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INTERSTATE VARIATION IN QUALITY OF LIFE IN INDIA – AN EMPIRICAL ANALYSIS

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ABSTRACT

*The concept of quality of life broadly encompasses how an individual measures the 'goodness' of multiple aspects of their life and it is measured by many social and economic factors. In this context a research study on **Interstate variation in quality of life in India – An empirical analysis** was formulated with the **objectives** of computing quality of life index for different States of India and identifying the factors causing interstate variation in quality of life in India. The study was related to 16 major states of India. The required information were compiled from National Health Profile 2008: Economic Survey, 2011-12 and Selected educational statistics, 2011-12. Following the United Nations Development Programme procedure, index of education, index of life expectancy, index of per capita income and finally the index of quality of life was calculated. The study estimated Theil's inequality index of selected variables and applied discriminant analysis. The study found that the estimated educational index was found to be the highest in Kerala (.93) and lowest in Bihar (.63). The quality life index was found to be the highest in Punjab (3.70) and lowest in Bihar (2.394). The estimated discriminant function revealed that population in various states accounted for large percentage of (77.95) change in quality of life. The study recommended that, to improve quality of life efforts need to be formulated to expand educational opportunity for the children and also more number of primary health centres should be established.*

INTRODUCTION

The concept of quality of life broadly encompasses how an individual measures the 'goodness' of multiple aspects of their life. These evaluations include one's emotional reactions to life occurrences, disposition,

sense of life fulfilment and satisfaction, and satisfaction with work and personal relationships (Diener, Suh, Lucas, & Smith, 1999).

Quality of life/well-being has both objective components – i.e., components external to an individual and measurable by ‘others’ – and subjective components – i.e., personal assessments of one’s own life or of particular aspects of life using measures of satisfaction, happiness, or other self-assessment scales (Campbell et al., 1976).

The well-being or quality of life of a population is an important concern in economics and political science. It is measured by many social and economic factors. A large part is standard of living, the amount of money and access to goods and services that a person has; these numbers are fairly easily measured. Others like freedom, happiness, art, environmental health, and innovation are far harder to measure. This has created an inevitable imbalance as programs and policies are created to fit the easily available economic numbers while ignoring the other measures that are very difficult to plan for or assess.

Many key indicator systems are bringing into the mix measures that give a more humanistic interpretation of what constitutes well-being, satisfaction, or desirability, i.e., the quality of life (QOL). In this sense, QOL indicators are measures that are non-monetary, socially-oriented, and qualitative in context. They manifest the pervasive agreement or general consensus of a population on what is valued and desired.

According to Diener and Suh, “QOL indicators or well-being measures are necessary since their aims are to evaluate society and add substantially to the regnant economic indicators that are now favored by some policymakers.” These QOL indicators provide an important additional measurement, a “direct” one, about how people feel about life conditions, which unlike economic and other objective measures or data are “indirect.” As such, QOL indicators explore and identify what factors are important to the good life, which do not rest solely on wealth or gross domestic product (GDP).

Kekic (2005) as well as in an earlier article by Felce and Perry (1995) state that these QOL factors are varied and extensive and cover the wide range of life domains. These include, for example, material comforts, health conditions, recreational opportunities, social interaction, learning or education status, creative expression and diversity, cultural values, work environment, compensation and finance, professional development, leisure activities, safety, housing, and freedom of expression. These factors, when placed within a common frame of reference, give an alternative and expanded comprehension as to existing external influences and life conditions, i.e., “a more complete, fuller assessment of the quality of life.

QOL indicator systems have established themselves as useful and insightful ways of determining the status and position of select populations. They provide another facet, a more humanized one, to assess the progress of the economy, education, health, and other commonly used categorizations of people within a specified geographical area—from the community-level to much larger spheres such as regions and states, even nations.

