



PHYSICAL QUALITY OF LIFE INDEX: ANALYSING STATE WISE LEVEL OF DEVELOPMENT IN INDIA

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ABSTRACT This paper analyzes variation in the regional development of India based on the Physical Quality of Life Index. This index based on three indicators literacy rate, life expectancy, and infant mortality rate. From the census and other reports, data have been extracted, and based on these data index values have been computed. These computed values show a disparity in the level of development. That shows the impact of various indicators on the development process of a country. This paper emphasizes the state wise differences in development. It shows the level of development in three classes high, medium, and low. It also shows the status of different states in comparison to India. Lastly there are some suggestions are given to resolve the problems in low developed regions based on PQLI.

KEYWORDS : Life Expectancy, Infant Mortality, Physical Quality of Life Index, Literacy

INTRODUCTION:

India is the second largest in terms of population and seventh in the area; it is characterized as one of the largest developing market economies in the world. It holds fifth position in gross domestic product and third in purchasing power parity. Since the latter half of the 20th century, India had developed it as a growing economy that is serving the world as well as the country itself. Therefore, the measurement of the country's development is very important in some short periods, to know about the actual well being or growth of the population. As the rate of development increases, it also shows the better condition of the population in various indices like human development index, headcount ratio, physical quality of life index, etc. In this paper, the Physical Quality of Life Index (PQLI) has been selected as an indicator of measurement of development that includes literacy and some basic population variables like infant mortality and life expectancy at birth. It is a composite index that includes the before said three indicators and gives a result value that shows the level of development. This paper includes a state wise analysis of the physical quality of life index of India and compares spatial differences in the level of development.

OBJECTIVES:

This study shows the level of development based on some indicators based on countries Education, Health, and Nutrition structures. Specified objectives are:

- To show the level of development based on PQLI.
- To study the development among the states of India.
- To find out the spatial variations of development in terms of PQLI.

Study Area: Study area includes 28 states and 7 union territories of India that extends from 8°4' north to 37°6' north latitude and 68°7' east to 97°25' east longitude. It covers almost 3.287 million km². This large areal extension shows the variation in the distribution of human resources. It is one of the major reasons behind the disparity in development among these regions.

Database And Methodology:

To prepare this index few parameters like life expectancy at birth, infant mortality rate, and literacy rates have been considered. These data mostly found in various government reports like Census of India, 2011, Selected Socio-Economic Statistics India 2011, 2011 and NITI AYOOG website, etc. In the construction of Physical Quality of Life Index values, some quantitative techniques have been applied and for mapping, QGIS software has been used. The focus is to develop an index and to show the regional differences in development among all states.

A Glimpse On Physical Quality Of Life Index In India:

The Physical Quality of Life Index (PQLI) is an index to measure the quality of life or level of development of a country. Morris and McAlpin (1982; 1-30) to determine the variation in regional development and economic growth developed this measure. Aforementioned three indicators are very easy to compute. These do not reflect any culture or perceptions, rather numerical values. These indicators not related to each other and have separate effects on development. Each component has different performance levels to

contribute to development. The performance of each indicator evaluated on a scale of zero to 100. 100 represent 'Best' performances and zero the 'Worst' performance. Once the performances of these indicators scaled into index values, to measure the common value or to equalize the effects of these indicators a composite index calculated by averaging the indicators by giving equal weight to each of them. This composite index also scaled into zero to 100. Literacy rate ranged from zero to 100 percent of the target population, the range for infant mortality rates are 229 to 7 per thousand births, life expectancy rates calculated in 38 to 77 years. The formulas to calculate PQLI:

1. According to this formula Years of Life Expectancy are calculated:

$$\frac{\text{Life Expectancy at Birth} - 38}{0.39}$$

2. Infant Mortality rate calculated to an index number according to this formula:

$$\frac{229 - \text{Infant Mortality Rate per Thousand}}{2.22}$$

3. Literacy Index values correspond to the actual census data.
4. The composite index for PHYSICAL QUALITY OF LIFE INDEX formula is:

$$\frac{\text{Life Expectancy Index} + \text{Infant Mortality Index} + \text{Literacy Index}}{3}$$

