Quality of life in Dimapur (India)

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I. Introduction: Raising the quality of life, defined as the state of material well being of a community or an individual on account of availability of, access to and consumption of the requisites of generally aspired conditions of living, is ordinarily an important objective of almost all socio-economic and political endeavours. For determining the direction of such endeavours and stressing particular points or aspects pertaining to the same, one has to measure the extent of quality of life that a community has attained. Then one may also investigate into the nature and the determinants of quality of life attained by that community to choose the correct type of instruments for policy or planning purposes.

Yet, one must distinguish quality of life from standard of living. Standard of living is defined by the state of consumption activities pertaining to the material requisites of well being that is commanded by the means at the disposal of the consumer and consumption of which goods and services is willful and optional. Quality of life is inclusive of the standard of living and something more. Beyond the standard of living, it includes the impacts and effects of a willful or compulsory consumption of the externalities in the surrounding, natural or man-made, appealing or obnoxious, that defines the consumer's state of living in its entirety.

Any economy at a particular instance has a fixed amount of material as well as oligarchic wealth (in the sense of Roy Harrod) that it can offer to the consumers. Here wealth means "goods and services", whether natural or man-made. Similarly, it also has a fixed amount of material and oligarchic nuisances, "bads and dis-services", whether natural or man-made, to offer to the consumers. The offer, optional or compulsory at the end of the supplier, might be priced or gratis and the acceptance of the offer may similarly be optional or compulsory at the end of the consumer. Some elements of these types of wealth as well as nuisance permit exclusion while some others do not. Either the supplier or the consumer or both may exercise exclusion. While the standard of living entails the consumption of material wealth that permits exclusion at both ends (by the supplier as well as the consumer), the quality of life consists of the consumption of both types of wealth and nuisances (material and oligarchic) of both denominations (excludable and un-excludable). An example would suffice to make the point clearer. A car is a material wealth that is excludable at both ends. Its consumption is a measure of the standard of living. When many in number, the individuals using car would create a social scarcity for parking facilities (oligarchic wealth) as well as pollute the surrounding. One person's standard of living furthers nuisance (social scarcity and pollution) for another person that is neither excludable (at both sides) nor compensated for and strains the quality of latter's life, though it may not affect the latter's standard of living adversely. A rise in the

standard of living of the many in the society would often degrade the quality of life, not the standard of living, of the most, including those who enjoy the higher standard of living. This is the paradox of affluence (Fred Hirsch, pp.27-54). It does not mean, however, that poverty of individuals or that of the society as a whole begets higher quality of life. Enough supply of material wealth (both private and public) and the higher standard of living of the many is a necessary and vital ingredient of quality of life at individual as well as community level.

II. The Subjective and the Objective Measures of Quality of Life: The wearer best knows where the shoe pinches. The quality of life of a person is what he perceives it to be: very good, good, satisfactory, bad or miserable. Assume the distribution to be a unimodal one. Then the modal perception might be a measure of the quality of life at the gross level. Vox populi vox dei. The voice of the people is the voice of the Truth. Thus we define the subjective measure of quality of life. However, in the real life the opinion of each individual reflects his own position vis-à-vis his own ideals (J. K Galbraith, pp. 196-197). Opinions might not be expressed sincerely. General opinion might lead only to a patent falsehood, not the truth.

So, the critics would not agree. Think of a positional economy. Think of a society whose members are divided into the predator and the prey; the masters and the maids; the "MEN" and the "bungled and botched". Much of this is there at the philosophical level. May we construct QOL Index reflecting conditions of the underdog (John Rawls)!

A man is known not by what he says or opines, but by what is revealed through his action. What almost everybody aspires for, in action, is what improves an individual's quality of life, if achieved; what almost everybody is averse to, in action, is what erodes an individual's quality of life, if met with. This dictum might help in defining an objective measure of quality of life. This stand on measurement of quality of life is, nevertheless, subject to a similar criticism. One may invoke the paradox of affluence.

Both stands contain some truth. A purely subjective measure of QOL may be misleading in its contents as well as imports to policy guidelines. On the other hand, a purely objective measure might score no better. One must strike a balance and choose a judicious mix of the two. On certain issues, the objective realities are telling and opinions do not add much. Yet, on certain other issues there may be no clue other than seeking the opinion of the people to depend upon. Therefore, the methodology of constructing a measure (index) of QOL may vary from place to place as well as from purpose to purpose which such a measure would serve.

III. Quality of Life in an Urban Area: Seen in the light of the deliberation made above, quality of life in a town is a multifaceted phenomenon, determined by the cumulative and interactive impacts of numerous and varied factors like housing condition, urban infrastructure, access to various urban amenities and facilities, income, standard of living, physical and social environment, etc. The "feel good" factor also is there. People strive to optimally choose residential location and the result of such choice is the variation in quality of life according to the location of residential units. Generally, Central Business

District (CBD) and its immediate surrounding exhibit crowding and distant peripheries lack in amenities and facilities, affecting quality of life of the residents adversely.

IV. The Present Study: This study is a modest attempt to assess the quality of life in Dimapur and its periphery. Dimapur town is the most important and cosmopolitan commercial centre of Nagaland, India, connected with railways, roadways and airways and hence often referred to as the gateway to Nagaland. Census 1991 reported a population of 57 thousand living in this town. The decennial growth rates of population during 1971-81 and 1981-91 were 165 and 73 percent respectively. We estimate that at present the population of Dimapur is over one lakh. At a crow fly distance of about 8 kms (highway distance 16 kms) from the CBD of Dimapur, there is a small town, Chumukedima, with an estimated population of about 13 thousand. Our study covers this small township also.

Due to various geographical, political and economic reasons, Dimapur has neither grown radially nor linearly, but in the three quadrants barring the II (north-west) quadrant. We have conceptually divided the township, its suburb and the periphery into five sectors, (1) CBD and its immediate surrounding, the central sector, (2) first order ring around the central sector, (3) second order ring around the central sector, (4) third order ring or the terminal ring of the township, and (5) rural settlements in the vicinity of the township. Although the urban area of Chumukedima is away from Dimapur, it resembles the sites in the first order ring around the central sector. We have included Chumukedima in the second sector, though it is geographically far away from the core. Then twenty one sites have been chosen randomly from these sectors; four each from the first and the second sectors, five each from the third and the fourth sectors, and three from the fifth sector. The fifth sector works as the control sector. From each site, we have selected eleven households randomly to collect information on the scheduled variables. The first author has personally visited all the sample households and collected information from them on a multitude of variables reflecting various aspects of quality of life (e.g. education, housing, utilities and amenities, accessibility, waste disposal and environment, income & expenditure, entertainment, health condition, etc.). In total, we have surveyed two hundred thirty one (231) households. Eleven households hail from Chumukedima.

V. Analysis of Data and Construction of QOL Indices: We have visualized QOL as a multifaceted unobservable attribute, which is instrumentally measurable in each dimension by means of an index. Perhaps, it does not have a natural zero and the natural scale to facilitate the construction of an absolute measure that may claim a universal use. It requires an arbitrary base to define its zero (N. Georgescu-Roegen, pp. 17-46).

