POPULATION DYNAMICS, ENVIRONMENT AND QUALITY OF LIFE IN NORTH-EAST INDIA

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The growth in population beyond the optimal size associated by socio-political development and technical revolution results in increased pressure on natural environment as well as on the process of economic development. In order to achieve a better quality of life, care has to be taken to obtain smooth movement in all the systems and sub systems connected with quality of living. The change in the total environment system stimulates a new pattern of population dynamics that moves in its own cycle to alter the system factor of the quality of life. Therefore, uniform velocity in the same direction in all the sub-systems is a necessary condition to prevent disorderliness or malfunctioning in the total system of quality of life.

Population dynamics in the North East India as in other societies and regions has two basic components: dynamics through natural process and dynamics through induced process. As regarding to the natural growth rate of population during the period of 1971-2001, all the states in the region have registered higher growth rate than the rate for the whole country. As a result, the increasing population pressure in this region has given rise to linkages between quality of life, population dynamics and environmental degradation.

It is against this background, the paper intends to provide an economic explanation to the emerged linkages among these three components. The paper documents a conceptual framework of quality of life; examines the causal explanation about the complexity of population dynamics and environment inter-connections; illustrates the impact of population dynamics on the quality of life and on environment and constructs a case for setting guidelines for improving the quality of life in the region.

In the above context, the present paper by developing a system approach to quality of life makes a comparative analysis of the same in order to point out how disorderliness in a particular sub-system i.e., population dynamics adversely affects the environment and quality of life in the NE region of India. Further some suggestions are made in order to harmonize the total system of quality of life in the region.

In consonance with the above objectives, the paper has been designed into five sections. Section I deals with the problem of population dynamics in North-East India by giving emphasis on growth aspects followed by an analysis of quality of life in NE India in section II. Section III gives in brief the impact of population dynamics on the environment where we have argued that a high growth of population gives rise to a situation where natural resources are under increasing pressure, threatening public health and development. Water shortages, soil exhaustion, loss of forests, air and water pollution, and degradation of

coastlines afflict many areas. As the population grows, improving living standards without destroying the environment becomes a global challenge.

POPULATION DYNAMICS

Population dynamics in N.E. India as in other societies and region has two basic components: dynamics through natural processes and dynamics through induced processes. Individual state focussed researches testify the above statement (Panda, 1988, Rai and Goel, 1984). As regards to natural growth rate of population during the period 1971-81, all the states in the region have registered higher growth rate than the rate for the whole country (Butola, Undated p-32). The same trend stands irreversed during the period 1981-91. During this period, average annual exponential growth rate for the region ranges between 2.12 % (Assam) and 4.5 % (Nagaland) against the national rate of only 2.11 %. Included among the contributing factors for such high natural growth rate of population in the region are low level of the development of family planning facility, minority status of tribal communities and other socio-cultural factors. The region has also received large influx of people due to the development of service, trade, transport and communication. Despite several and repeated agitation against transcontinental migration, the influx of people from neighboring countries is still taking place. Both the means, natural and induced have remarkably contributed to alter the demographic characteristics of the region, which can be observed from the table-1. Apart from the change in size, sex ratio rural-urban distribution and density, there are some other hidden phenomena having direct and far-reaching impact on the quality of life system. Some of them may be revealed as;

-Majority of the North Eastern states have registered higher growth rate of population during the decade 1981-91 as compared to that during the just preceding decade whereas for India as a whole it is reverse i.e. declining.

-The density ratio of the region has gone up by 18.1% during the period 1981-91 as against 26.4 % increase for India but it is a contrast that the rate of change in density for all the states except Assam is higher than the rate for India during the same period. This is because of a large population base of Assam that has a dominating impact on the demographic measure of the region.

Looking at this demographic trend, it is imperative to raise a question whether other subsystems in the quality of life system have taken care of these factors with a view to improving or at least retaining the quality of life in the region. The following section addresses to this question.