Example: Calculation of PQLI for India

1. Life Expectancy Index:

$$\frac{67.5 - 38}{0.39} = 75.64$$
2. Infant Mortality Index:

$$\frac{229 - 44}{2.22} = 83.33$$
3. Literacy index: 74.04 = 74.04
4. Physical Quality of Life Index:

$$\frac{75.64 + 83.33 + 74.04}{3} = 77.67$$

This composite index shows various types of development indicators and all of them are equally important. Based on the formulas PQLI calculated for 28 states and 7 union territories of India to show the variation or imbalance in regional development. Among the states, Kerala shows the highest PQLI value of 95.34 and the lowest in Uttar Pradesh and Madhya Pradesh with value 71.12. In Union Territories Puducherry has the highest with 91.83 and lowest in Chandigarh 82.24. These values represent the status of health condition, literacy, and awareness among the peoples about their social and economic development.

Status Of Indicators Among The States Of India:

This study reveals the spatial differences based on these indicators among the states of India. Literacy is the most important indicator among these three as the other two indicators highly depend on this. According to the diagram below the relationship

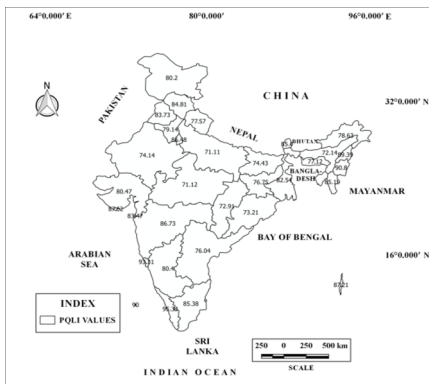


Figure 1: Glimpse On Physical Quality Of Life Index In India

Source: Electronic media [www.niti.gov.in](http://www.niti.gov.in/content/infant-mortality-rate-imr-1000-live-births): "content/infant-mortality-rate-imr-1000-live-births." Retrieved on 5/3/2020. [www.censusindia.gov.in](http://www.censusindia.gov.in/2011-prov-results/data_files/india/Final_PPT_2011_chapter6.pdf): "2011-prov-results/ data_files/india/Final_PPT_2011_chapter6.pdf" Retrieved on 5/3/2020.

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between literacy rate and the infant mortality rate is negative. As per product-moment correlation method R^2 value is 0.453 (figure 2) shows the moderately negative status of the relationship between these two indicators. As an example, the top-ranked states like Kerala (literacy rate 93.91% and IMR 12 persons per 1000 births), Goa (literacy rate 87.40% and IMR 11 persons per 1000 births), and third-ranked state in India and first in North Eastern Manipur also shows the same picture (literacy rate 79.85 % and IMR 11 persons per thousand births). In the state, those stands below the table according to PQLI values also show the same status of this relation as Uttar Pradesh (literacy rate 69.75% and IMR 57 persons per thousand births), Assam (literacy rate 73.18 and 55 persons per thousand births). However, in some states, this relation shows a different scenario. In states like Gujarat, Haryana, Jammu and Kashmir, and Rajasthan high Infant mortality rates are found with a high literacy rate (table: 1) The top-ranked states possess high literacy rate and it is expected that

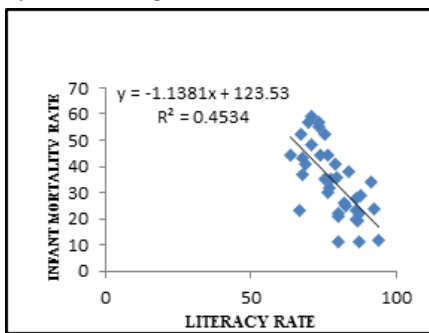


Figure 2: Relationship Between Literacy Rate And Infant Mortality Rate Of India, 2011

Source: Electronic media [www.niti.gov.in](http://www.niti.gov.in/content/infant-mortality-rate-imr-1000-live-births): "content/infant-mortality-rate-imr-1000-live-births." Retrieved on 5/3/2020.