We visualize that QOL has four dimensions or facets: (a) Housing conditions, (b) Economic aspects like income, expenditure on necessities like food, clothing, rent, education, etc, (c) High Consumption, which includes consumption of mass media like newspaper, TV, library services, indulgence in hobbies, movies, picnic, drama shows, concerts, and educational services, health status and consumption of health services, etc. and (d) Accessibility to market and work place including the mode of transport. Among these aspects of QOL, the aspect of high consumption deserves a special attention. While

food, clothing, housing and movement are rather necessities and relate to the bodily needs, the consumption of mass media products, hobbies, entertainment, etc. emanate from the mind and characterize the cultural needs of the better off in the society. One might ask a very pertinent question here. Whose life is 'the life' and whose values determine what type of life is loftier? T.B. Veblen said long back that the values of the Leisure Class determine the values of the society. This class defines what is life and what one means by quality of life. The loftier quality of life is the quality of life that the Leisure Class lives. The Labour Class only imitates them. More leisure, more wasteful and conspicuous consumption, more indulgence in unproductive labour and idle curiosity are the sine qua non of a high quality of life. "I like work; it fascinates me. I can sit and look at it for hours", wrote Jerome K. Jerome (sarcastically, of course). In a similar sense, we have used the term "high consumption". Be what the high quality of life is, high consumption defines that. We must clarify one more thing. We have visualized "Economic aspect" as one of the facets of QOL. One may ask: is housing or high consumption extra-economic? The answer is, obviously, an emphatic no. Yet, we do not want to indulge in this discussion now. Our categorization is only to facilitate the work at hand with no ado to logical or conceptual neatness in the categories used here.

We have grouped the variables into four categories as noted above and for each category a facet index of QOL has been constructed. In doing so, Principal Component Analysis has been used. It might be reported here that in spite of being aware of the optimal and desirable properties of the Principal Component Analysis in constructing indices by linear combination of object variables (Kendall, M G and A Stuart, pp. 250-299), we have tried with a few other methods of constructing composite indices. Relative Frequency method (assign weights proportional to the frequency of occurrence), Inverse Relative Frequency method (assign weights inversely proportional to the frequency of occurrence), Dispersion Weight method (assign weights proportional to the standard deviation of the variables), Inverse Dispersion Weight method, and Angular Weights method (assign weights proportional to the cosine of the average of the arc-cosine of the coefficient of correlation between a given variable and other variables in the object set, that is: $W_i = \cos((\Sigma\cos^{-1}(r_{ij}))/m)$) and so on. Except the Angular Weight Method, all others perform miserably. However, Principal Component Analysis does perform the best. This is being reported here only in passing that the alternative methods used by us in transit and unsuccessfully were devised on the basis of some thought given to them but they did not perform. We hold that this note on failure is important. It tells a more complete story of investigation.

VI. Facet Indices of QOL: At the first instance QOL indices have been constructed for four major facets, namely, (1) Housing, (2) Economic, (3) High Consumption and (4) Accessibility. The findings regarding them are reported here.

Housing: To represent this facet as large as 58 (number of) variables have been used. These variables include: 1) Kitchen, 2) Living room, 3) Study room, 4) Bed room, 5) Other rooms, 6) Store room, 7) Total Rooms, 8) Household Members, 9) Ownership, 10) Building structure, 11) Plot size, 12) Floor area, 13) Inter-building Distance, 14) Running Water, 15) Water supply source, 16) Water supply method, 17) Electricity, 18)

Power failur,e 19) Use of fans, 20) No. of fans, 21) Radio, 22) LPG, 23) Fridge, 24) TV, 25) TV Type, 26) Telephone, 27) Furniture, 28) Furniture Specification, 29) Ventilation, 30) Sunshine, 31) Compound rating, 32) Waste disposal method, 33) Distance Pub-disposal Sink, 34) Water logging, 35) Logging span, 36) Fallow Land, 37) Public Drainage, 38) Excreta disposal, 39) Noise, 40) Smok/Dust, 41) Foul Smell, 42) Water Pollution, 43) Nature of Water Pollution, 44) Satisfied with Sanitary condition, 45) Park, 46) Park distance, 47) Parking space, 48) Parking space size, 49) distance (residence to highway), 50) distance(residence to main road), 51) Main road repaired, 52) Road Type, 53) Side drains, 54) Side drains working, 55) Potholes, 56) Vehicle access, 57) Road maker agency, and 58) Satisfactory Road.

Table 1:Loadings for Facet-Index of Housing(58 variables)

0.411	0.554	0.378	0.596	0.538	0.555	**0.729**	-0.015	0.008
0.655	0.207	**0.743**	-0.089	0.528	-0.230	0.513	0.448	0.032
0.410	**0.760**	0.188	0.617	0.629	0.573	0.666	**0.705**	0.268
0.739	0.558	-0.014	0.212	0.346	-0.028	-0.095	0.065	-0.267
-0.077	0.023	-0.120	-0.166	-0.286	-0.247	-0.005	0.278	0.090
-0.013	0.097	0.123	0.316	0.140	0.412	0.113	0.215	0.084
-0.164	0.144	0.158	0.260					

EIGEN VALUE = 8.75913; VARIATION EXPLAINED = 15.10 PERCENT

The first five dominant positive variables (Table 1) with loadings larger than 0.70 are: (#7) no. of rooms in the house (per capita), (#12) floor area (per capita), (#20) no. of fans used, (#26) telephone connection, and (#28) modern furniture like sofa set, dining table and the like. On the other hand the most dominant negative (loadings less then -0.10) variables - that affect quality of life adversely – are the presence of: (#36) fallow land in the vicinity, (#39) disturbing noise, (#40) smoke/dust in the air, (#41) foul smell in the air, and (#42) water pollution. Additionally, two other variables that obtain negative loadings are (#15) source of water supply and (#57) approach road construction agency. They indicate to a poor level of public contribution to water supply and maintenance of the approach road. The contribution of first five dominant positive variables to the variation in the QOL index is a little over 30 percent. The contribution of all negative variables together is below 5 percent. About a dozen of variables are too poorly loaded to contribute significantly to the index and one may possibly drop them out. The index is reliable even though it explains only 15.10 percent of the total variation in the host of 58 variables.

Economic Status: This facet is made up of 26 variables that include: 1) Employed, 2) Nature of Employment, 3) Monthly income range, 4) Bank Savings a/c, 5) Insurance, 6) Food expenditure, 7) House rent, 8) Child Education, 9)Toiletries, 10) Newspaper, 11) Entertainment, 12) Addiction, 13) Clothes, 14) Donations, 15) Total Expenditure, 16) Vegetarian, 17) Freq. Of Non-veg food, 18) Meal outside, 19) Tea snacks outside, 20) Smoking/chewing etc , 21) Fresh milk consumption, 22) powder Milk Consumption, 23) Fruits, 24) Eggs, 25) Meat/fish, and 26) Expenses on Vegetables.

Table 2:Loadings for Facet-Index of Economic Aspects
(26 variables)

0.061	0.136	0.676	0.488	0.438	**0.706**	0.164	0.624	**0.718**
0.770	0.618	0.236	**0.823**	**0.715**	**0.910**	-0.105	0.508	0.570
0.192	-0.080	0.333	0.164	**0.714**	0.421	0.434	0.548	

EIGEN VALUE = 7.34257; VARIATION EXPLAINED = 28.24 PERCENT

The first six dominant positive variables (Table 2) with loadings larger than 0.70 are: per capita expenditure on particulars; (#6) food items, (#9) toiletries, (#10) newspaper, (#13) clothes, (#14) donations, (#23) fruits and (#15) gross per capita expenditure, which is loaded the most. Only two variables obtain negative loadings: (#16) status of being a vegetarian and (#20) addiction to smoking, chewing etc. However, they are only poorly loaded. Dominant positive variables together contribute a little over 56 percent to the index assuring reliability of the latter in measuring the quality of life of the sample households.

