Determinants of Quality of Life in Dimapur Nagaland (India)

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I. Introduction: This study is a modest attempt to identify the determinant factors of 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. At present the population of Dimapur is over a 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 a population of about 13 thousand. Our study covers this small township also.

It is interesting as well as rewarding to inquire as to the factors that determine (variations in) the quality of life in our study area. Theoretically but rather vaguely we conjecture that one of the components of quality of life is the standard of living that depends on the consumption of personalized (private) goods and services having two properties (i) excludability and (ii) rivalry or competition among the consumers (Harrod). This component of quality of life is primarily based on income level of the consumers. Nevertheless, the quality of life is something more than merely the standard of living. The second component of quality of life entails consumption of public goods that characterize non-rivalry (many consumers can share the public goods) as well as non-excludability. When a public good is provided for some, it is provided for all irrespective of the fact whether the latter ones pay for it or not. This leads to over-use of public goods (Hirsch). Ultimately, it leads to overcrowding. Not only that, there are certain external diseconomies that emanate from their use and they are non-excludable 'negative spill-over'. Consumption of these common goods and 'bads' make up a significant part of quality of life.

Our objective at present is to investigate into the determinants of quality of life. We visualize that there are a few essential and ordinarily unobservable variables that reflect themselves into the indicator variables constituting one or the other aspect of quality life. The quality of life is an abstract concept. It is a concept that has large many dimensions. An indicator in each dimension might be measurable, but together they make the concept fuzzy and only a qualitative statement may be made about the whole. Yet, we believe that some leading factors determining quality of life are discernible as well as measurable. With this background we make an attempt to extract factors of quality of life in our study area.

II. The Data Base: Due to various geographical, political and economic reasons, Dimapur has grown neither 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) the central business district, 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. From those households we collected information on a multitude of indicator variables – in all 113 in number, 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.

It would be useful to list the indicator variables on which data were collected. Table-1 below provides such a list. These variables will often be addressed to by their mnemonics or the short name to facilitate remembering and addressing.

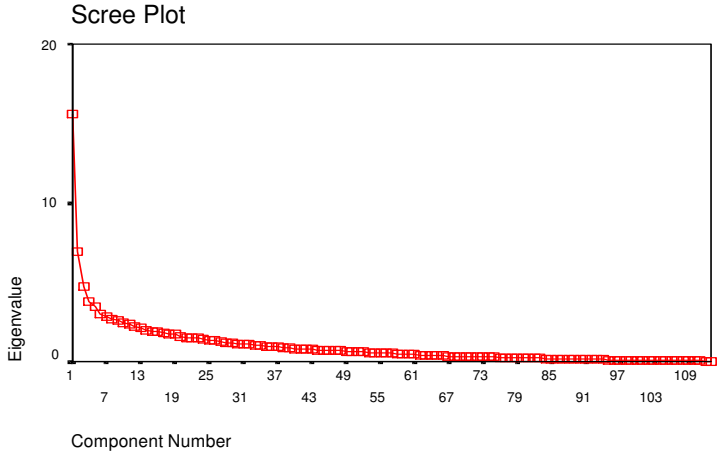
Table-1: Indicators of Quality of Life in Dimapur

Sl. No.	Mnemo-nics	Name of the Variable	Sl. No	Mnemo-nics	Name of the Variable
1	KITCHEN	No. of Kitchen rooms per capita	58	NVEGFRQ	Frequency of Nonveg Consumption
2	LIVROOM	No. of Living Rooms per capita	59	MEALOUT	Does eat meals outside home
3	STDYROOM	No. of Study Rooms per capita	60	TEASNACK	Tea/snacks outside Home
4	BEDROOM	No. of Bed Rooms per capita	61	SMOKCHEW	Smoking/Chewing
5	STOROOM	No. of Store Rooms per capita	62	FRESHMLK	Consumption of Fresh Milk/month
6	O_ROOM	No. of Other Rooms per capita	63	PWDRMLK	Consumption of Powder Milk/month
7	BLDSTRUC	Building Structure	64	FRUITS	Expenses on food per month
8	PLOTSIZE	Plot Size	65	EGGS	Consumption of eggs/month
9	FLOORARE	Floor Area	66	MEATFISH	Meat/Fish consumption
10	IBDIST	Inter-Building Distance	67	VEGEXPND	Expenses on Vegetables/m
11	WATSUPS	Water Supply System	68	NEWSREGL	Regular Readership of Newspaper
12	WSUPMETH	Water Supply Method	69	TYPNEWSP	Type of Newspaper subscribed
13	ELECTRIC	Type of Power Connection	70	NWSCOL	Which news columns are read
14	PWRFAIL	Freq. of Power Failure	71	TVHOUR	TV watching for how Many hours
15	NUMBFAN	No. of Fans in the House	72	LIBRARY	Does go to Library
16	LPG	Use of LPG for Cooking	73	NOLIBWHY	Does not go to Library Why?
17	FRIDGE	Use of Fridge	74	D_LBRARY	Distance of Library
18	TVTYPE	Type of TV	75	LIBADQT	Is Library facility adequate
19	TELEPHON	Telephone Connection	76	HOBBYTYP	Which types of hobbies
20	FURNSPEC	Furniture Specification	77	HOBBYFAC	Has the facilities for hobbies
21	VENTILAT	Ventilation adequacy	78	HOBYHIND	Hindrances in pursuing Hobbies
22	SUNSHINE	Sunshine availability	79	HBHINDTY	Type of hindrances in pursuing the hobbies
23	CMPNDRAT	Rating of the Compound	80	MOVIEFRQ	Frequency of movie-going
24	WTDSPMTH	Waste Disposal Method	81	PICNIC	Goes to picnic
25	DPDSINK	Distance from Public Sink	82	DRAMA	Goes to drama
26	WLOGSPAN	Duration of Water Logging	83	DRMAFAC	Facilities for Drama
27	FALLOWLN	Fallow Land in the Vicinity	84	ED_GPA	Education of Grand Father
28	PUBDRAIN	Public Drainage	85	EDFATHER	Education of father
29	XCRETDSP	How excreta are disposed off	86	EDMOTHER	Education of mother
30	NOISE	Noise Level	87	EDRESPON	Education of the Respondent
31	SMOKDUST	Smoke and Dust in Air	88	CHLDPSCL	Children in Pre-School
32	FOULSMEL	Foul Smell in Air	89	CHLDSCHL	Children in School
33	NWATPOLN	Nature of Water Pollution	90	CHLDCOLG	Children in college
34	SATSANIT	Satisfied with Sanitary Condition	91	DPSCHOOL	Distance of Pre-school
35	PARKDIST	Distance of Park if any	92	DSCHOOL	Distance of school
36	PRKSPSIZ	Size of Parking Space	93	DCOLLEGE	Distance of College
37	D_HIWAY	Distance from Highway	94	STDEDINS	Standard of Educational Institutions around
38	D_MNROAD	Distance from Main Road	95	FMSICK	Is a family member sick
39	MNRDREP	Has Main Road been repaired	96	IDMEMBER	Sick member's relationship with the Respondent
40	ROADTYPE	Type of Approach Road	97	DISEASE	Which disease?
41	SIDDRAIN	Side Drainage	98	DURSICK	Duration of Sickness
42	SDRAINWR	Is Side Drainage Working	99	DISABILI	Any family member is suffering From disability
43	POTHOLES	Potholes in the approach Road	100	XRAYFRQ	Frequency of X-ray taken
44	VEHCLACC	Accessibility by Vehicle	101	EYESIGHT	Is eye sight normal