[www.censusindia.gov.in](http://www.censusindia.gov.in/2011-prov-results/data_files/india/Final_PPT_2011_chapter6.pdf): "2011-prov-results/ data_files/india/ Final_PPT_2011_chapter6.pdf" Retrieved on 5/3/2020.

they will also possess good health care facilities. Awareness about child health care, maintaining proper guidelines before and after childbirth among the people reflects adequate provision and knowledge about basic health facilities. Therefore, they can cut down the IMR very significantly. In the low ranked states, there is a high load of the

population so the proper distribution of knowledge is restricted. Due to the low literacy rate and lack of awareness on basic health care facilities, the IMR is very high.

Second indicator - life expectancy rate also depends on literacy. According to the diagram (figure 3) the relationship between life expectancy rate and literacy rate is positive. As per product moment, correlation method R^2 , value is 0.245 that shows a low positive relation. The top ranked state depicts the same relationship, as the life expectancy rates are very high with high literacy. In Kerala, Goa and UT Puducherry Life expectancy rate is 74.8 years with above 90% literacy rate. Therefore, it is inevitable that literacy must have played a big role to develop proper health care facilities and lowers the cases of mal nutrition and hunger. On the other hand, the low ranked states Uttar Pradesh, Madhya Pradesh, Assam, and Chhattisgarh have only 63.8 years of life

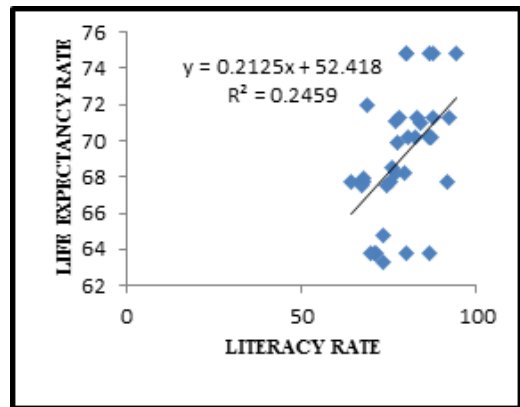


Figure 3: Relationship Between Literacy Rate And Life Expectancy Rate Of India, 2011

Source: [www.censusindia.gov.in](http://www.censusindia.gov.in/2011-prov-results/data_files/india/Final_PPT_2011_chapter6.pdf): "2011-prov-results/ data_files/india/Final_PPT_2011_chapter6.pdf" Retrieved on 5/3/2020.

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expectancy with nearly 70% of literacy. The gap between top and low ranked states is very high. In terms of literacy, it is almost 20% and in life expectancy, it is about 10 years. Therefore, it clearly depicts the high population load among the low ranked states as they have failed to raise the value of PQLI. There is an exceptional case in Chandigarh as high literacy (86.43%) with low life expectancy (63.8 years). The main reason behind this situation is air pollution. (www.indianexpress.com. Retrived on 20/5/2020)

Spatial Variation Of Physical Quality Life Index In India:

Based on the highest and lowest values of States and UTs there are three zones have been created as High, Medium, and Low. States and union territories having a PQLI of 71.1 to 79.2 are in the low level of development, those between 79.2 and 87.3 in medium level and 87.3 to 95.3 in high level of development. Thirteen states and union territories of India (37.14% of the total number of states and union territories) are in lowest zone, fifteen (42.86% of the total number of states and union territories) are in medium and seven (20% of the total number of states and union territories) in high level of development. The high zone has 5 union territories and only 2 states. These zones reveal the regional disparity among all States and union territories of India. As a developing country, India is going through the development process and this process based on these development indicators that show the growth of literacy rates based on combined gross enrolment ratio, adult literacy rate, and the effects some government policies across the country (Sarva Shiksha mission, mid-day meal). States and union territories having good health facilities, nutrition condition, medical facilities helps to uplift the Expected years of life and below the rate of Infant Mortality Rates. This total process shows the difference in the distribution of literacy and health facilities among various states of India. Almost 24 States and Union Territories showing PQLI values above countries level and 11 States and UT are having index values below the countries' average levels.