High Consumption: This facet is made up of 43 variables concerning: 1) Newspregular, 2) Name of newspaper, 3) newscol, 4) tvwatch, 5) 89 tvhour, 6) library, 7) nolibwhy, 8) dlib, 9) libadqt, 10) hobby, 11) hobbytype, 12) hobbyfac, 13) hobbyhind, 14) hobbyhindrtype, 15) movie, 16) moviefreq, 17) picnic, 18) drama, 19) dramafac, 20) edgpa, 21) edfather, 22) edmother, 23) ed respondent, 24) childstudy, 25) childpreschool, 26) childschool, 27) childcollege, 28) dpreschool, 29) dschool, 30) dcollege, 31) standard of ed institutions, 32) fmsick, 33) idmember, 34) disease, 35) dursick, 36) disability, 37) xray, 38) xrayfrq, 39) eyesight, 40) eyeglass, 41) famdoctor, 42) exercise and 43) noexerwhy.

Table 3:Loadings for Facet-Index of High Cons(43 variables)

0.675	**0.706**	**0.638**	0.476	0.272	0.253	-0.162	0.304	-0.190
0.635	**0.677**	0.409	0.484	0.395	-0.089	-0.081	0.479	0.416
0.438	0.456	0.526	0.557	**0.646**	-0.069	-0.138	-0.153	0.144
0.066	0.041	0.226	-0.367	0.003	-0.018	-0.004	0.125	-0.005
0.209	0.222	-0.045	0.217	0.394	0.258	-0.193		

EIGEN VALUE = 5.79747; VARIATION EXPLAINED = 13.48 PERCENT

The first six dominant positive variables (Table 3) with loadings larger than 0.60) are: (#1) regular readership of newspaper, (#2) readership of national and widely circulated newspapers, (#3) readership of editorials, feature articles, national and international news etc., (#10) indulgence in hobbies, (#11) hobbies of varied types, and (#23) the educational level of the respondent. On the other hand, variable #31 (opinion regarding the standard of educational institutions around) is negatively (and rather strongly) loaded. Two other negatively loaded variables referring to (#9) adequacy of library facilities, and (#43) adequacy of facilities of and participation in physical exercises deserve a mention. Consumption of health facilities (variable # 37 through #42 except #39 which is

regarding the normal eyesight) obtains moderate positive loadings. Some ten variables obtain poor loadings and contribute very little to the index. Overall, the power of the index of quality of life representing this facet is relatively lower than those for housing and economic aspects. It is rather expected. In less developed regions consumption for satisfaction of physical wants (food, clothing and shelter) is usually dominant and more prominent than consumption for the satisfaction of non-physical wants. For many such non-physical wants either do not exist or they are nowhere in the priority list. The Principles of Hierarchy, Subordination, Satiability and Growth of Wants formulated by Banfield, Gossen, Jevons and Menger deserve a reference (see Georgescu-Roegen, pp. 193-204). In Veblen's vein, high consumption is the indulgence of the Leisure Class.

Accessibility: This facet is made up of eight variables namely, 1) dmarket, 2) modemarket, 3) marketfrq, 4) dwork, 5) modework, 6) timework, 7) monthcost and 8) modeqlty.

Table 4:Loadings for Facet-Index of Accessibility
(8 variables)

0.423	-0.367	0.226	**0.856**	0.210	**0.831**	-0.117	**0.774**

EIGEN VALUE = 2.44383; VARIATION EXPLAINED = 30.54 PERCENT

Among those variables, (#4) distance from home to work, (#6) time taken in commuting between home and the work place and (#8) quality of service provided by the conveyance to the work place and back obtain high positive loadings (Table 4). Negative loadings are obtained by (#2) mode of transport to visit the market and (#7) monthly cost of conveyance. The index is satisfactorily representative.

VII. The Composite Index of Quality of Life: Having constructed indices measuring the four facets of quality of life in the study area, an attempt may now be made to construct a composite index of quality of life. This index is a weighted linear combination of the facet-wise indices. Once again, the technique of Principal Components has been used to obtain such an index.

Table 5:Loadings for Composite Index of QOL
(4 Facet Indices)

0.90114	0.91229	0.86129	-0.16330

EIGEN VALUE = 2.41281; VARIATION EXPLAINED = 60.32 PERCENT

One finds (Table 5) that while housing, economic and high consumption indices obtain very large loadings, accessibility obtains a very small (but negative) loading. That is to say that accessibility, though not much important, affects quality of life adversely. One may note that while accessibility enhances quality of life on the one hand, it is also, on the other hand, associated with high noise level, dust and foul smell in the air and other polluting agents that adversely affect the quality of life of the people. It may also be noted that Dimapur is not a large township where commuting takes much time or cost.

Work places and market places are as ubiquitous as the residential sites. Rickshaws (both hand driven and autos) are available in plenty and cheap. This fact is reflected in the small loading obtained by the index measuring accessibility.

VIII. Distribution of Households according to QOL: The frequency distribution of sample households according to the value of the Composite Index of QOL is presented in Table 6. The values of mean, median, standard deviation and Pearsonian coefficient of skewness (based on ungrouped data) are 0.00, -0.24, 2.41 and 0.30 respectively.

Table 6: Frequency Distribution of Sample Households according to the Composite Index of Quality of Life in Dimapur

Class	(-6 , -4)	(-4, -2)	(-2, 0)	(0, 2)	(2, 4)	(4, 6)	(6, 8)	(8, 10)
Freq.	1	55	75	58	26	11	3	2

IX. Proximity to Bliss or Hell Point: From the viewpoint of appeal there may be four types of variable: (a) ***nice***, the more of which is monotonically preferred to the less; (b) ***nasty***, the less of which is monotonically preferred to the more; (c) ***neutra***l, ambivalent or having no preference related to changes in either direction; and (d) ***naïve/ primitive***, on which preference relations are altered once a point, called a saturation or satiation point (either in one or both directions) is reached. A naïve variable might be appealing (repugnant) within a range but further beyond a limit any change is nauseating (likable). Within limits, naive variables behave either like a nice variable or like a nasty variable. It is a commonplace experience that almost all primitive (bodily) wants are satiable and the law of variable proportions as well as the Weber-Fechner law works on them. Due to this fact, almost all variables related to the satisfaction of primitive (bodily) wants are naïve. The matters may be different in case of cultural, spiritual, psychic or paranormal wants.