45	RDMAKER	Who constructed Approach Road?	102	EYEGLASS	Does wear specs
46	SATROADC	Satisfied with Road Condition	103	FAMDOCTO	Has a family Doctor
47	BNKSACC	Has Bank Savings A/c	104	EXERCISE	Does exercise
48	INSURANC	Has Insurance	105	NOEXRWHY	If no exercise, then reason
49	FOODEXP	Expenditure on food PC/month	106	DMARKET	Distance of Market place
50	HOUSRENT	House rent Per Capita/month	107	MODEMRKT	Mode used to go to Market
51	EDUCEXP	Expenses on Education PC/m	108	MRKTFRQ	Frequency of going to Market
52	TOILETEX	Expenses. on Toiletries, PC/m	109	DWRKPLC	Distance of Work Place
53	NEWSPEX	Expenses on News Paper PC/m	110	MODEWRK	Mode used to go to Work Place
54	ENTRTNEX	Exp on Entertainment PC/m	111	TIMEWRK	Travel Time to go to the work Place
55	ADDICTEX	Expenses on Addiction, PC/m	112	TRVLCOST	Travel Cost to Work Place
56	CLOTHEXP	Expenses on clothing, PC/m	113	MODEQLTY	Quality of Mode used to go to the Work Place
57	DONATEX	Expenses on Donation, PC/m			

III. Factor Analysis of Indicators of Quality of Life: To resolve our data on 113 indicator variables (representing various aspects of quality of life of the respondents in our study area), into fewer comprehensible measures, we have gone in for factor analysis. Factor Analysis is a multivariate statistical method with a major objective of data reduction. It assumes that a few latent, fundamental and essential forces work in the hind side and manifest themselves into the empirically observed multivariate data on a complex of variables. These essential, but latent or unobservable forces are "factors". Thus, the relationship between these latent factors and the observed data on the variables is that of "the essence" and "the manifestations". Nevertheless, each individual variable that constitutes of the complex of empirical data has 'noise', specificity or errors of its own. Using suitable statistical and mathematical methods it is possible to extract these essential factors and in turn, they can be given a conceptual and theoretical meaning. Thus, Factor Analysis is a statistical method to extract the common, essential and latent variables that reflect themselves into a complex of empirically observed variables. These essential factors are very often much fewer in number than are their manifest variables. In this sense, factor analysis is a statistical method of reducing the dimensionality of data (Kim & Mueller). In the present context, we hold that the complex of 113 variables on different aspects of quality of life in the study area would resolve into much fewer number of 'factors' of quality of life, which will have meaningful interpretation.

Fig. 1: Scree Plot of Eigenvalues
of Inter-correlation MatrixAmong the Indicators of Quality of Life, Dimapur



The eigenvalues of the inter-correlation matrix (113x113) constructed from the indicator provide the scree plot. The elbow of the scree plot (fig.1) suggests five factors to be extracted. Alternatively, one may extract as many factors as the number of eigenvalues exceeding unity in magnitude. However, in that case, 38 factors have to be extracted. It is singularly difficult to

assign any meaning to such a large number of factors. So, it has been decided to extract only five factors and identify them with some meaningful concept. Rotated factor loadings matrix of five factors so extracted is presented in table-2.

Table 2: Rotated Factor Loadings Matrix

(Extraction/Rotation Method: Principal Component Analysis/Varimax with Kaiser Normalization).