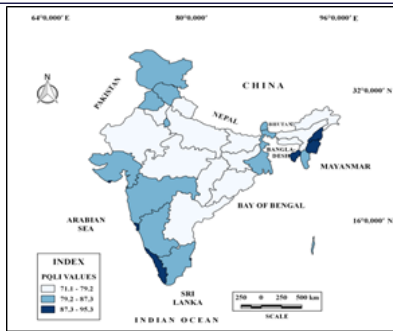


Figure 4: Physical Quality Of Life Indexes Showing Spatial Variation In Different States Of India, 2011

Source: www.niti.gov.in:”content/infant-mortality-rate-imr-1000-live-births.” Retrieved on 5/3/2020.

www.censusindia.gov.in:”2011-prov results/data_files/india/Final_PPT_2011_chapter6.pdf” Retrieved on 5/3/2020.

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Table 1: Condition Of States And Union Territories In India According To Pqli Values

Status Of Pqli Values Among The States And UT'S	States Of India	Life Expectancy At Birth (year)	Infant Mortality Rate(per Thousand People)	Literacy Rate	PQLI Values	Rank
Top Ranked States According To PQLI Values	Kerala	74.8	12	93.91	95.34	1
	Goa	74.8	11	87.4	93.32	2
	Manipur	74.8	11	79.85	90.8	3
Least Ranked States According To PQLI Values	Uttar Pradesh	63.8	57	69.72	71.12	28
	Madhya Pradesh	63.8	59	70.63	71.12	28
	Assam	63.3	55	73.18	72.14	26
	Chhattisgarh	63.8	48	72.91	72.91	25
Top Ranked UT On PQLI	Puducherry	74.8	19	86.55	91.83	1
Last Ranked UT On PQLI	Chandigarh	63.8	20	86.43	82.24	7

Source: www.niti.gov.in:”content/infant-mortality-rate-imr-1000-live-births.” Retrieved on 5/3/2020. www.censusindia.gov.in: “2011-prov results/data_files/india/Final_PPT_2011_chapter6.pdf” Retrieved on 5/3/2020.

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Table 2 Physical Quality Of Life Index, States, And Union Territories Of India

PQLI Value Range	Characteristics	Name Of The States	Share Of States In Percentage
71.1- 79.2	LOW	<i>Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Haryana, Jharkhand, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Uttar Pradesh, Uttarakhand.</i>	37.14%
79.2-87.3	MEDIUM	<i>Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Mizoram, Punjab, Sikkim, Tamil Nadu, Tripura, West Bengal, Chandigarh, D&N Haveli, Andaman, and Nicobar island.</i>	42.86%
87.3-95.3	HIGH	<i>Goa, Manipur, Nagaland, Daman & Diu, Lakshadweep, Puducherry and Kerala.</i>	20%

Source: www.niti.gov.in:”content/infant-mortality-rate-imr-1000-live-births.” Retrieved on 5/3/2020. www.censusindia.gov.in:”2011-prov results/data_files/india/Final_PPT_2011_chapter6.pdf” Retrieved on 5/3/2020.

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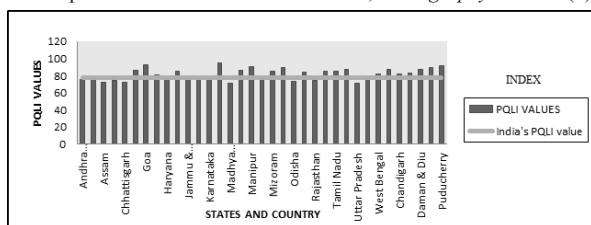


Figure 5: Physical Quality Of Life Indexes Showing The Status Of Different States In Comparison To India, 2011

Source: www.niti.gov.in:”content/infant-mortality-rate-imr-1000-live-births.” Retrieved on 5/3/2020.