Now, suppose, we have two sets, X and Y, of the two types of variable; X consisting of nice variables and Y consisting of nasty variables. An index, $\zeta = (\zeta_1, \zeta_2)$, is to be constructed such that each of the two elements of the index is a weighted sum (linear combination) of the variables, X and Y individually. Define $\zeta = (\zeta_1, \zeta_2) = (Xw, Yv)$, where w and v are weights. Note that ζ is a point in a two-dimensional space. If we define $B(\zeta) = \{Max(X)w, Min(Y)v\}$ and analogously, $H(\zeta) = \{Min(X)w, Max(Y)v\}$, then $B(\zeta)$ is the Bliss Point and $H(\zeta)$ is the Hell Point. Note that $B(\zeta)$ and $H(\zeta)$ are the two points in a two-dimensional space. It is assumed that Min(X), Min(Y), Max(X) and Max(Y) are some finite numbers, which in case of an empirical investigation are always (empirically) obtainable. Knowledge of Bliss and Hell points may help in interpretation as well as assessment of ζ so obtained. It also leads us immediately to design a measure that might be of a great use. The ratio, $\rho = (d(H)/d(B))$, where d(H) and d(B) are the norms with the Hell and the Bliss points as references, may indicate whether people are closer to the Hell or the Bliss point. One may define a norm in any particular manner (E. V. Krishnamurthy and S. K. Sen, pp. xxviii-xxix; C G Froberg, pp.62-63).

In the context of the present study, three of the four facet-indices are nice variables while accessibility exhibits the characters of a naive variable, acting rather nastily. The Hell and the Bliss points are (–32.00, -0.64) and (74.62, 1.05) respectively. The ratio of absolute norms is 0.431 while the ratio of Euclidean norms is 0.476. Both of them indicate to a relative proximity to the Hell point than to the Bliss point.

X. Quality of Life and the Relative Location of Residential Sites: Due to the location of predominantly economic activities like market place, the Central Business District (CBD) of a town is overcrowded and tumultuous. People seldom choose CBD for residential purposes unless compelled to do so. On the other hand, people generally do not want to reside far away from the CBD due to the need of the services offered by the CBD. In less developed economies where many cannot afford to own a vehicle and therefore must move either on foot or avail themselves of the public transport services, residential sectors are located only at a moderate distance from the CBD. Further, in such economies rural areas surrounding the urban settlements often lack in amenities and facilities that keep people away from choosing their residential sites in the outskirts of the town. All these forces determine the quality of life of the urban dwellers at different sites. It is usual to observe that the quality of life improves as one moves away from the CBD, attains a peak somewhere at the median distance, and thereafter it starts decreasing as we move farther away.

If we identify a household by its residence in one of these five sectors, we may use dummy variables to represent it. Let X(n,m) be a matrix of such information, where n=231 (number of households in the sample) and m=4 (number of sectors less one). If the i^{th} household resides in the j^{th} sector, then X(i,j) = 1, else X(i,j) = 0. Let Y(i) be the numerical value of QOL of the i^{th} household. We may formulate a linear regression model in which the quality of life (Y) is determined by the residential location (X). Thus,

$$\mathbf{Y = a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + b + e.}$$

In the model specified above, $\mathbf{a_i}$, **b** and **e** are the regression coefficient, regression constant and the error terms respectively. The specification of the model restricts that the residents of the control sector (the fifth sector or the villages in the rural area) do not partake of the benefits enjoyed by the urban dwellers in sectors 1 through 4. We do acknowledge the properties of the Generalized Least Squares (GLS) method of estimation, but, in the present context, Ordinary Least Squares (OLS) method has a natural and interpretive appeal. The OLS coefficients are linear functions of sector wise averages of QOL (= $\mathbf{a_j}$**+ b** for sectors j =1 through 4, and **b** for sector 5). The findings of OLS estimation are given in Tables #7 and #8.

For 4 and 226 (numerator's and denominator's degrees of freedom) the table values of F at 5 and 1 percent probability levels are 2.4 and 3.4 respectively. For R^2 = 0.12 (the minimal value of R^2 obtained by the estimated regression equations) F value is 7.70. Thus, all regression equations are statistically significant. For 226 degrees of freedom (when 't' assumes a normal distribution) and probability levels at 5 and 1 percent, the table values of 't' are 1.65 and 2.33 respectively. In the tables #7 and #8 above, '**'

denotes insignificance at 5 percent probability level and "*" denotes insignificance at 1 percent probability level. The coefficients significant at 1 percent level have no asterisks.

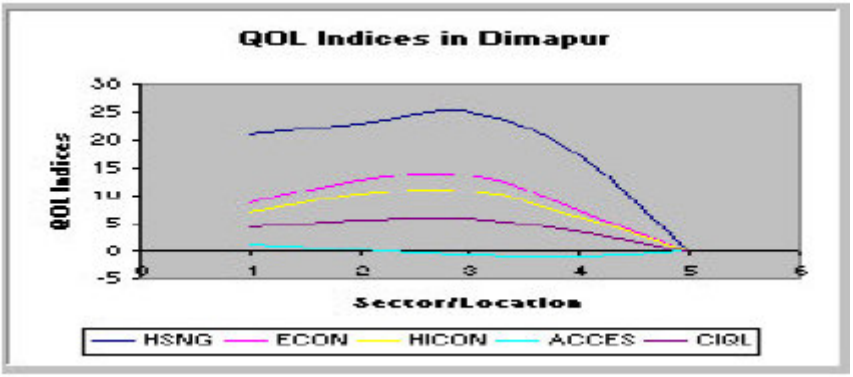
Table 7: Regression Coefficients of Facet Indices of QOL on Sector/Location

Variables	X1	X2	X3	X4	Constant	R^2
Housing:						
Coefficient	11.204	12.982	14.990	7.391	-9.936	0.31
't' Value	6.616	7.665	9.256	4.564	7.761	
Economic Status:						
Coefficient	3.479	7.946	9.047	2.448	-4.913	0.21
't' Values	2.284	5.216	6.212	1.681*	4.267	
High Consumption:						
Coefficient	3.034	6.309	6.751	2.313	-3.938	0.18
't' Values	2.479	5.153	5.767	1.976*	4.255	
Accessibility:						
Coefficient	1.406	0.342	-0.525	-1.020	0.035	0.12
't' Values	2.632	0.640**	1.031**	1.997*	0.087**	

Note : (** = Insignificant / ; * = Significant) at 5% p level. No asterisk = Significant at 1% p level.

Table 8: Regression Coefficients of Composite Index of QOL on Sector/Location

Variables	X1	X2	X3	X4	Constant	R^2
Coefficient	1.942	3.237	3.704	1.476	-2.220	0.27
't' Values	4.045	6.745	8.072	3.217	5.119	



While location of residence has statistically significant role to determine the quality of life in Dimapur, accessibility facet is insignificant at sectors 2 and 3. Sectors 1 and 4 obtain opposite coefficients for determining QOL due to accessibility.

An inspection of the magnitudes of the regression coefficients reveals that in general (except in case of accessibility) the values of the coefficients increase as we move from X_1 to X_2, attains a peak at X_3 and decrease as we move to X_4. Since all values of X are zero or unity, values of the coefficients indicate that at X_3 (sector 3) QOL attains its peak. Our findings corroborate to the general observation that as we move away from the core towards the periphery, quality of life first improves, attains its peak at or around the median area and then tapers off.

XI. Sector-wise Distribution of Over-all Quality of Life: We have noticed as to how the values of Composite Index of QOL cluster and vary over the sectors. It might be informative and perhaps prescriptive to observe how the values of the index are distributed in the five sectors. The table # 9 gives an idea of the same.