Factor	*1*	*2*	*3*	*4*	*5*	*Factor*	*1*	*2*	*3*	*4*	*5*
NUMBFAN	0.759	0.308				ED_GPA		0.297			
FURNSPEC	0.744	0.314				NWATPOLN	0.238	-0.246			
TVTYPE	0.675	0.223				STDEDINS		-0.233			
TELEPHON	0.659	0.305				PRKSPSIZ		0.202			
NEWSREGL	0.634			0.34		WTDSPMTH			0.712		
LPG	0.617		0.253			SMOKDUST			-0.687		
FRIDGE	0.611	0.247				PARKDIST			-0.621		
BLDSTRUC	0.566	0.229	0.275			FALLOWLN			-0.619		
DCOLLEGE	0.517			-0.261		D_HIWAY			0.59		
CHLDCOLG	0.517	-0.239		-0.221		NOISE			-0.582		
VENTILAT	0.497		0.239			PUBDRAIN			-0.571		
WSUPMETH	0.493					MNRDREP	0.332		0.56		
BNKSACC	0.487	0.248				RDMAKER			0.533		
EDRESPON	0.479	0.346		0.27		HOUSRENT		0.343	0.495		
FRUITS	0.476	0.343		0.403		SIDDRAIN			0.493		
TYPNEWSP	0.463	0.209	0.208	0.39		IBDIST			-0.485		
VEGEXPND	0.463			0.278		DWRKPLC	-0.266		0.431		
NWSCOL	0.444		0.25	0.39		DMARKET			0.418	-0.312	
ELECTRIC	0.442	0.203				D_MNROAD			0.408		
TVHOUR	0.441				-0.208	MRKTFRQ			0.395		
EGGS	0.432					CMPNDRAT	0.331		-0.389		
EDUCEXP	0.401	0.353				SATSANIT			0.362		
EYEGLASS	0.399				0.284	POTHOLES			-0.349		
MODEMRKT	0.394			0.264		SUNSHINE			-0.325		
TRVLCOST	0.382			0.267		DPDSINK			0.316		
NVEGFRQ	0.354	0.272				MODEQLTY			0.293	0.283	
MEATFISH	0.322					MOVIEFRQ			0.264		
CHLDPSCL	-0.319			0.304		SATROADC	0.225		0.239		
WATSUPS	-0.294					SDRAINWR					
FOULSMEL	-0.286					WLOGSPAN					
SMOKCHEW	-0.251					XCRETDSP					
PWDRMLK	0.226					MODEWRK	0.287			0.519	
FRESHMLK	0.219			0.2		HOBYHIND				0.449	0.414
EXERCISE						HOBBYTYP	0.27	0.343		0.438	0.302
NOEXRWHY						TIMEWRK			0.249	0.42	
KITCHEN		0.794				D_LBRARY				0.419	
LIVROOM		0.774				LIBRARY				0.412	
NEWSPEX	0.259	0.747		0.213		DRMAFAC		0.241		0.356	
FLOORARE	0.393	0.678				ROADTYPE			0.258	-0.311	
O_ROOM		0.664				DPSCHOOL				0.272	
ENTRTNEX	0.242	0.662	0.206			HOBBYFAC		0.224		0.265	
CLOTHEXP	0.511	0.6				NOLIBWHY				-0.257	
FOODEXP	0.349	0.588				FAMDOCTO	0.218			0.222	
BEDROOM	0.286	0.569		-0.244		TEASNACK				0.222	
DONATEX	0.337	0.523				IDMEMBER					0.776
TOILETEX	0.362	0.522				DISEASE					0.763
STDYROOM		0.517				FMSICK					0.742
STOROOM	0.333	0.499				HBHINDTY				0.375	0.458
MEALOUT	0.214	0.471		0.315		DISABILI					0.379
EDFATHER		0.445		0.237		EYESIGHT					-0.378
CHLDSCHL		-0.431				PWRFAIL				-0.205	-0.374
DRAMA		0.4		0.215		DURSICK		0.202		-0.204	0.326
INSURANC		0.372				XRAYFRQ					0.322
PLOTSIZE		0.353	-0.26			LIBADQT					-0.207
EDMOTHER	0.205	0.346		0.274		DSCHOOL					
ADDICTEX		0.344				VEHCLACC					
PICNIC	0.236	0.323		0.29		**Note: Loadings with a magnitude < 0.20 suppressed.*					

IV. Identification of Factors: Having extracted five 'factors', the next problem is to identify them. The loadings obtained by various indicators suggest the following categorization. However, it must be borne in mind that no mechanical method to identification is available. A caution and judgment regarding identification of factors is of the utmost importance.

Factor 1:High End Consumption: In this category one may include the personalized flow of utility emanating from various objects that have four distinctive characteristics. First, that they have excludability, at the end of the supplier as well as the consumer, and, therefore, the consumer has the freedom of choice with regard to their consumption at the qualitative level (to consume or not) as well as the quantitative level (how much to consume). Secondly, they are the means to comfort and luxury and their income as well as price elasticity is larger in magnitude. Thirdly, high income and standard of living characteristic of the leisure class (Veblen) support their consumption. Lastly, most of them relate to durable consumer goods. In our case, indicators pertaining to this type of consumption are: TVTYPE, NUMBFAN, FURNSPEC, TELEPHON, NEWSREGL, TVHOUR, FRIDGE, LPG, BLDSTRUC, EDRESPON, FRUITS, TYPNEWSP, BNKSACC, VEGEXPND, NWSCOL, WSUPMETH, EGGS, CHLDCOLG, DCOLLEGE, MODEMRKT, ELECTRIC, EDUCEXP, NVEGFRQ, TRVLCOST, MEATFISH, and EYEGLASS, etc.

Factor 2:Low End Consumption : "Rice, Raiment and Roof" including the consumption of personalized space are the major items of low-end consumption. They are necessities. Their income and price elasticities are smaller in magnitude. In our analysis, variables that make up the second factor are: KITCHEN, LIVROOM, FLOORARE, NEWSPEX, BEDROOM, O_ROOM, ENTRTNEX, CLOTHEXP, FOODEXP, STOROOM, STDYROOM, DONATEX, CHLDSCHL, TOILETEX, MEALOUT, PLOTSIZE, EDFATHER, EDMOTHER, ADDICTEX, INSURANC, PICNIC and so on.