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Table 4: Physical Quality Of Life Index Of India, 2011

States Of India	Life Expectancy At Birth (year)	Life Expectancy Index	Infant Mortality Rate (per Thousand People)	Infant Mortality Index	Literacy Rate	Literacy Index	PQLI Values
Andhra Pradesh	67.9	76.67	43	83.78	67.66	67.66	76.04
Arunachal Pradesh	67.7	76.15	23	92.79	66.95	66.95	78.63
Assam	63.3	64.87	55	78.38	73.18	73.18	72.14
Bihar	67.7	76.15	44	83.33	63.82	63.82	74.43

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DISCUSSION AND CONCLUSION:

To assess the development various indicators have been taken to show a composite index namely PQLI. To develop this index based on census and other secondary data sources are used. Variations among the states and ut’s show the uneven distributions of these indicators. However, states like Kerala, Goa, and Tripura have almost reached at the optimum level of development. Some states like Bihar, Jharkhand, Uttar Pradesh, and Madhya Pradesh with huge areal extension and population showing a sluggish rate of development. If some changes have been done based on this analysis to equalize the development then it will decrease the variations. The zones with low development in Uttar Pradesh, Madhya Pradesh, Bihar, and Orissa having a large amount of rural area and huge population pressure needs some development policies related work participation and poverty alleviation that will help to grow their economic condition. These policies indirectly will affect education, health facilities. Economic growth helps to develop per capita income that leads to the uplift living standard. If these policies are implemented then it will breakdown the vicious circle of poverty and indirectly it will slow down the rate of unemployment, hunger, malnutrition, morbidity, child mortality, etc.

Chhattisgarh	63.8	66.15	48	81.53	71.04	71.04	72.91
Delhi	70.2	82.56	28	90.54	86.34	86.34	86.48
Goa	74.8	94.36	11	98.19	87.4	87.4	93.32
Gujarat	68.2	77.44	41	84.68	79.31	79.31	80.48
Haryana	68.2	77.44	44	83.33	76.64	76.64	79.14
Himachal Pradesh	71	84.62	38	86.04	83.78	83.78	84.81
Jammu & Kashmir	72	87.18	41	84.68	68.74	68.74	80.2
Jharkhand	67.7	76.15	37	86.48	67.63	67.63	76.75
Karnataka	68.5	78.21	35	87.39	75.6	75.6	80.4
Kerala	74.8	94.36	12	97.75	93.91	93.91	95.34
Madhya Pradesh	63.8	66.15	59	76.58	70.63	70.63	71.12
Maharashtra	71.3	85.38	25	91.89	82.91	82.91	86.73
Manipur	74.8	94.36	11	98.19	79.85	79.85	90.8
Meghalaya	67.7	76.15	52	79.73	75.48	75.48	77.12
Mizoram	67.7	76.15	34	87.83	91.58	91.58	85.19
Nagaland	74.8	94.36	21	93.69	80.11	80.11	89.39
Orissa	64.8	68.72	57	77.48	73.45	73.45	73.22
Punjab	71.1	84.87	30	89.64	76.68	76.68	83.73
Rajasthan	67.5	75.64	52	79.73	67.06	67.06	74.14
Sikkim	70.2	82.56	26	91.44	82.2	82.2	85.4
Tamil Nadu	70.2	82.56	22	93.24	80.33	80.33	85.38
Tripura	71.3	85.38	29	90.1	87.75	87.75	87.74
Uttar Pradesh	63.8	66.15	57	77.48	69.72	69.72	71.12
Uttarakhand	63.8	66.15	36	86.94	79.63	79.63	77.57
West Bengal	69.9	81.79	32	88.74	77.08	77.08	82.54
Andaman & Nicobar islands	70.2	82.56	23	92.79	86.27	86.27	87.21
Chandigarh	63.8	66.15	20	94.14	86.43	86.43	82.24
D&N Haveli	71.3	85.38	35	87.39	77.65	77.65	83.47
Daman & Diu	70.2	82.56	22	93.24	87.07	87.07	87.62
Lakshadweep	71.3	85.38	24	92.34	92.28	92.28	90
Puducherry	74.8	94.36	19	94.59	86.55	86.55	91.83
India	67.5	75.64	44	83.33	74.04	74.04	77.67

Source: [www.niti.gov.in:content/infant-mortality-rate-imr-1000-live-births](http://www.niti.gov.in/content/infant-mortality-rate-imr-1000-live-births). Retrieved on 5/3/2020.

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