,880 males and 3, 78,291 females. Thanjavur has a sizeable amount of schedule caste and schedule tribe population as well.

The schedule caste population of Thanjavur comprises of 3.01 lakhs, and the schedule tribe population of the ancient city of Tamil Nadu comprises of 0.04 lakhs. Most of the local indigenous inhabitants of the ancient city depend on agriculture for earning their livelihood. The cultivators of Thanjavur are classified into three distinct categories of small cultivators, marginal cultivators and agricultural laborers. As per the statistics provided by the census of the year
2001, the district of Tanjavur holds 41,856 populations of small farmers, 21,531 population of marginal cultivators and 4,68,906 population so agriculture all aborers.

The demographic statistics of the traditional city of Tamil Nadu in South India offers complete factual knowledge about Thanjavur. The census data shows that most of the native inhabitants of Thanjavur reside in the villages of the district and are engaged in agricultural activities.

### TALUK LEVEL POPULATION DATA-2001

<table>
<thead>
<tr>
<th>Name of Taluk</th>
<th>Total Population</th>
<th>Total Literates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Thanjavur</td>
<td>222679</td>
<td>225622</td>
</tr>
<tr>
<td>Thiruvaikudan</td>
<td>85740</td>
<td>87546</td>
</tr>
<tr>
<td>Orathanadu</td>
<td>115144</td>
<td>119151</td>
</tr>
<tr>
<td>Kumbakonam</td>
<td>201858</td>
<td>202535</td>
</tr>
<tr>
<td>Papanasam</td>
<td>125837</td>
<td>129256</td>
</tr>
<tr>
<td>Thiruvaiyar</td>
<td>106325</td>
<td>106652</td>
</tr>
<tr>
<td>Pattukottai</td>
<td>181460</td>
<td>188828</td>
</tr>
<tr>
<td>Peravurani</td>
<td>57595</td>
<td>59910</td>
</tr>
</tbody>
</table>

*(Sources- Thanjavur district statistical office books-2008).*
Time series methods, it is helpful to understand the behavior of time series in general terms. Time series are comprised of four separate components: trend component, cyclical component, seasonal component, and irregular component. These four components are viewed as providing specific values for the time series when combined. In a time series, measurements are taken at successive points or over successive periods. The measurements may be taken every hour, day, week, month, or year, or at any other regular (or irregular) interval. While most time series data generally display some random fluctuations, the time series may still show gradual shifts to
relatively higher or lower values over an extended period. The gradual shifting of the time series is often referred to by professional forecasters as the trend in the time series.

A trend emerges due to one or more long-term factors, such as changes in population size, changes in the demographic characteristics of population, and changes in tastes and preferences of consumers. In example, the trend may be decreasing over time. Professional forecasters often describe an increasing trend by an upward sloping straight line and a decreasing trend by a downward sloping straight line. Using a straight line to represent a trend, however, is a mere simplification in many situations, nonlinear trends may more accurately represent the true trend in the time series.

Although a time series may often exhibit a trend over a long period, it may also display alternating sequences of points that lie above and below the trend line. Any recurring sequence of points above and below the trend line that last more than a year is considered to constitute the cyclical component of the time series, these observations in the time series deviate from the trend due to cyclical fluctuations (fluctuations that repeat at intervals of more than one year).

The irregular component of the time series represents the residual left in an observation of the time series once the effects due to trend, cyclical, and seasonal components are extracted. Trend, cyclical, and seasonal components are considered to account for systematic variations in the time series. The irregular component thus accounts for the random variability in the time series. The random variations in the time series are, in turn, caused by short-term, unanticipated and nonrecurring factors that affect the time series. The irregular component of the time series, by nature, cannot be predicted in advance. Time series forecasting methods are based on analysis of historical data (time series: a set of observations measured at successive times or over successive periods). They make the assumption that past patterns in data can be used to forecast future data points.

**COMPONENTS OF TIME SERIES DEMAND:**

**Average:** The mean of the observations over time.

**Trend:** A gradual increase or decrease in the average over time.
Seasonal influence: Predictable short-term cycling behavior due to time of day, week, month, season, year, etc.

Cyclical movement: Unpredictable long-term cycling behavior due to business cycle or (product/service) life cycle.