Factor 3:Consumption of Public Goods, Commons and Negative Spillovers: Consumption of this category characterizes non-excludability and non-rivalry. Due to free riding, these goods are often over-used and subject to over-crowding. In our analysis, the variables entering this category are: SMOKDUST, WTDSPMTH, PARKDIST, FALLOWLN, NOISE, D_HIWAY, PUBDRAIN, HOUSRENT, MNRDREP, RDMAKER, IBDIST, SIDDRAIN, CMPNDRAT, DWRKPLC, MRKTFRQ, D_MNROAD, DMARKET, SATSANIT, POTHOLES, MOVIEFRQ, SUNSHINE, DPDSINK, MODEQLTY, SATROADC, etc.

Factor 4:**Supplementary Consumption**: These are miscellaneous type of consumption supplementing standard of living. In our analysis they constitute the fourth factor. They are: HOBBYTYP, HOBYHIND, MODEWRK, HOBBYFAC, DRMAFAC, LIBRARY, ROADTYPE, D_LBRARY, TIMEWRK etc.

Factor 5:Health-related Attributes: The fifth factor is made up of the health related variables in main. Of them, IDMEMBER, DISEASE, FMSICK, XRAYFRQ, EYESIGHT, DISABILI and DURSICK are some prominent ones to mention. It is a negative type of factor. Its larger value indicates poorer health conditions and abatement of quality of life.

V. Distribution of Mean Factor Scores over the Sectors of the Township: A regression analysis carried out to study the spatial distribution of mean factor scores over the sectors of the township of Dimapur reveals that factor#3 monotonically decreases as we move away from the central business district (CBD) to the periphery. It is in conformity with our expectation. The CBD is more crowded and polluted. It caters to the largest floating population who over-use the

public facilities there. Factor #5 (related with poor health conditions) scores higher in the CBD and as we move away to sectors #3 and #4, a decline is observed. It is likely that health conditions are poorer in the CBD and better in sectors #3 and #4. But due to poor conditions of living, health in the rural areas scores poorer.

Factors #1, #2, and #4 are closely related with standard of living. Mean scores of these factors are lower in the CBD and rise as we move away to sectors #2 and #3. They attain their peak in sector #3 and after that the experience a decline as we move away further to sectors #4 and #5.

Table 3: Regression Coefficients of Bartlett Factors on Sectors
(Factor Extraction/Rotation Method: Principal Component Analysis/Varimax with Kaiser Normalization).

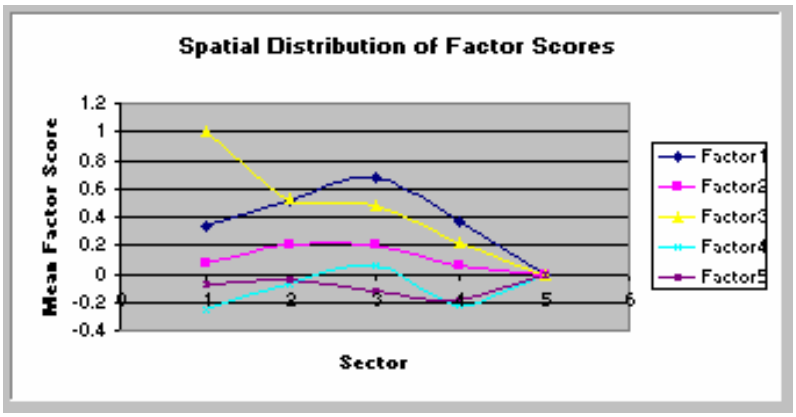
Factor	Statistic	Sector1	Sector2	Sector3	Sector4	Sector5	R^2	F value
Factor1	Coeff	0..854	1.289	1.582	0.876	-0.993	.248	18.6
	t value	4.240	6.400	8.211	4.546	6.523		
Factor2	Coeff	0.198	0.516	0.482	0.151	-0.287	.037	2.17*
	t value	0.868	2.265	2.212	0.691	-1.664		
Factor3	Coeff	2.546	1.364	1.120	0.520	-1.135	.666	112.6
	t value	18.959	10.155	8.723	4.051	11.183		
Factor4	Coeff	-0.649	-0.188	0.121	-0.499	0.250	.088	5.45
	t value	2.927	0.849	0.570	2.354	1.489		
Factor5	Coeff	-0.193	-0.110	-0.292	-0.451	0.234	.023	1.34**
	t value	0.839	0.477	1.329	2.053	1.350		

Note: * Significant at 5*; ** not significant

Table 4: Beta Regression Coefficients of Factors on Sectors
(Factor Extraction/Rotation Method: Principal Component Analysis/Varimax with Kaiser Normalization).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Sector 1	0.336	0.078	1.002	-0.256	-0.076
Sector 2	0.507	0.203	0.537	-0.074	-0.043
Sector 3	0.675	0.206	0.478	0.052	-0.125
Sector 4	0.374	0.064	0.222	-0.213	-0.192
Sector 5	0	0	0	0	0

Fig. 2: Spatial Distribution of Factor Scores
(Factor Extraction/Rotation Method: Principal Component Analysis/Varimax with Kaiser Normalization).



A perusal of the list of variables making up different factors suggests that the first, the second and the fourth factors might have a significant correlation among them. All of them are closely relate to personalized (private) consumption of goods and services that define standard of living. But the rest two factors, the third identified with the consumption of public goods and negative spill-over and the fifth related with health conditions may be only poorly correlated or orthogonal to the others. With this idea in mind, we venture to carry out an oblique rotation.