Determinants of quality of life

The nine quality-of-life factors, and the indicators used to represent these factors, are:

1. **Material wellbeing**, GDP per person, at PPP in \$.
2. **Health**, Life expectancy at birth, years.
3. **Political stability and security**, Political stability and security ratings.
4. **Family life**, Divorce rate
5. **Community life**, Dummy variable taking value 1 if country has either high rate of church attendance or trade-union membership; zero otherwise.
6. **Climate and geography**.
7. **Job security**.
8. **Political freedom and**
9. **Gender equality**.

In India researchers like Gargi Ghosh (2012), Indra and Venkatraja(2012) Sujoy das and Niranjana Roy (2013), have analysed the Quality of life of people. But there had been no effort concentrating on the analyses of **Inter State variation in Quality of life**. Hence the research study on "**Interstate variation in quality of life in India – An empirical analysis**" was formulated with the following **objectives**.

- a. To compute quality of life index for different States of India
- b. To find out the extent of variation in different components of quality of life in different States of India and
- c. To identify the factors causing interstate variation in quality of life in India

Hypotheses formulated:

- i. There exist no regional variation in quality of life
- ii. State population, number of primary health centres, total expenditure and educational expenditure are insignificant determinants of quality of life.

Methodology

The study is related to 16 major states of India – Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal. These states account for 90 percent of the total population of India. The present research work extensively depends on the Secondary data from the following official sources.

1. National Health Profile 2008.
2. SRS India, 2009

3. Economic Survey, 2011-12
4. Selected educational statistics, 2011-12.

Following the United Nations Development Programme procedure, the following different index numbers have been constructed:

(i) Index of 'education is given by:

$$IE = \frac{(\text{Actual value of Xi of the state}) - (\text{Minimum value of Xi})}{(\text{Maximum value of Xi}) - (\text{Minimum value of Xi})}$$

Where Xi refer to the State – wise literacy rate in percentage. The UNDP has assumed the minimum and maximum values of literacy rate to be 0 and 100 percent respectively

(ii) Index of life expectancy is given by:

$$ILE = \frac{(\text{Actual value of Xi of the state}) - (\text{Minimum value of Xi})}{(\text{Maximum value of Xi}) - (\text{Minimum value of Xi})}$$

Where Xi refer to the State – wise figure of life expectancy at birth in years. The UNDP has assumed the minimum and maximum values of life expectancy to be 25 and 85 years respectively.

(iii) Actual value of Purchasing Power Parity is given by:

$$PPP = \frac{\text{Per capita income of the state}}{\text{Per capita GDP}} * 1240$$

Here, PPP refers to the purchasing power parity of rupee equivalent to dollar. The per capita GDP at the All India level is considered as \$ US 1,240 as given by the UNDP. The per capita GDP of India at current price stood at Rs. 6,262 in the year 2010-2011.

(iv) Index of per capita income of the state is given by:

$$IPCI = \frac{(\text{Actual value of PPP of the state}) - (\text{Minimum value of PPP})}{(\text{Maximum value of PPP}) - (\text{Minimum value of PPP})}$$

Here the UNDP assume the minimum and maximum values of per capita GNP at PPP to be \$US 100 and 5,448 respectively.

(v) Index of any item of quality of life is given by:

$$Iqa = \frac{(\text{Maximum value}) - (\text{Minimum value})}{(\text{Actual value}) - (\text{Minimum value})}$$

UNDP assumes minimum and maximum values to be 0 to 100 percentage respectively, which makes actual value of any item to be equal to index of that item.

(vi) Index of quality of life is given by:

$$Qli = \frac{\text{Sum of index numbers of all items of quality of life}}{\text{Number of items of quality of life}}$$

Tools used

1. Theil's inequality index

To find out the extent of variation in literacy rate life, expectancy, per capita income and other selected variables the study calculated Theil's inequality index. The formula used was

$$X = x \cdot \log_1/x$$

2. Discriminant analysis

The study applied discriminant analysis to identify the factors causing interstate variation in quality of life. On the basis of the average quality of life index, the states were classified into two categories - Group I comprises of State having quality of life higher than the state average, and Group II represents the States having quality of life below the national average. The estimated discriminant function is of the form

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

where,

Y = Quality of life;

X1 = State population;

X2 = Number of primary health centers;

X3 = Total expenditure in various States and

X4 = Education expenditure

The discriminant function was estimated based on unstandardized coefficients and the validity of discriminant function was tested by calculating Mahalanobis d^2 value. Based on the discriminant function coefficient the relative discriminant power of each variable was calculated.