Table 9: Sector-wise Distribution of Composite Index Of QOL

Sectors/ Measures	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Overall
Mean	-0.278	1.017	1.484	-0.744	-2.220	0.000
Median	-0.683	0.547	1.233	-0.999	-2.566	-0.243
Skewness	0.545	0.600	0.329	0.427	0.809	0.302
Gini Coeff	-8.75	2.42	1.77	-2.54	-0.62	Cannot be Computed

Table 10: Location cum Community wise Distribution of Sample Households

Site/Community	Sector I	Sector 2	Sector 3	Sector 4	Sector 5	Total
Ao	4	5	14	23	0	**46**
Angami	2	4	5	1	0	**12**
Lotha	7	15	12	9	11	**54**
Sema	0	4	12	1	0	**17**
Sangtam	0	1	1	0	11	**13**
Zeliang	7	0	1	0	0	**8**
Chakesang	0	1	0	0	11	**12**
Kuki	0	0	0	11	0	**11**
Other Nagas	0	1	4	0	0	**5**
Non-Nagas	*24*	*13*	*6*	*10*	*0*	***53***
Total	**44**	**44**	**55**	**55**	**33**	**231**

Due to the nature of measurement, it is not possible to work out Gini Coefficient for the Composite Index of QOL over the whole range (because the mean is zero). Perhaps it

would be misleading to use Gini coefficients at the sector level also, though they could be numerically computable (Table 9). We warn, nonetheless, that they may mislead. However, measures of skewness in different sectors suggest that it is the least in sector 3 followed by sector 4 while it is largest in sector 5 followed by sectors 2 and 1.

If QOL index is regressed on the dummy variables representing membership of a particular community, regression coefficients indicate the mean QOL of the communities. The coefficients of regression thus obtained are presented in Table 11.

XII. Community-wise QOL: Among the sample households (231 in number) 178 belong to the various Naga tribes while the rest belong to varied non-Naga communities. Their location cum community wise cross distribution is given in Table 10.

Table 11: Community-wise Regression coefficients of Quality of Life in Dimapur

Community	Ao	Angami	Lotha	Sema	Other Nagas	Constant
Coefficient	1.053	1.657	1.185	2.042	-0.917	-0.528
"t" Value	2.325	2.305	2.725	3.259	2.058	1.711
Number	46	12	54	17	49	

While the Semas and the Angamis (their average QOL being statistically indistinguishable) have appreciably high quality of life, the Lothas and the Aos (whose average QOL are statistically indistinguishable) are only in the above average class. Other Nagas, most of them dwelling in the semi-urban or rural settlements, cluster significantly below the median value of QOL. The Non-Nagas are a little better on an average. Barring a few, most of the Non-Nagas, who are urban dwellers, belong to Bengali, Bihari, Kachari, Keralite, Manipuri, Marwari or Nepali communities. Some of them are in business or service while others belong to the wage-earner class.

XIII. A Canonical Correlation Analysis: We have two sets of variable, Y (Facet indices of QOL) and X (location/Sector codes and Community codes). We have observed how they are related. However, in each case we have assumed a single equation model in which a particular facet of QOL is explained by location codes or the overall (composite) index of QOL is explained by community codes. However, if we attempt at finding out how location and community codes together correlate with all facet indices of QOL, we may go in for Canonical Correlation Analysis (Kendall M G and A Stuart, pp. 299-306). Here we have used detailed community description of Nagas. Canonical correlation coefficient is equal to 0.612 and the weights obtained by location, community and the facet indices are presented in the Table 12.

Our findings with regard to the weights obtained by location remain essentially unchanged. Location #3 obtains the largest weight once again and similar tendency of the movement of QOL over the locations is observed. Among the tribes, now Lothas obtain the largest weight. Note that these weights are net of the effects of location, unlike in the regression analysis above where the effects of location were inclusive. Unlike Aos,

Angamis and Semas, many among the Lothas in the sample reside in sector 5. While location effects were inclusive, the average QOL of the Lothas was under-estimated.

Table 12: Regression Coefficients of QOL on Location and Community Variables

Location:	1	2	3	4
Coefficient:	0.29917	0.29926	0.35731	0.18356

Community	Ao	Angmi	Lotha	Sema	Sngtm	Zlng	Chksng	Kuki	O. Nagas
-Coefficient	0.08	0.07	0.13	0.06	0.02	0.02	0.05	0.01	–0.01

Facet Index of QOL	Housing	Economic	Hi Cons	Access
Coefficient	0.60939	0.02052	0.00153	0.08249

On the other hand, the coefficient associated with the 'Housing Facet' is overwhelmingly large compared to other facets. This is so due to the high degree of association among the facets of housing, economic status and high consumptions, which a single index might be sufficient to capture. Indeed the inter-correlation matrix among them reveals the said high degree of association (Table 13). The facet-index of QOL in housing has extracted communality from other facet indices.

Table 13: Inter-Correlation matrix of Facet-Indices of QOL

Facet Index of QOL	Housing	Economic	HiCon	Access
Housing	1.000	0.759	0.661	-0.072
Economic		1.000	0.675	-0.148
HiCon			1.000	-0.036
Access				1.000

XIV. An Alternative Approach to Construction of QOL Indices: In the earlier sections of this work we have visualized object variables in each facet independent across the facets. In other words, we have assumed a block-diagonal structure. The object variables in housing (58 in number) are assumed to be uncorrelated with the object variables in "economic aspect", "high consumption" and "accessibility" and so on.

Nevertheless, this assumption might not be correct at all. Economic status depends on the type and the source of livelihood correlated with the material resources and the skill of the members of a household. This in turn determines housing condition and high consumption. In assuming otherwise we part with the reality, and statistically we use only the information that constitute the blocks in the diagonal of the full inter-correlation matrix (135 x 135) while the off-diagonal blocks are ignored. That amounts to a use of only a one-third, 32.16 percent = $[\Sigma_j\{m_j\,(m_j-1)\}/\{m(m-1)\}]x\ 100$, of the total information

contained in the full inter-correlation matrix. Here m_j is the number of object variables included in the j^{th} facet (j = 1, 2, 3, 4) and m = Σm_j. Now we propose that instead of working with them in a compartmentalized manner, take all of them together and carry out Principal Components Analysis on the pooled set of the object variables.

Table 14: Loadings of Object Variables in the Pooled Set (135 variables)

0.379	0.524	0.394	0.519	0.504	0.567	**0.680**	0.043	0.014
0.549	0.204	**0.692**	-0.034	0.472	-0.212	0.461	0.447	-0.004
0.367	**0.768**	0.207	0.572	0.656	0.558	**0.683**	**0.701**	0.238
0.760	0.470	0.036	0.196	0.249	-0.043	-0.072	0.020	-0.194
-0.017	0.005	-0.115	-0.095	-0.218	-0.176	-0.018	0.204	0.070
0.047	0.064	0.136	0.204	0.068	0.313	0.020	0.154	0.087
-0.076	0.097	0.078	0.185	0.082	0.203	**0.679**	0.554	0.403
0.637	0.187	0.518	0.620	**0.722**	0.633	0.154	**0.760**	0.615
0.796	-0.043	0.446	0.524	0.129	-0.113	0.305	0.149	0.657
0.398	0.366	0.472	0.631	0.569	0.531	0.513	0.318	0.140
-0.067	0.208	0.181	0.417	0.518	0.279	0.268	0.173	-0.123
-0.115	0.457	0.392	0.297	0.307	0.457	0.433	0.645	-0.178
-0.266	-0.204	0.168	0.003	0.037	0.247	-0.324	-0.080	-0.098
-0.105	0.112	-0.058	0.214	0.238	-0.003	0.212	0.320	0.234
-0.150	-0.135	0.409	0.215	-0.219	0.313	-0.059	0.364	0.089