I used this liner trend forecast method for in these theses: The linear trend forecasting models is defined by \( y = a + b(x) \) where \( x \) is observed from the value of the period \( t \), \( a \) is constants and also called a intercept and \( b \) is constant and is called as regression coefficient by applying least square principle first, we have to fit models as

For example for:

<table>
<thead>
<tr>
<th>YEARS</th>
<th>( y )</th>
<th>( x )</th>
<th>( x^2 )</th>
<th>( xy )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-99</td>
<td>59870</td>
<td>-4</td>
<td>16</td>
<td>239480</td>
</tr>
<tr>
<td>1999-00</td>
<td>56358</td>
<td>-3</td>
<td>9</td>
<td>169074</td>
</tr>
<tr>
<td>2000-01</td>
<td>58507</td>
<td>-2</td>
<td>4</td>
<td>117014</td>
</tr>
<tr>
<td>2001-02</td>
<td>62841</td>
<td>-1</td>
<td>1</td>
<td>62841</td>
</tr>
<tr>
<td>2002-03</td>
<td>63330</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003-04</td>
<td>64462</td>
<td>1</td>
<td>1</td>
<td>64462</td>
</tr>
<tr>
<td>2004-05</td>
<td>23870</td>
<td>2</td>
<td>4</td>
<td>47740</td>
</tr>
<tr>
<td>2005-06</td>
<td>87203</td>
<td>3</td>
<td>9</td>
<td>261609</td>
</tr>
<tr>
<td>2006-07</td>
<td>81595</td>
<td>4</td>
<td>16</td>
<td>326380</td>
</tr>
<tr>
<td>Total</td>
<td>558036</td>
<td>0</td>
<td>60</td>
<td>111782</td>
</tr>
</tbody>
</table>

Since \( \sum x = 0 \), therefore, (Sources- Thanjavur district statistical office books).

\[
(a) = \frac{\sum y}{n (n - Total)} = \frac{558036}{9} = 62004
\]

\[
(b) = \frac{\sum xy}{\sum x^2} = \frac{111782}{60} = 1863
\]

Thus substituting the value of ‘a’ and ‘b’ in the straight line of the trend, we get

\[
Y = a + b(x)
\]

\[
y = 62004 + 1863 (x)
\]

\[
x = 2006 - 2007 = 4
\]

\[
\text{So} \quad 2020 - 2021 = 18
\]

Forecast value for the year 2020-2021

\[
y = 62004 + 1863 (18)
\]

Forecast of the population for the year 2020-2021 = 95538
Classification of the school education of the thanjavur district:

- Schools for general education students,
- Schools for professional education students,

Schools of general education students and teachers

<table>
<thead>
<tr>
<th>YEARS</th>
<th>HER-SEC</th>
<th>HIGH</th>
<th>MIDDLE</th>
<th>PRIMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-1999</td>
<td>83</td>
<td>115</td>
<td>217</td>
<td>1100</td>
</tr>
<tr>
<td>1999-2000</td>
<td>104</td>
<td>119</td>
<td>217</td>
<td>1120</td>
</tr>
<tr>
<td>2000-2001</td>
<td>112</td>
<td>123</td>
<td>215</td>
<td>1113</td>
</tr>
<tr>
<td>2001-2002</td>
<td>112</td>
<td>123</td>
<td>214</td>
<td>1114</td>
</tr>
<tr>
<td>2002-2003</td>
<td>110</td>
<td>121</td>
<td>249</td>
<td>1124</td>
</tr>
<tr>
<td>2003-2004</td>
<td>99</td>
<td>124</td>
<td>256</td>
<td>1127</td>
</tr>
<tr>
<td>2004-2005</td>
<td>100</td>
<td>124</td>
<td>281</td>
<td>1208</td>
</tr>
<tr>
<td>2005-2006</td>
<td>148</td>
<td>171</td>
<td>305</td>
<td>1303</td>
</tr>
<tr>
<td>2006-2007</td>
<td>149</td>
<td>175</td>
<td>300</td>
<td>1314</td>
</tr>
<tr>
<td><strong>2020</strong></td>
<td><strong>190</strong></td>
<td><strong>251</strong></td>
<td><strong>481</strong></td>
<td><strong>1649</strong></td>
</tr>
</tbody>
</table>

(Source- Thanjavur district statistical office books)

In this Data’s shows, how many schools of general education increase during the period of 1998 to 2020. From these figures to classified the how many schools general education increase in Thanjavur district.

During the year of 1998-2007 the Her-secondary, high, middle and primary schools are increased in high level. But the same time the primary schools are year by year increasing to high. In between the years of 2007-2020 the Her-secondary, high, middle and primary schools will be increased in high level.
In this Data’s shows, how many students studied in her -secondary schools during the period of 1998 to 2020. From these figures to classified the growth rate of the students.

During the year of 1998-2004, students’ strength was high. The years 2004-05, the student’s strength was decrease. [Male -23870, female -31295, Totally -55165]. After that student’s strength was increased the next two years. [Male -81595, female -77842, Totally -159437]. In between 2007 to 2020, student’s strength will expect to increase. [Male -95538, female-93266,Totally -193804].