FINDINGS OF THE STUDY

A. Interstate variation in different components of quality of life

Quality of life is influenced by education, life expectancy, per capita net domestic product, drinking water, electricity, households, number of beds etc.

Estimated educational index for the different states of India 2011

Table 1 represents estimated educational index for the different states of India

TABLE 1 ESTIMATED EDUCATIONAL INDEX FOR THE DIFFERENT STATES OF INDIA 2011

Sr. No.	States	Literacy Rates 2011	Educational index *	Rank
1	Andhra Pradesh	67.66	0.67	14
2	Assam	73.18	0.73	10
3	Bihar	63.82	0.63	16
4	Gujarat	79.31	0.79	5
5	Haryana	76.64	0.76	7
6	Himachal Pradesh	83.78	0.83	2
7	Karnataka	75.60	0.75	9
8	Kerala	93.91	0.93	1
9	Madhya Pradesh	70.63	0.70	12
10	Maharashtra	82.91	0.82	3
11	Orissa	73.45	0.73	10
12	Punjab	76.68	0.76	7
13	Rajasthan	67.06	0.67	14
14	Tamil Nadu	80.33	0.80	4
15	Uttar Pradesh	69.72	0.69	13
16	West Bengal	77.08	0.77	6
	India	74.04	0.74	

Source: Economic Survey

*Estimated figure based on the data compiled

Table 1 reveals that literacy rate was the highest in Kerala (93.91 percent) and lowest in Bihar (62.82 percent) As such the estimated educational index was found to be the highest in Kerala (.93) and lowest in Bihar (.63).

Estimated life expectancy index for different states of India - 2002-06

Table 2 represents the estimated life expectancy index for different states of India

TABLE 2: ESTIMATED LIFE EXPECTANCY INDEX FOR DIFFERENT STATES OF INDIA - 2002-06

No.	States	Life expectancy (in years)	Life expectancy Index*	Rank
1	Andhra Pradesh	64.4	0.65	8
2	Assam	58.9	0.56	14
3	Bihar	61.6	0.61	10
4	Gujarat	64.1	0.65	8
5	Haryana	66.2	0.68	4
6	Himachal Pradesh	58.6	0.56	14
7	Karnataka	65.3	0.67	6
8	Kerala	74.0	0.81	1
9	Madhya Pradesh	58.0	0.55	16
10	Maharashtra	67.2	0.70	3
11	Orissa	59.6	0.57	13
12	Punjab	69.4	0.74	2
13	Rajasthan	62.0	0.61	10
14	Tamil Nadu	66.2	0.68	4
15	Uttar Pradesh	60.0	0.58	12
16	West Bengal	64.9	0.66	7

	India	64.7	0.66	
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Source: SRS, Registrar General of India

*Estimated figure based on the data compiled

The analysis of estimated life expectancy revealed that Kerala has the highest life expectancy index of 0.81 and Madhya Pradesh has the lowest index of 0.56.

Table 3 represents estimated index of per capita net state domestic product for various States of India

TABLE 3 ESTIMATED INDEX OF PER CAPITA NET STATE DOMESTIC PRODUCT AT FACTOR COST FOR DIFFERENT STATES OF INDIA 2010-11

(at Constant Prices)