In the pooled set, the number of object variables (Z) is 135 in total (58 of housing, 26 of economic aspect, 43 of high consumption and 8 of accessibility pooled together). The inter-correlation matrix of these variables has an order of 135 x 135. The largest latent root of the inter-correlation matrix is 18.481, which explains 13.69 percent of the total variation in the object variables, Z. The loadings obtained by the (standardized) object variables are presented in Table #14. We define,

$$I_{HS} = \sum_{1}^{58}(Z_j W_j);\ I_{EC} = \sum_{59}^{84}(Z_j W_j);\ I_{HC} = \sum_{85}^{127}(Z_j W_j);\ I_{AC} = \sum_{128}^{135}(Z_j W_j);\ I_{QL} = \sum_{1}^{135}(Z_j W_j)$$

Here I_{HS} , I_{EC} , I_{HC} , and I_{AC} are facet indices (defined in the current approach) of housing, economic aspect, high consumption and accessibility respectively, and I_{QL} is the composite index of quality of life. The Z is the set of object variables (standardized) and W is the vector of the loadings. Defining the indices in this manner has three properties; first that it has no longer been assumed that different facets are uncorrelated with each other, second that the loadings are comparable within as well as across the facets as they are obtained from the same eigenvector, and finally, that $I_{QL} = I_{HS} + I_{EC} + I_{HC} + I_{AC}$. We recall that we selected the sample households (11 each) from 21 sites. Site wise QOL averages are presented in Table 17.

It would be interesting to inquire if redefining facet indices and composite indices has altered the relationship between sectors and the QOL indices. As before, we regress the indices (obtained in an alternative way) on sector dummies. The results are tabulated in Table 15. We find that except in the case of accessibility facet, our findings are

essentially unaltered. In case of accessibility, the relationship that was weak and faltering earlier has now become strong enough to suggest that IAC facet also exhibits the same relationship with sectors/location as other facet indices do. We have also compared the properties of the residuals of regression equations across the earlier and the latter indices of QOL. We simply report that the residuals of the latter QOL indices conform more closely to the standard Gauss-Markov assumptions (Henri Theil, pp. 119-124) regarding suitability of OLS. We do not want to overload our discourse with those details at present. Nor have we ventured to use Zellner's SURE method (J. Johnston, pp. 337-341).

Table 15: Regression Coefficients of QOL Indices on Sector Dummies

Variables	X_1	X_2	X_3	X_4	Constant	R^2
IHS/Coeff	8.786	11.286	13.288	6.375	-8.505	0.28
IHS/t value	5.470	7.026	8.651	4.150	7.004	
IEC/Coeff	3.298	7.345	8.418	2.259	-4.569	0.21
IEC/t value	2.378	5.296	6.348	1.703*	4.358	
IHC/Coeff	3.087	5.755	6.201	2.555	-3.769	0.20
IHC/t value	3.054	5.693	6.415	2.643	4.932	
IAC/Coeff	0.193	0.769	1.303	1.004	-0.733	0.23
IAC/t value	0.960**	3.817	6.765	5.214	4.811	
IQL/Coeff	15.367	25.155	29.210	12.193	-17.576	0.28
IQL/t value	4.205	6.883	8.359	3.489	6.362	

Note : (** = Insignificant / ; * = Significant) at 5% p level. No asterisk = Significant at 1% p level.

Table 16: Correlation Matrix (Between and Across) Earlier and Alternative QOL Indices

	IHS	IEC	IHC	IAC	IQL	hsng	econ	hicon	acces	comp
IHS	1.000									
IEC	0.786	1.000								
IHC	0.720	0.713	1.000							
IAC	0.408	0.454	0.495	1.000						
IQL	0.936	0.920	0.864	0.528	1.000					
HSNG	**0.996**	0.768	0.711	0.384	0.924	1.000				
ECON	0.777	**0.999**	0.705	0.452	0.913	0.759	1.000			
HICON	0.670	0.682	**0.990**	0.475	0.827	0.661	0.675	1.000		
ACCES	-.098	-.142	-.048	**-.306**	-.124	-.072	-.148	-.036	1.000	
COMP	0.912	0.918	0.889	0.505	**0.994**	0.901	0.912	0.861	-.163	1.000

Thus, the new approach has only reinforced our earlier findings with an added accent. Now there is a simple additive relationship between I_{QL} and facet indices. The contributions of I_{HS} , I_{EC} , I_{HC} and I_{AC} to I_{QL} are 41.11, 33.41, 22.66 and 2.82 percent respectively. The inter-correlation matrix of new (alternative) indices and earlier indices suggests (see bold underlined entries in Table 16) that except IAC (new) and ACCES (old) facet indices (that are negatively correlated, r = -0.306), other new and old indices are extremely highly correlated (coefficient of correlation, r, at least equal to 0.99). This

degree of correlation, when the number of observations in the sample is as large as 231, is extremely high and indicative of perfect correlation.

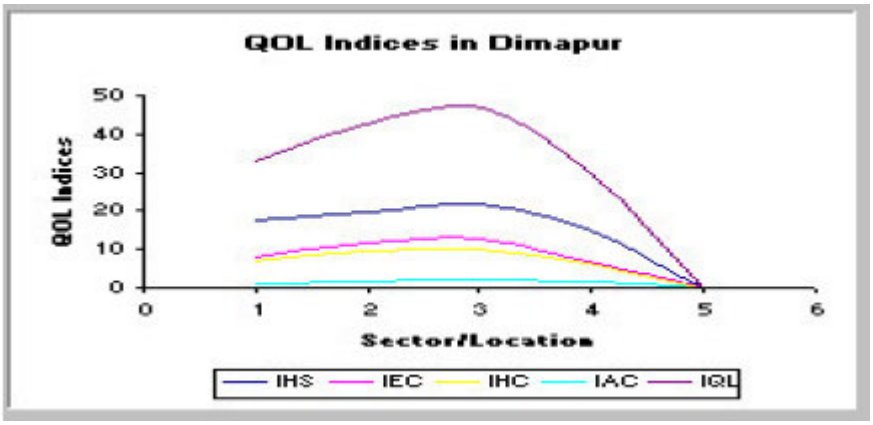


Table 17: AVERAGE QOL INDICES AT DIFFERENT SAMPLE SITES, DIMAPUR

Site No.	SECTOR CODE	SITE NAME	--- FACET-INDICES OF QUALITY OF LIFE--- HIS	IEC	IHC	IAC	OVERALL IQL
1	1	DIMAPUR_TOWN	2.039	1.511	0.017	-0.009	3.558
2	1	DIMAPUR_TOWN	-0.806	-3.299	-1.829	-0.112	-6.047
3	2	DIMAPUR_TOWN	4.089	5.263	4.011	0.657	14.023
4	3	DUNCAN	6.173	2.073	3.565	0.557	12.369
5	3	RESIDENCE/KYONG_COLONY	4.120	2.829	2.528	0.177	9.655
6	1	DHOBINALA	-1.415	-2.690	-1.851	-1.217	-7.175
7	1	NEW_MARKET	1.312	-0.605	0.936	-0.817	0.825
8	2	CIRCULAR_RD/KHERMAHAL/ NOTON_BASTI	6.611	4.090	3.919	0.277	14.898
9	2	CHUMUKEDIMA	1.593	0.400	-0.393	-0.812	0.788
10	3	LINGIRIJAN	5.662	4.951	0.347	0.352	11.314
11	3	THAHEKHU	4.929	2.921	1.662	1.224	10.737
12	3	NAGARJAN	3.028	6.466	4.057	0.538	14.091
13	5	SENJUM	-5.483	-2.087	-0.746	0.394	-7.923
14	4	AOYIMIKUM	-2.419	-1.302	-1.990	0.309	-5.402
15	2	PURANA_BAZAR	-1.170	1.348	0.406	0.022	0.608
16	4	KUSHIABIL	0.537	-0.213	0.533	0.507	1.365
17	4	AOYIMTI	-3.281	-2.339	-1.127	0.388	-6.360
18	4	PHAIPIJANG	-3.453	-3.690	-1.676	0.713	-8.107
19	4	DIPHUPAR	-2.035	-4.006	-1.809	-0.561	-8.412
20	5	TSSITHRONGSE	-10.160	-6.234	-5.379	-1.096	-22.871
21	5	BADE	-9.871	-5.387	-5.181	-1.495	-21.935