VI. Factors resulting from Oblique Rotation: To follow the suggestion noted above, we make an attempt to oblique rotation of factors using "Promax" rotation method. We find that the factors are indeed correlated as shown in the table of inter-correlation matrix of Factors.

Table 5: Factor Correlation Matrix

(Extraction: Principal Components. Rotation: Promax)

Factor	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1.000	.469	0.034	0.283	0.045
Factor 2		1.000	0.062	0.226	-0.009
Factor 3			1.000	0.096	0.084
Factor 4				1.000	0.041
Factor 5					1.000

Table 6: Regression Coefficients of Bartlett Factors on Sectors

(Extraction: Principal Components. Rotation: Promax)

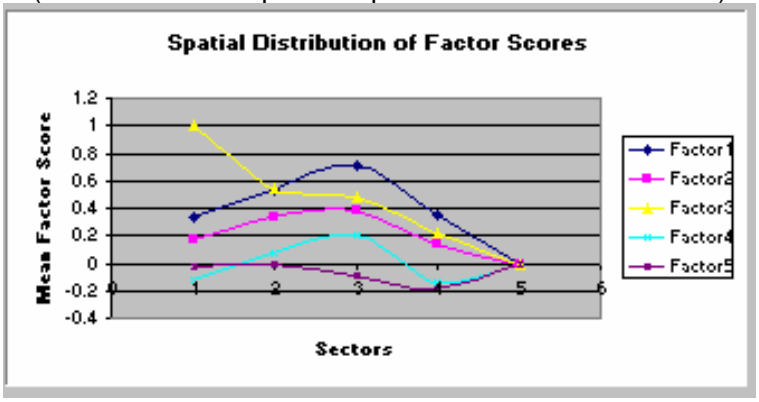
Factor	Statistic	Sector1	Sector2	Sector3	Sector4	Sector5	R^2	F value
Factor1	Coeff	0.835	1.366	1.662	0.821	-1.010	0.287	22.7
	t value	4.253	6.962	8.856	4.374	6.810		
Factor2	Coeff	0.443	0.836	0.882	0.343	-0.535	0.098	6.11
	t value	2.008	3.790	4.179	1.626	3.208		
Factor3	Coeff	2.530	1.377	1.137	0.501	-1.134	0.665	112.0
	t value	18.808	10.236	8.839	3.894	11.153		
Factor4	Coeff	-0.318	0.167	0.488	-0.312	-0.013	0.105	6.61
	t value	1.145	0.759	2.323	1.482	0.080		
Factor5	Coeff	-0.076	-0.036	-0.222	-0.425	0.175	.025	1.47**
	t value	0.329	0.159	1.011	1.936	1.010		

Note : ** Not significant

Table 7: Beta Regression Coefficients of Factors on Sectors
(Extraction: Principal Components. Rotation: Promax)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Sector 1	0.328	0.174	0.996	-0.125	-0.03
Sector 2	0.538	0.329	0.543	0.066	-0.014
Sector 3	0.709	0.376	0.485	0.208	-0.095
Sector 4	0.35	0.146	0.214	-0.133	-0.181
Sector 5	0	0	0	0	0

Fig. 3: Spatial Distribution of Factor Scores
(Extraction: Principal Components. Rotation: Promax)



A comparative study of the results obtained by the orthogonal and the oblique rotations reveals that that our conclusions are essentially unaltered. The first factor (that relates to High End Consumption) attains its peak in sector 3. The second factor (that relates to basic consumption of food, clothing, housing, etc.) as well as Factor #4 behaves in the same manner. These factors are related to the 'standard of living' of the households. However, the third factor (pertaining to consumption of public or common goods and non-excludable negative spill-over) scores highest in sector 1 and it has the monotonically declining trend as one moves away from the CBD. Lastly, Factor #5 (health conditions) improves as we move away fro CBD to sector #4, but beyond that it deteriorates. We observed similar tendencies when we analyzed the spatial distribution of mean factor scores obtained by orthogonal rotation.

VII. A Change in the Method of Factor Extraction: It would be interesting to investigate if the method of extraction (of factors) has any significant effect on our findings or our conclusions are rather immune to changes in the method of extraction. In what has been presented above, Principal Component Analysis was the method of extraction of factors. Now we use the "Principal Axis" and the "Image" factoring methods of extraction.

Table 8: Factor Correlation Matrix
(Extraction: Image Factoring. Rotation: Promax)

Factor	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1.000	.484	0.071	0.212	-0.078
Factor 2		1.000	0.071	0.154	-0.131
Factor 3			1.000	0.149	0.108
Factor 4				1.000	-0.054
Factor 5					1.000

Table 9: Regression Coefficients of Bartlett Factor Scores on Sectors
(Extraction: Image Factoring; Rotation: Promax with Kaiser Normalization).

Factor	Statistic	Sector1	Sector2	Sector3	Sector4	Sector5	R^2	F value
Factor1	Coeff	0.757	1.342	1.631	0.735	-0.963	0.276	21.56
	t value	3.756	6.655	8.456	3.813	6.318		
Factor2	Coeff	0.410	0.739	0.866	0.278	-0.491	.087	5.37
	t value	1.794	3.229	3.962	0.115	2.841		
Factor3	Coeff	2.592	1.388	1.160	0.450	-1.141	0.659	109.38
	t value	18.353	9.828	8.592	3.332	10.691		
Factor4	Coeff	-0.508	-0.043	0.163	-0.565	0.201	.082	5.07
	t value	2.160	0.183	0.724	2.511	1.128		
Factor5	Coeff	0.267	0.105	-0.053	-0.011	-0.056	.012	0.70**
	t value	1.107	0.436	0.230	0.046	0.306		

Note : ** not significant

Table 10: Beta Regression Coefficients of Factors on Sectors
(Extraction: Image Factoring;Rotation: Promax with Kaiser Normalization).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Sector 1	0.292	0.157	0.979	-0.189	0.101
Sector 2	0.518	0.282	0.524	-0.016	0.04
Sector 3	0.682	0.359	0.475	0.066	-0.022
Sector 4	0.308	0.112	0.184	-0.228	-0.004
Sector 5	0	0	0	0	0

Fig. 4: Spatial Distribution of Factor Scores
(Extraction: Image Factoring; Rotation: Promax with Kaiser Normalization).