Table I: Population Dynamics in N.E. India

	Growth Rate	Density

	Decennial		Av. Anl. Exponential				
	1971-81	1981-91	1971-81	1981-91	1981	1991	
Arunachal Pradesh	35.15	36.85	3.04	3.06	8	10	
Assam	36.05	24.24	2.12	2.12	254	236	
Manipur	32.46	29.29	2.85	2.51	64	82	
Meghalaya	32.04	32.86	2.80	2.76	60	79	
Nagaland	50.05	56.08	4.09	4.50	47	73	
Tripura	31.92	34.30	2.79	2.90	196	263	
N.E. Region	36.28	36.00	2.94	2.97	104	130.50	
All India	24.66	23.85	2.22	2.11	216	273	

Source: Basic Statistics of North Eastern Region, 1995, NEC, Shillong.

POPULATION DYNAMICS AND QUALITY OF LIFE.

Quality of life in NorthEast India based on the earlier discussed conceptual framework is analyzed by selecting a list of quality of life indicators (see Table-2). Since the aspired level of living is a product of the perceived, comparison between the levels of resources enjoyed by the people and their referent others; the magnitude of the selected indicators for North-East India has been compared with their respective magnitudes for the country as a whole. In a socialistic democratic country, where equality and egalitarianism guide the process of development, it is quite natural for the people in one region to expect their consumption of various quality of life influencing resources to be at par with that enjoyed by the people in other regions under the same political territory. Therefore, the quality of life in North-East India is discussed on a comparative basis.

As a response to the social objectives enshrined in our constitution, all the state governments in North East region have given priority to health in their five year plans in order to achieve improvement in the health status of the people. Although, life expectancy has gone up along with a declining infant mortality, and diseases have been effectively brought under control, health situation in North-East India still remains as a cause of serious concern. The population growth rate continues to be alarmingly high. Per capita calorie consumption is yet to match the recommended allowances resulting in severe malnutrition particularly among expectant mothers and children. A sizeable population in all the state capitals does not have access to safe drinking water and basic sanitation amenities leave alone the condition of the rural mass. Water born diseases along with the dangerous cerebral malaria claim many lives in Assam, Tripura and Arunachal Pradesh. Though there is an increasing trend in the number of PHCs Hospitals and CHSs, their services are far from adequate. A relative comparison reveals that both the indicators of population pressure on hospital beds (1576 persons per bed) and area coverage per hospital (0.66-lakh hectare.) are higher than that of the country as a whole (1324 persons and 0.29 lakh. hectare.). The population per doctor or hospital may be less but from the patient point of view particularly when we consider the geography of the region it is important to reflect the average distance that he/she travels to reach hospital. With regard to quality of the hospitals and their services, it may be pointed out here that the health institutions with an uneven distribution suffer from non-availability of adequate finance, equipments and competent manpower. Health

care units in private sector in collaboration with an exploitative unethical medicine market have come forward to offload the pressure on the public hospitals but at the cost of an unbearable pressure on our economic resource availability.

Table-II: Quality of life in N.E Region and India as a whole

Selected indicators	Ref. Years	NE Region	India as a whole
Population (in lakhs(	1991	315.48	8463.03
Area (Lakh Hectares)	2000	255.05	3287.80
Density	2000	123	273
Forest area percentage	2000	65.19	19.50
Per capita net cultivated area(Acre)	2000	0.28	0.37
Per capita foodgrain production (kg)	2000	125.87	201.15
Yield rate of total foodgrains (Qntt.per hect)	2000	13.53	14.87
Per capita availability of live stock and poultry (no)	2000	0.67	0.31
Per capita inland fish production (kg)	2000	5.47	2.01
Percentage of of main workers	2000	33.00	37.46
Percentage of population registered in employment exchange	2000	4.02	3.56
Population per Small Scale industry (Thousand)	2000	3.38	1.45
Percapita production from SSIs (Rs)	2000	140.17	510.68
No.of SSIs per thousand hectare	2000	0.37	1.77
Urban percentage	2000	13.89	26.40
Percentage of pucca houses to total houses(Rural andUrban)	2000 (R) (U)	- -	22.40 64.70
Per capita consumption of electricity (kwtt)	2000	99.24	330.60
Per capita consumption of petroleum products(kg)	2000	42.85	69.96
Road (km) per 100 sq.km	2000	45.69	62.80
Percentage of surfaced road to total road	2000	27.08	50.52
Area served by a post office sq.km	2000	39.09	1.60
Area served by a hospital (lakh hect)	2000	0.66	0.79
Population served per hospital bed	2000	1576	1324
Literacy rate	2000	44.44	36.23
Per capita budgeted expenditure on education (Rs)	2000	295.92	243.92
Population (thousand) per bank	2000	15.37	11.42
Per capita Net SDP (Rs in current price)	2000	4057.11	5054.00

Source: Various sources mainly Basic statistics of North East region, NEC, 1995 some figures are Computed from the data collected from the above sources.