Sr. No	States	Per capita net state domestic product at Current Prices In ₹	Purching power parity In ₹	Index of per capita net state domestic product*	Rank
1	Andhra Pradesh	62912	12457	0.026	8
2	Assam	30569	6053	0.003	14
3	Bihar	20708	4100	-0.003	16
4	Gujarat	75115	14874	0.034	3
5	Haryana	94680	18748	0.048	1
6	Himachal Pradesh	65535	12977	0.027	7
7	Karnataka	60946	12068	0.024	9
8	Kerala	71434	14145	0.032	5
9	Madhya Pradesh	32222	6380	0.004	13
10	Maharashtra	83471	16528	0.040	2
11	Orissa	40412	8002	0.010	12
12	Punjab	69737	13809	0.030	6
13	Rajasthan	42434	8402	0.011	11
14	Tamil Nadu	72993	14454	0.033	4
15	Uttar Pradesh	26355	5218	0.000064	15
16	West Bengal	48536	9611	0.015	10
	India	53331	10560.59	0.019	

Source: Central Statistical Office (CSO) website as on 01.03.2012

*Estimated figure based on the data compiled

Table 3 implies that the index per capita net State domestic product was found to be the highest in Haryana (0.048)

The study tries to estimate the quality of life based on the data on percentage of household with access to safe drinking water, electricity connection, residence in pucca houses and availability of beds in public hospitals.

Estimated index of Households with Access to Safe Drinking Water – 2010-11

Table 4 presents the estimated index with reference to household access to safe drinking water.

TABLE 4 ESTIMATED INDEX OF HOUSEHOLDS WITH ACCESS TO SAFE DRINKING WATER – 2010-11

Sr. No	States	Percentage of Households with Access to Safe Drinking	Estimated Index*	Rank
1	Andhra Pradesh	80.1	0.80	10
2	Assam	58.8	0.58	15
3	Bihar	86.6	0.86	5
4	Gujarat	84.1	0.84	9
5	Haryana	86.1	0.86	6
6	Himachal Pradesh	88.6	0.88	2
7	Karnataka	84.6	0.84	8
8	Kerala	23.4	0.23	16
9	Madhya Pradesh	68.4	0.68	12
10	Maharashtra	79.8	0.79	11
11	Orissa	64.2	0.64	14
12	Punjab	97.6	0.97	1
13	Rajasthan	68.2	0.68	13
14	Tamil Nadu	85.6	0.85	7
15	Uttar Pradesh	87.8	0.87	4
16	West Bengal	88.5	0.88	3
	India	77.9	0.77	

Source: Economic Survey, 2011-12; Office of the Registrar General, Ministry of Home Affairs,

*Estimated figure based on the data compiled

It can be inferred from Table 4 that Punjab has highest index of households with safe drinking water (0.97) and Kerala has the lowest value (0.23).

Estimated index of households with access to electricity

Table 5 represents the estimated index with reference to household access to electricity.

TABLE 5 ESTIMATED INDEX OF HOUSEHOLDS WITH ACCESS TO ELECTRICITY

Sr. No	States	Percentage of households with access to electricity	Estimated index*	Rank
1	Andhra Pradesh	92.2	0.92	5
2	Assam	37.1	0.37	12
3	Bihar	16.4	0.16	14
4	Gujarat	90.4	0.90	6
5	Haryana	90.5	0.90	6
6	Himachal Pradesh	96.8	0.96	1
7	Karnataka	90.6	0.90	6
8	Kerala	94.4	0.94	3
9	Madhya Pradesh	67.1	0.67	10
10	Maharashtra	83.9	0.83	9
11	Orissa	43.0	0.43	16
12	Punjab	96.6	0.96	2
13	Rajasthan	67.0	0.67	15
14	Tamil Nadu	93.4	0.93	4
15	Uttar Pradesh	36.8	0.36	13
16	West Bengal	54.5	0.54	11
	India	67.3	0.673	

Source: Economic Survey, 2011-12

*Estimated figure based on the data compiled

There was a remarkable disparity with respect to households with access to electricity. While 96.8 percent of the households in Himachal Pradesh had electricity connection only 16 percent of the households in Bihar had the electricity connection.