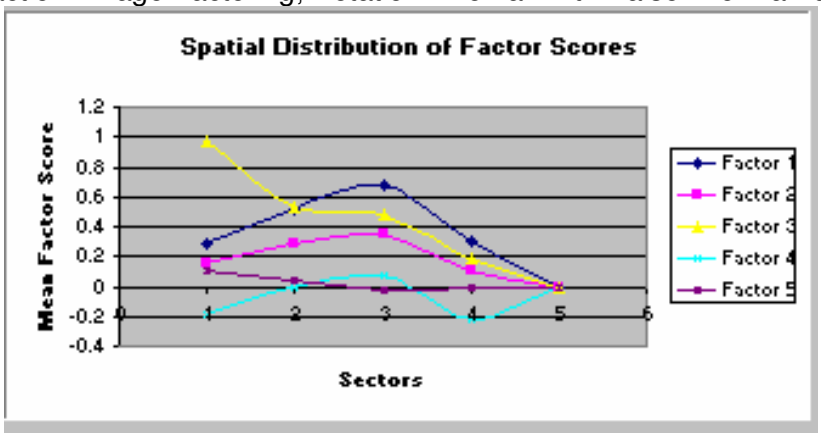


Table 11: Factor Correlation Matrix
(Extraction: Unweighted Least Squares. Rotation: Promax)

Factor	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1.000	0.506	0.061	0.407	-0.046
Factor 2		1.000	0.083	0.308	-0.093
Factor 3			1.000	0.126	0.113
Factor 4				1.000	-0.049
Factor 5					1.000

Table 12: Regression Coefficients of Bartlett Factor Scores on Sectors

(Extraction: Unweighted Least Squares Factoring; Rotation: Promax with Kaiser Normalization).

Factor	Statistic	Sector1	Sector2	Sector3	Sector4	Sector5	R^2	F value
Factor1	Coeff	0.885	1.406	1.687	0.854	-1.041	0.276	21.52
	t value	4.338	6.889	8.648	4.375	6.751		
Factor2	Coeff	0.469	0.858	0.979	0.357	-0.571	0.107	6.79
	t value	2.061	3.771	4.499	1.641	3.318		
Factor3	Coeff	2.648	1.453	1.190	0.484	-1.180	0.670	114.95
	t value	18.871	10.358	8.869	3.607	11.123		
Factor4	Coeff	-0.266	0.313	0.657	-0.269	-0.101	0.122	7.87
	t value	1.133	1.331	2.924	1.197	0.570		
Factor5	Coeff	0.127	0.020	-0.149	-0.195	0.054	.013	0.72**
	t value	0.509	0.080	0.623	0.819	0.286		

Note : ** not significant

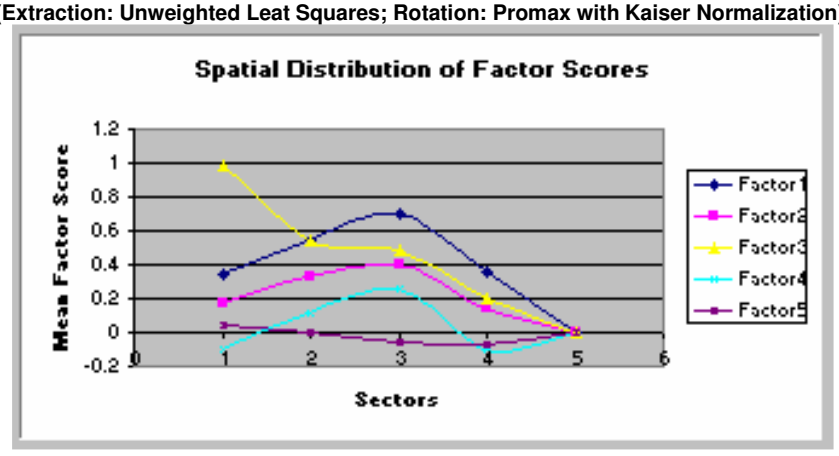
Table 13: Beta Regression Coefficients of Factors on Sectors

(Extraction: Unweighted Least Squares Factoring;Rotation: Promax with Kaiser Normalization).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Sector 1	0.338	0.178	0.990	-0.097	0.046
Sector 2	0.536	0.326	0.544	0.114	0.007
Sector 3	0.698	0.403	0.483	0.260	-0.059
Sector 4	0.353	0.147	0.196	-0.106	-0.077
Sector 5	0	0	0	0	0

Fig. 5: Spatial Distribution of Factor Scores

(Extraction: Unweighted Leat Squares; Rotation: Promax with Kaiser Normalization).



The factor identified with the consumption of commons, public goods and non-excludable negative spill-over score highest in the CBD and with a movement towards the periphery it declines monotonically. On the other hand, factors identified with the standard of

living score lower in the CBD, attain a peak in Sector #3 and onwards they decline as we move to sector #4 and the peripheral rural settlements. Evidently, our conclusions are grossly immune to the alterations in the method of extraction (as well as rotation). Such stability confirms to some extent that the identification of factors has been reliable.