The variables that load larger than **0.60** in the new QOL index are, namely, (#7) Total rooms (per capita), (#12) Floor area (per capita), (#20) No. of fans, (#23) Fridge, (#25) TV type, (#26) Telephone, (#28) Furniture, (#61) Monthly income, (#64) Food Expenditure, (#67) Expenses on toiletries, (#68) Expenses on newspaper, (#69) Expenses on entertainment, (#71) Expenses on clothes, (#72) Expenses on donations, (#73) Total Expenditure, (#81) Expenses on fruits, and lastly, (#107) the education level of the respondent. They add to the quality of life if they have larger values. On the other hand, variables that load *negative* and smaller than **–0.10** (and therefore adversely affect the quality of life if they assume larger values) are, namely, (#15) Water supply source, (#36) Fallow land in the vicinity, (#39) Noise, (#41) Foul smell in the air, (#42) Water pollution, (#78) Smoking and chewing, (#99 and #100) Movie going and its frequency,

(#108) Number of Children studying in school, (#109) No. of Children in pre-school, (#110) No. of Children in school, (#115) Standard of educational institutions, (#118) Disease, (#127) Reason for not doing physical exercise, (#128) Distance of market from the residence, and (#131) Distance of work place from the residence.

XV. Statistical Distribution of the Overall QOL Index: If we look into the statistical properties (J N Kapur and H C Saxena, p. 53 and pp. 196-300) of the Overall (Composite) Index of QOL, we find that it follows Type I Distribution of Karl Pearson. We obtain the determinantal equation $F(x) = b_0 + b_1x + b_2x^2 = 0$, for which $b_0 = 428.2117$, $b_1 = 9.96722$, and $b_2 = -0.0846$. The two roots of the equation are –33.4596 and 151.2759. The Pearsonian betas are: $\beta_1 = 0.6595$ and $\beta_2 = 3.5597$. The Pearsonian gammas are: $\gamma_1 = 0.8059$ and $\gamma_2 = 0.5596$. However, these details are only of a statistical interest.

XVI. Sector-wise Distribution of Households as per QOL Index: It is important to know as to how the households living in different sectors are distributed according to the General (Composite) Index of QOL. The QOL Index is distributed with mean = 0 and standard deviation = 18.481. The cumulative distribution classified according to mean+Fd is presented in Table 18. Here F is a factor like 2, 1.5,…, -1.0, -1.5 and so on and the abbreviation **>2d** means the QOL class that includes the households that obtain QOL point greater than mean+2SD. In each of the sectors 1, 2 and 3 there is one household whose QOL index is below the level of mean -1.5d while in sector 5 such three households are there. Earlier we have seen that the distribution of QOL over the sectors follows a particular pattern. It increases as we move away from the core, attains a peak in sector 3 and then dwindles down sharply as we move to sectors 4 and 5.

Table 18: Sector-wise Distribution of Households According to QOL Index

Sector/Class	**>2d**	**>1.5d**	**>1d**	**>0.5d**	**>Mean**	**> -0.5d**	**> -1.0d**	**> -1.5d**
Sector1	2	3	5	10	**16**	27	37	43
Sector2	2	4	8	17	**30**	39	42	43
Sector3	4	9	19	26	**41**	51	53	54
Sector4	1	3	4	6	**13**	41	48	55
Sector5	0	0	0	1	**3**	5	14	30
Total	9	19	36	60	**103**	153	194	225

However, that finding was based on the sector-wise arithmetic mean (or regression coefficients) of QOL obtained by the households living in those sectors. It is a commonplace knowledge that the arithmetic mean is very sensitive to the extreme values of its components. Now we look into the number of households in different sectors and QOL classes rather than (local) averages of QOL in different sectors. The table #18 presented above is indicative, nay confirmatory, of the tendency observed earlier in table #15. The said tendency starts revealing itself from the third column onwards in the table #18 (class >1.5d and the classes to the right thereof). It becomes prominent in the fourth column there.

XVII. The Destitute Households: Let us inquire of the number of destitute households in different sectors. Much would depend on how we define destitution because at present, in the context of our discourse, there is no measure to decide on the same. Possibly, one may hold that those who score less that mean-1.0d of QOL Index are destitute households. Normally, no more than 16 percent of the individuals in a sample are below this level unless their distribution has a significantly positive skewness. From Table 18 we find that the sectors 1 through 5 have the number of destitute households 7, 2, 2, 7 and 19 in that order, summing up to 37 in number (about 16 percent of the total households in the sample). The number of destitute households in sector 5 is as many as the sectors 1 through 4 have together, while sectors 2 and 3 are much better off. Once again, it vindicates our earlier findings.

XVIII. Supra-Destitute Households and the QOL Index: Here by '*supra-destitute'* households, we mean the collection of households having QOL above the destitute households. The term purports to connote the complementariness and not the contrariness to destitute households. We do not wish to use any antonym of destitute (rich, well-to-do, affluent, etc.) as it might mean contrariness than contradictoriness of terms. Logically, 'supra-destitute' means 'not-destitute'. We contemplated earlier for a moment (in the section II of this paper) on the possibility of constructing a QOL index reflecting the conditions of the underdog among the households. Such an index of QOL may be proportional to the ratio of supra-destitute households residing in a particular sector to the total number of destitute households living in that sector weighted by the proportion of the total number of households (in the sample) residing in that sector. On this consideration now let us measure the quality of life in a sector. Viewed in the manner proposed above, we define the measure of QOL_j in sector j as:

$$QOL_j = 100[\{(n_j - D_j)/D_j\}.(n_j/n)].$$

In the expression above, n_j is the number of households in sector j, n is the total number of households ($=\Sigma n_j$) and D_j is the number of destitute households in sector j. It is pertinent to note that the measure proposed above is extremely sensitive to the number (if very small) of the destitute households in the sample. However, if the number of destitute households is not very small and the sample is a good representative of the population, such an index may indicate to the quality of life of the population. The Table #19 presents the values of the index for different sectors while we measure the quality of life in the said manner.

Table 19: QOL Measured in terms of the Relative Number of Destitute Households

Sector	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
QOL	100.68	400.00	630.95	163.27	10.53

We observe that our earlier conclusion remains largely unaffected except that the core sector (#1) slides below the sector 4. Owing to the small numbers, one may expect large standard errors of estimate in such a situation. Nevertheless, if the sample size is large, definitive conclusions may be drawn.