Estimated index with reference to percentage of households residing in pucca houses with four rooms

Table 6 represents the percentage of households residing in pucca houses with four rooms

TABLE 6 ESTIMATED INDEX WITH REFERENCE TO PERCENTAGE OF HOUSEHOLDS RESIDING IN PUCCA HOUSES WITH FOUR ROOMS

Sr. No	States	Percentage of households residing in pucca houses with four rooms	Estimated index*	Rank
1	Andhra Pradesh	6.6	0.06	9
2	Assam	20.6	0.20	1
3	Bihar	7.0	0.07	7
4	Gujarat	5.2	0.05	11
5	Haryana	5.6	0.05	11
6	Himachal Pradesh	13.0	0.13	2
7	Karnataka	9.1	0.09	5
8	Kerala	5.0	0.05	11
9	Madhya Pradesh	9.3	0.09	5
10	Maharashtra	4.3	0.04	16
11	Orissa	6.6	0.06	9
12	Punjab	20.6	0.20	1
13	Rajasthan	7.0	0.07	7
14	Tamil Nadu	5.2	0.05	11
15	Uttar Pradesh	5.6	0.05	11
16	West Bengal	13.0	0.13	2
	India	7.5	0.075	

Source: Economic Survey, 2011-12;

*Estimated figure based on the data compiled

In Punjab highest percent of households (20.6 percent) were living in household with four rooms. In contrast in Maharashtra only 4.3 percent of households were living in houses with four rooms.

Estimated index with reference to availability of beds in public hospital

Table 7 represents the information on availability of beds in public hospital

TABLE 7 ESTIMATED INDEX WITH REFERENCE TO AVAILABILITY OF BEDS IN PUBLIC HOSPITAL

Sr. No	States	Number of beds per lakh population	Estimated index*	Rank
1	Andhra Pradesh	76	0.76	4
2	Assam	16	0.16	13
3	Bihar	45	0.45	9
4	Gujarat	79	0.79	3
5	Haryana	11	0.11	15
6	Himachal Pradesh	10	0.1	16
7	Karnataka	57	0.57	8
8	Kerala	110	1.1	2
9	Madhya Pradesh	21	0.21	11
10	Maharashtra	128	1.28	1
11	Orissa	17	0.17	12
12	Punjab	28	0.28	10
13	Rajasthan	14	0.14	14
14	Tamil Nadu	61	0.61	7
15	Uttar Pradesh	74	0.74	5
16	West Bengal	71	0.71	6
	India	321	3.21	

Source: Directorate general of Health Service Statistical Abstract of India 2002

*Estimated figure based on the data compiled

Table 7 implies that in Maharashtra the number of beds available in public hospitals was found to be the highest (128) and in Himachal Pradesh it was found to be the lowest (10).

Estimated quality of life index for different states of India.

Based on the above indices the study tried to estimated quality of life index for different states of India. Table 8 represents the estimated quality of life index for different states of India.

TABLE 8 ESTIMATED QUALITY OF LIFE INDEX FOR DIFFERENT STATES OF INDIA

Sr. No	States	Edu- -cation index	Life expec- -tancy index	Per capita net state domestic product index	Drinking water index	Electri- -city index	House index	Beds index	Quality of life index
1	Andhra Pradesh	0.67	0.65	0.026	0.80	0.92	0.06	0.76	3.23
2	Assam	0.73	0.56	0.003	0.58	0.37	0.20	0.16	2.47
3	Bihar	0.63	0.61	-0.003	0.86	0.16	0.07	0.45	2.31
4	Gujarat	0.79	0.65	0.034	0.84	0.90	0.05	0.79	3.38
5	Haryana	0.76	0.68	0.048	0.86	0.90	0.05	0.11	3.31
6	Himachal Pradesh	0.83	0.56	0.027	0.88	0.96	0.13	0.1	3.40
7	Karnataka	0.75	0.67	0.024	0.84	0.90	0.09	0.57	3.37
8	Kerala	0.93	0.81	0.032	0.23	0.94	0.05	1.1	3.15
9	Madhya Pradesh	0.70	0.55	0.004	0.68	0.67	0.09	0.21	2.72
10	Maharashtra	0.82	0.70	0.040	0.79	0.83	0.04	1.28	3.40
11	Orissa	0.73	0.57	0.010	0.64	0.43	0.06	0.17	2.46
12	Punjab	0.76	0.74	0.030	0.97	0.96	0.20	0.28	3.70
13	Rajasthan	0.67	0.61	0.011	0.68	0.67	0.07	0.14	2.73
14	Tamil Nadu	0.80	0.68	0.033	0.85	0.93	0.05	0.61	3.43
15	Uttar Pradesh	0.69	0.58	0.000064	0.87	0.36	0.05	0.74	2.66
16	West Bengal	0.77	0.66	0.015	0.88	0.54	0.13	0.71	3.10
	All India	0.74	0.66	0.01	0.77	0.67	0.07	3.21	3.37