VIII. Relationship between Income Group and the Factors of Quality of Life: We have seen that irrespective of the method of extraction and rotation, three important factors relate to 'standard of living' determined by high-end consumption, low-end consumption and supplementary consumption. Two factors, however, are different in essence. One of them has been identified with the consumption of public goods and negative spillover and the other with the health conditions.

How do these factors relate to the income groups to which the households belong? It is natural to think that the factors identified with the 'standard of living' would correlate positively with income and there too, the factor identified with 'high-end' consumption would correlate more strongly with income than the factors identified with the 'low-end' and supplementary consumption. On the other hand, the factor identified with public consumption and negative spillover would have either a poor correlation with income or it will correlate negatively with income. The reasons for a negative correlation of this factor lies in the fact that the high income group may choose residential sites that have lesser extent of negative spillover and crowding of public goods. Lastly, the factor identified with health conditions (which is a negative indicator of quality of life) would either have no correlation with income or it will vary inversely with the level of income.

We have classified households in three income groups: (i) Low income group (with Rs. 5000 or less per month), (ii) Middle income group (with Rs. between 5000 to15000 per month) and (iii) High income group (above Rs. 15000 per month). Our hypotheses are supported by the findings when five factors are extracted by unweighted Least Squares method, Promax rotation, Bartlett's method of factor scores, while income group identifier alone is the regressor and the factor scores are the regressands. The hypotheses are supported by the models where factors are conceived as functions of income group identifier as well as the residential location of households (sectors). We have experimented with other methods also, but our conclusions remain unaltered.

Table 14: Regression Coefficients of Bartlett Factor Scores on Income
(Extraction: Unweighted Least Squares Factoring; Rotation: Promax with Kaiser Normalization).

Regressor →	Statistic	Constant	Income Group	R^2	F value
Factor1	Coefficient	-2.123	1.069	0.471	203.56
	t value	13.538	14.267		
Factor2	Coefficient	-1.241	0.624	0.159	43.32
	t value	6.245	6.587		
Factor3	Coefficient	-0.137	0.069	0.002	0.43**
	t value	0.624	0.658		
Factor4	Coefficient	-1.081	0.544	0.334	28.74
	t value	5.087	5.361		
Factor5	Coefficient	-0.040	0.020	0.000	0.035**
	t value	0.178	0.187		

Note: ** not significant

Table 15: Regression Coefficients of Bartlett Factor Scores on Income and Sectors
(Extraction: Unweighted Least Squares Factoring; Rotation: Promax with Kaiser Normalization).

Regressor →	Stati-stic	Cons-tant	Income Group	Sector 1	Sector 2	Sector 3	Sector 4	R^2	F
Factor 1	Coeff	-2.415	0.889	0.542	0.860	1.008	0.595	0.554	55.84
	t	14.383	11.837	3.320	5.149	6.153	3.837		
Factor 2	Coeff	-1.348	0.503	0.275	0.550	0.596	0.211	0.195	10.91
	t	5.947	4.958	1.249	2.440	2.693	1.008		
Factor 3	Coeff	-0.916	-0.170	2.713	1.558	1.320	0.533	0.680	95.75
	t	6.325	2.629	19.280	10.811	9.336	3.988		
Factor 4	Coeff	-0.784	0.442	-0.437	0.042	0.320	-0.398	0.185	10.21
	t	3.303	4.161	1.895	0.177	1.379	1.814		
Factor 5	Coeff	-0.004	0.037	0.113	-0.003	-0.177	-0.206	0.013	0.59**
	t	0.014	0.319	0.443	0.011	0.694	0.854		

Note: ** not significant

Table 16: Regression Coefficients of Bartlett Factor Scores on ownership/Rural Residence

Regressor →	Statistic	QOL Factor as a Function of Ownership of Dwelling				QOL Factor as a Function of Rural Dwelling (Sector 5)		
		Constant	Ownership	R^2/ F		Constant	Rural Res	R^2/ F
Factor1	Coeff	-0.360	0.114	0.020/ 4.58		0.174	-1.215	0.170/ 47.0
	t value	1.987	2.141			2.592	6.858	
Factor2	Coeff	0.098	-0.031	0.001/ 0.33**		0.095	-0.666	0.051/ 12.2
	t value	0.532	0.574			1.323	3.499	
Factor3	Coeff	1.479	-0.467	0.319/107.2		0.197	-1.376	0.210/ 61.05
	t value	9.610	10.353			2.953	7.813	
Factor4	Coeff	0.188	-0.059	0.005/ 1.12**		0.017	-0.118	0.001/ 0.34**
	t value	0.983	1.059			0.220	0.581	
Factor5	Coeff	0.253	-0.080	0.009/ 2.04**		-0.009	0.068	0.000/ 0.10**
	t value	1.325	1.427			0.117	0.309	

*Extraction by Un-weighted LS; Rotation by Promax with Kaiser Normalization. ** not significant.

IX. Ownership of Urban Dwelling and the Factors of QOL: We observe that ownership of urban dwelling is associated with higher standard of living (significant positive coefficient for Factor#1) and favourable consumption of public goods (significant negative coefficient for Factor#3). In case of other Factors, the coefficients are statistically insignificant. On the other hand, rural dwelling (residence in Sector 5) is associated with lower standards of living (significant negative coefficients for Factors#1 and #2), but a favourable Factor#3 (possibly due to lesser extent of negative spillovers). These findings are quite in conformity with expectations and common experience.