During the year 1998-2007 the teachers strength is gradually increase, in 2021[Teachers-4345].
In this Data’s shows, how many students studied in high schools during the period of 1998 to 2020. From these figures to classified the growth rate of the students.

During the year of 1998-2004, students’ strength was low. The next years 2004-05, the student’s strength was increase. [Male -64226, female -62794. Totally -127020]. After that student’s strength was decrease the next two years. [Male -30 891, female -35785, Totally -66676]. In between 2007 to 2020, student’s strength will expect to increase. [Male -60072, female-62008,Totally -122080].

During the year 1998-2007 the teachers strength is gradually increase, in 2021[Teachers-2215].
In this Data’s shows, how many students studied in middle schools during the period of 1998 to 2020. From these figures to classified the growth rate of the students.

During the year of 1998-1999, students’ strength was low. The next years 1999-2001, the student’s strength was decrease. [Male - 47145, female -11537, Totally -58682]. After that student’s strength was increase the next five years. [Male -43930, female -40920, Totally -84850]. In between 2007 to 2020, student’s strength will expect to increase. [Male -41398, female-44562, Totally -85960].

During the year 1998-2007 the teachers strength is gradually increase, in 2021[Teachers-2826].
In this Data’s shows, how many students studied in Primary schools during the period of 1998 to 2020. From these figures to classified the growth rate of the students.

During the year of 1998-2003, students’ strength was high. The next two years 2002-04, the student’s strength was decrease. [Male -66489, female -64622, Totally -13111]. Student’s strength was decrease the next three years. [Male - 67983, female -67586, Totally -135569]. In between 2007 to 2020, student’s strength will expect to increase. [Male -44071, female-183937, Totally -228008].

During the year 1998-2007 the teachers strength is gradually decrease, in 2021[Teachers-2542].
In this Data’s shows, how many students studied in teacher training –aduthurai during the period of 1998 to 2020. From these figures to classified the growth rate of the students.

During the year of 1998-2003, students strength was high. The next two years 2003-04, the student’s strength was decrease. [Male -46, female -53, Totally -99]. After that student’s strength was decrease the next three years. [Male -66, female -78, Totally -144]. In between 2007 to 2020, student’s strength will expect to increase. [Male -26, female-87, Totally -116]. male students strength is decreased in years by years.

During the year 1998-2007 the teachers strength is gradually decrease, in 2020[Teachers-27].
In this Data’s shows, how many students studied in teacher training –orathanadu, during the period of 1998 to 2020. From these figures to classified the growth rate of the students.

During the year of 1998-2001, students’ strength was low. The next two years 2002-03, the student’s strength was increase. [female -234, Totally -234]. Students’ strength was decrease the next years. The next two years 2005-07, the student’s strength was increase. [female -165, Totally -165]. In between 2007to 2020, student’s strength will expect to increase. [female-213,Totally -213]. Mostly the female students are concentrated.

During the year 1998-2007 the teachers strength is gradually decrease, in 2021[Teachers-9].
CONCLUSION

According to this study, from the year of 1998-2020 Thanjavur districts school student’s strength is gradually increased.

i. Her - secondary schools wise the student’s strength is will be increased to compare with previous years .in the year of 2020-the total students male-95538, female-98266, and total-193804.

ii. High school wise the student’s strength is will be increased to high because the middle schools were improved its status. So the high school students strength is will improved too high. In the year of 2020-the total students male-60072, female-62008, total-122080.

iii. Middle school wise the student’s strength is will be decreased to high. So the middle school students strength is will not improved. In the year of 2020-the total students male-41398, female-44562, total-85960.

iv. Primary schools wise the student’s strength is will be increased to compare with previous years .in the year of 2020-the total students male-44071, female-183937, and total-228008.

v. Nowadays the pre-primary schools are very fast to improve.

vi. Teacher training –Aduthurai students strength was low, but in 2020, student’s strength will expect to increase. [Male -26, female-87, totally -116].Male student’s strength is decreased in years by years.

vii. Teacher training –Orathanadu students strength was increased .in the year of 2020 [female-213;Totally -213]. Mostly the female students are concentrated.

So in this abve information to we are clearly known the Thanjavur district population will be increasing coming years. At the same time the literacy, transportation and medical health institution also increased too high. More over Thanjavur district will be urbanized in 2020-2021 years. In this changes are getting more problems in our society, but at the same time in these changes (population transportation, education, and medical health) are very power full influence of this urbanization studies.

REFERENCES

[3] (UNFPA 2002)). Hot spot of population growth and urbanization in the Asia-Pasific coastal region