Source: Calculated figures based on the data compiled

Table 8 makes it evident that quality life index was found to be the highest in Punjab (3.70) and lowest in Bihar (2.31). At the All India level the estimated index was (3.37). The states of Andhra Pradesh, Assam, Bihar, Haryana, Kerala, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal had the quality of life index below the All India average.

B) Estimated Theils inequality index of selected variables

To find out the extent of variation in literacy rate, life expectancy, per capita income and other selected variables the study calculated Theils inequality index Table 9 represents the estimated Theils inequality index of selected variables.

TABLE 9 ESTIMATED THEILS INEQUALITY INDEX OF SELECTED VARIABLES

S. No.	Variables	Theil's inequality index
1	Literacy Rate	-0.02959
2	Life expectancy	0.0058
3	Per capita net state domestic product	0.2767
4	Percentages of Households with Access of Safe Drinking	0.0307
5	Percentages of Households with Access of Electricity	0.0748
6	Percentages of Households residing in pucca houses with four rooms	0.1445
7	Number of beds per lakh population	0.2493
8	Quality of life index	0.008916

Source: Calculated figures based on the data compiled

Table 9 reveals that there had been more variation in per capita net state domestic product since the estimated Theils inequality index was found to be highest (0.2767) However the estimated Theils inequality index was found to be the lowest for literacy rate (-0.02959).

C) Identification of factors causing interstate variation in quality of life index

The study applied discriminant analysis to identify the factors causing interstate variation in quality of life On the basis of the average quality of life index the State were classified in to two category - Group I comprise of states, having quality of life higher than the State average and Group II represents the States having quality of life below the national average.

Initially to test the mean difference in the quality of life, wilks Lambda (U – statistics) and its equivalent univariate F – test, one way analysis of variance was calculated.

Table 10 represents the estimated Wilks lambda and univariate statistics of selected variables

TABLE 10 WILKS LAMBDA AND UNIVARIATE STATISTICS OF THE SELECTED VARIABLES

Variable	Wilks lambda	F value/ chi-square	Significant level
Population	.842	2.629	.121
Primary health centre	.990	.148	.707
Expenditure	.981	.278	.606
Educational expenditure	.983	.236	.635
Chi square	10.287		.036

The selected variables are significant as indicated by Wilk's lambda and chi square value. Table 11 represents the estimated potency index of the selected variables.

TABLE 11 ESTIMATED POTENCY INDEX OF THE SELECTED VARIABLES

Variable	Group I mean	Group II mean	Mean difference (xi)	Bi	bixi	Potency index
Population	6.78	3.75	3.03	.778	2.33	77.95
Number of primary health centres	1408.5	1240	168.5	.002	.33	11.25
State expenditure	341.12	402.92	16.8	.004	.24	8.28
Educational expenditure by the states	16.58	17.30	.72	.105	.07	2.52
Total					2.99	100

Of the selected variables, population in various states accounted for large percentage of (77.95) change in quality of life. However the educational expenditure by the States has contributed only 2.52 percent change in quality of life.

CONCLUSION

1. There exist interstate variation in quality of life
2. The population is an important factor influencing quality of life in various States.

MEASURES RECOMMENDED

1. To improve literacy in backward States efforts need to be formulated to expand educational opportunity for the children in all States.
2. More number of primary health centres and community health centres should be established to improve health status and
3. The drinking water facilities need to be improved in all the States and further all the villages need to be electrified.

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