X. Factors of Quality of Life and the Nature of Employment. Our sample households derive income from employment as well as property. Among those who derive income from

employment, some are government employee, some others are employed in the private sector while yet others are self-employed. We have investigated the relationship of the factors of quality of life with the nature of employment of the respondent. We find that there is only a weak relationship between the first three factors (#1, #2 and #3) and the nature of employment (table 20). Factors #4 and #5 exhibit no dependence on nature of employment. The overall index of quality of life responds weakly to the nature of employment, though not very strong.

Table 17: Regression Coefficients of Factor Scores on Nature of Employment

Regressor →	Stati-stic	Constant	Govt. Employment	Private Employment	Self Employment	R^2	F
Factor 1	Coeff	-0.138	-0.109	**0.403***	0.132	0.052	4.158
	t	0.752	0.513	1.929	0.508		
Factor 2	Coeff	-0.145	0.025	0.165	**0.583****	0.031	2.447
	t	0.791	0.117	0.784	2.222		
Factor 3	Coeff	-0.006	0.009	-0.171	**0.589****	0.054	4.311
	t	0.034	0.041	0.821	2.269		
Factor 4	Coeff	-0.046	-0.116	0.194	0.079	0.019	1.428
	t	0.248	0.537	0.916	0.297		
Factor 5	Coeff	-0.075	-0.036	0.117	0.243	0.007	0.538
	t	0.402	0.017	0.549	0.914		
Overall QOLI	Coeff	-3.619	-1.206	**7.517***	**8.688***	0.056	4.476
	t	1.076	0.308	1.949	1.810		

Note: ** = significant at 5% and * = significant at 10% level of significance.

XI. Factors of QOL and the Ethnicity of Households: An investigation of the association of the factors of QOL with ethnicity reveals that in case of Factor#1 (Standard of living on account of high end consumption) the Semas are better off followed by the Angamis, the Lothas and the Aos, while at the other end the Kukis and the Zeliangs are in the unfavourable state (see table # 21). On account of Factor#3 (Consumption of public goods and negative spillovers) the Zeliangs and the Kukis, (followed by Other Nagas and the Semas) are better off while the Angamis and the Lothas at the other end are relatively worse off. This is so mostly due to the fact that a large majority of the Zeliangs and the Kukis (in the sample) are residing in the rural settlements (Sector 5) surrounding the township of Dimapur. We have already seen that rural residents have better score on Factor#3. The Semas, the Zeliangs and the Aos score favourably on Factor#5 (health conditions). In matters of Factor#4, the Lothas score favourably. In case of other coefficients one may reserve one's comments as these coefficients (different Factors and different tribes) are statistically infirm. The conclusions follow that the advance Nagas (The Semas, the Angamis, the Aos and the Lothas) score favourably on the Factors of QOL relating to the standard of living, but they also share the negative spillovers of urban living more in proportion. The Zeliangs and the Kukis score unfavourably on the standard of living but they share the urban externalities and negative spillover of urban living lesser in proportion. The constant terms in the regression equations relate to the non-Naga households. In case of

factor#1 the non-Nagas are better than the Kukis and the Zeliang while in case of Factors#3 and #5 they score worst.

Table 18: Regression Coefficients of Factor Scores[$] on Naga Sub-ethnicity

F/E		CNST	Angm	Ao	Chak	Kuki	Lotha	O_Naga	Sema	Sngt	Zlng	R^2	F
F1	**C**	-0.372	0.825	0.605	0.410	-.755	0.646	0.267	1.243	0.723	-.658	.241	7.79
	t	*2.953*	*2.812*	*3.273*	*1.178*	*2.573*	*3.642*	*0.877*	*4.862*	*1.684*	*2.319*		
F2	**C**	-0.082	0.454	0.257	-0.236	-.184	0.192	-0.487	0.399	0.073	-.498	.062	1.62**
	t	*0.580*	*1.385*	*1.243*	*0.608*	*0.562*	*0.968*	*1.428*	*1.396*	*0.152*	*1.572*		
F3	**C**	0.817	-0.496	-.064	0.489	-.765	-0.863	-1.580	-1.413	-.093	-.785	.350	13.20
	t	*6.875*	*1.791*	*6.100*	*1.490*	*6.379*	*5.154*	*5.510*	*5.859*	*2.700*	*6.664*		
F4	**C**	-0.200	0.483	0.279	-0.320	-.387	0.494	-0.286	0.666	0.557	-.223	.088	2.37*
	t	*1.382*	*1.436*	*1.315*	*0.801*	*1.152*	*2.428*	*0.820*	*2.270*	*1.132*	*0.684*		
F5	**C**	0.337	-0.552	-.556	-0.461	-.155	-0.090	-0.369	-1.235	0.425	-.942	.127	3.56
	t	*2.381*	*1.677*	*2.680*	*1.180*	*0.470*	*0.454*	*1.081*	*4.304*	*0.883*	*2.956*		

$ Extraction: Un-weighted LS; Rotation: Promax/ Kaiser Normalization. * Signif at 5%; ** Not signif.

XII. Conclusion: Our study prompts us to conclude that standard of living and consumption of public goods/services including negative spillover determine quality of life (QOL) of the residents in our study area. The QOL in the medial sector between the CBD and the periphery is better than that in other sectors mainly due to higher standard of living (on account of higher income), but QOL due to consumption of public goods/externalities monotonically improves as we move away from the CBD. The overall index of quality of life has only a weak relationship with the nature of employment of the residents. The advance Nagas (the Semas, the Angamis, the Aos and the Lothas) score favourably on the Factors of QOL relating to the standard of living, but they also share the negative spillovers of urban living more in proportion. The Zeliangs and the Kukis score unfavourably on the standard of living but they share the urban externalities and negative spillover of urban living lesser in proportion.

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