Let us contemplate on a regression model that may describe QOL in table 19 above in terms of a polynomial of the sector codes. Let QOL_j be the value of the index of quality of life and $L_j = j$, the serial number of sector j. Thus, $L_1 = 1$; $L_2 = 2,\ldots,L_5 = 5$. We specify our model as $QOL = EXP(\Sigma a_k L_k + e)$, where k=1, 0, -1 and -2. In words, a factor of QOL varies proportionately with the sector code (k=1), while another factor varies inversely with it (k = -1 and –2). It also has a constant factor (k=0). The exponential specification (or its semi-log-linear transformation) has some justification in terms of increase and decay. One may also note that the serial number of sectors is not a nominal number, but, it has some meaning in terms of accessibility, availability of urban facilities, congestion, etc. at least in an ordinal sense. In the same vein, the first factor may tentatively represent "room for expansion or surplus carrying capacity" while the second factor may be "availability or flow of urban utilities and facilities". The surplus carrying capacity of the core might be very little and the flow of urban amenities there might be quite large. In the outer zones of the town, the case might be reverse. We have estimated the coefficients of the regression equation as follows:

$$QOL = Exp\{-4.7346\ L^{1} + 36.0000\ L^{0} - 55.5606\ L^{-1} + 28.9082\ L^{-2} + e\}; \quad R^2 = 0.9996$$
$$\qquad\qquad (30.18) \qquad (29.44) \qquad\quad (20.36) \qquad (17.21)$$

The figures in the parentheses are 't' values. All regression coefficients are significantly different from zero at 1 d.f. and 5 percent level of significance (table values of 't' for 1 and 5 percent levels of significance are 31.82 and 12.71 respectively). However, we would not attach much value to this finding unless empirical evidences further support it.

XIX. Conclusion: In this study we have touched upon several issues relating to an investigation into conceptualization, definition, measurement, spatial and community-wise distribution, asymmetry, inequality and a few other related aspects of quality of life in a commercial township of a developing tribal-abundant state located in a less developed, hilly and frontier region of India. Unlike many studies on the assessment of quality of life at a macro level wherein certain gross indicators (mortality rates, per capita income or literacy rate, etc. at the national or the regional level) have conventionally been used to measure QOL, in this investigation we had to measure QOL by means of micro-level indicators. This distinction is important because the object and the level of an investigation determine the choice of variables as well as the methodology to be entertained. Indicators of quality of life relevant to a macro-level study might be inappropriate or unavailable to a study at micro-level and vice versa. The same is true with the appropriateness of methodology as well.

Quality of life is an all-inclusive concept that draws heavily upon many disciplines. It is also a dialectical concept that does not easily yield to quantitative analysis. However, in this study we tried to measure it. Whether such an attempt is an instance of 'misplaced concreteness' or fanatical 'arithmomorphism' (N. Georgecu-Roegen) is an open question. Numbers can do much and much is there that numbers cannot do. We perceive the limitations of classical statistics. Yet, we have tried to deal with the issue with the help of classical statistical tools. We believe that our attempt has possibly not gone in vain.

Although a vindication of some generally held view by an empirical finding is not a proof of the mettle either of the said view or the said empirical finding, but such a correspondence, nevertheless, provides some confidence to the researcher. With this sense of self-restraint and discretion, we present the summary of our findings as follows:

1. Economic and Accessibility aspects of QOL constitute relatively more cohesive sets of indicators/variables than the Housing and the High Consumption aspects.

2. Of the four facet indices of QOL, those related to housing, economic aspects and high consumption are singularly dominant and positive. They together contribute over 97 percent to the Composite Index of QOL. The fourth facet relates to accessibility. It contributes but only a little to the Index.

3. The distribution of sample households according to the value of the Composite Index of QOL is asymmetric around the mean value. Overall, the sample households are closer to the Hell point and farther from the Bliss point. Asymmetry is the least in sector 3 followed by sector 4, and the most in sector 5 followed by the sectors 2 and 1.

4. Average Quality of Life improves as one moves away from the core (sector 1), attains it peak at sector 3 and sharply declines afterwards.

5. Average Quality of Life of the "advance" Nagas (Ao, Angami, Lotha and Sema Nagas) is much higher than "Other Nagas" and the non-Nagas. The Lothas in the urban area (sectors 1 to 4) are perhaps better off. The non-Nagas are all urban dwellers and, on an average, the quality of their life is a little better than "Other Nagas".

6. Construction of the facet indices as well as the composite index based on full matrix of inter-correlation among the indicators of QOL yields better results than if the indices are constructed by using block-diagonal partial information. This finding is natural and expected. We always pay for ignoring the relevant information. The weak and faltering performance of the facet index of accessibility based on partial information has followed the suit after the incorporation of full information. This finding has some prescriptive value for the future research.

7. A perusal of the table containing loadings of pooled (135) object variables (indicators) suggests that about one-fourth of the loadings (absolute value) are less than 0.10. Exclusion of such variables from the object set would not affect the composite index of QOL adversely, but only add to the parsimony. However, retaining them does not have any undesirable affect. We have avoided, therefore, an exercise in pruning them out. An advice to exclude such 'weaklings' from the set of object variables in order to enhance the explanatory power of the index is rather usual. We hold that such an advice is naive and its practice illusive. An inference based on partial information can never outperform the inference based on full information. Nature never speaks a lie; she has left it to us to interpret her words.

8. There are a number of destitute households in the sample. Most of them are in the rural outskirts of Dimapur, but scarcely a few in the sectors 2 and 3, where average quality of life is better. Perhaps, a residence in sector 2 or 3 is economically inaccessible to them. An index of QOL based on the consideration of destitute households vindicates the conclusions drawn earlier.

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References and Bibliography

1. Froberg, C. E. (1965): *Introduction to Numerical Analysis*. Addison-Wesley, London.
2. Galbraith, J. K (1958): *The Affluent Society*. Hamish Hamilton, London.
3. Georgescu-Roegen, N. (1966): *Analytical Economics*. Harvard University Press, Cambridge, Mass.
4. Harrod, R. F. (1958): The Possibility of Economic Satiety – Use of Economic Growth for Improving the Quality of Education and Leisure ; in *Problems of United States Economic Development*. Committee for Economic Development, New York; I, 207-213.
5. Hirsch, F. (1978): *Social Limits to Growth*. Harvard Univ. Press, Cambridge, Mass.
6. Jerome K Jerome (-) Quoted in *The New Penguin English Dictionary*, 2000. Penguin Books. p. 1622.
7. Johnston, J (1991): *Econometric Methods*. McGraw-Hill, New Delhi.
8. Kapur, J N and H C Saxena (1982): *Mathematical Statistics*. S. Chand & Co. New Delhi.
9. Kendall, M G and A. Stuart (1968): *The Advanced Theory of Statistics*. III. Charles Griffin, London.
10. Krishnamurthy, E V and S K Sen (1981): *Computer- based Numerical Algorithms*. Affiliated East-West Press, New Delhi.
11. Rawls, J. (1971): *A Theory of Justice*. Harvard Univ. Press, Cambridge, Mass.
12. Theil, H (1971): *Principles of Econometrics*. John Wiley, New York.
13. Veblen, T. B. (1899/1953):*The Theory of the Leisure Class*. New American Library, New York.