As regard to housing, the situation is not better. Strains have sprung up with their own socio-economic consequences (Sarma, 1992)**.** While analyzing the quality of houses in the region it is found that the percentage of pucca houses to total houses in both the urban and rural areas is far less than the national average (22.4 % for rural and 64.7% for urban).

Food grain production in North-East India has registered a 37.41 % growth during the period 1971-87. Cultivated area has increased from 26.7 lakh hectares in 1970-71 to 35.01 lakh hectares in 1986-87. About 3.72 % of the country's population reside in the North- East but its share in total food grain

production is only 2.6 %. According to one estimate (Agarwal, 1992), the total requirement of cereals in 1989 was 5734 thousand tons whereas the production figure for the year shows a shortage of more than 30%. Despite an increase in per capita availability of food grain, malnutrition at a high degree continues to exist because of unequal distribution system. The percentage of cultivated land to total land is far below the same for the country as a whole during the period 1970-71 to 1991-91. Although the carrying capacity of the land in the region has experienced increase, the actual pressure due to population explosion has more than neutralized the improvement (Pandey, 1990). India's situation is better in this regard with a carrying capacity of 0.9 persons per hectare in 1985-86. Yield rate of the region has increased by 54 % during the period 1970-94 as against 71% increase in country's yield rate. While observing the traditional agricultural practices and low yield rates (Chaudhury, 1996) the increase in food grain production over the period may be attributed to enlargement of cultivated land by encroaching forested tracts.

Increasing population pressure on agricultural resources in North-East India has been progressively lowering the per capita availability. While comparing agricultural resource availability between North-East region and India as a whole by means of set of indicators viz; per capita cultivated area, per capita food grain production and per capita availability of livestock and poultry, it is found that the region's figures are much below than that of the nation. With regard to other agricultural commodities like milk, egg and fish, the percentage of production in North East India to the total production of the country (1.61 %, 3.2 % and 2.7 % for milk egg and fish respectively), is less than 3.72 %, the percentage of North East population to the Indian population. This is also an indication of the excess pressure on these commodities, which is offloaded by import from other parts of the country.

North-East India is endowed by nature with abundant forest resources. Since the economy of some of the states in the region is still forest based or under transformation from forest to agriculture, the pressure on forest resources is increasing. Sudden change in the life style of the people and still practiced shifting cultivation particularly in the tribal dominated states has caused rapid depletion of forests (Ramakrishna, 1993, Das, 1995) and thus degradation of bio-diversity in the region. The population pressure on forest resources is relatively less but while looking at the structure of the economy and utilization of forest resources (as the raw products are sold without much value addition), the impact of the pressure gets multiplied in the region. As a result the demand for wood exceeds tremendously the sustainable production of wood (Hindustan times, New Delhi, 21 Feb.1991) particularly in Assam and Nagaland.

Table III: Regional Variation in Quality of Life in N.E. India

Selected indicators	Ref. Year	A.P	Assam	Mani-pur	Megha-laya	Mizo-ram	Naga-land	Tri-pura	Coeffi-cient of variation
Population(lakhs)	1991	8.65	224.14	18.37	17.75	6.90	12.10	27.57	-
Area (lakh hectares)	2000	83.58	38.52	22.36	22.49	21.09	16.53	10.48	-
Density	2000	10	286	82	79	33	73	263	86.53
Forest area percentage	2000	82.03	33.20	80.00	69.80	86.20	86.90	50.90	27.11
Per capita net cultivate area (Acre)	2000	0.54	0.30	0.22	0.19	0.21	0.37	0.26	38.19

Per capita food production (kg)	2000	218.49	117.23	180.73	77.75	91.30	126.45	162.50	34.19
Yield rate for total foodgrain(qntt.per hect	2000	11.88	12.90	21.66	11.03	15.99	12.52	17.46	23.86
Per capita availability of live stock and poultry (N0.)	2000	1.30	0.51	1.64	0.90	1.21	0.93	0.68	34.88
Per capita inland fish production (kg.)	2000	1.73	5.80	5.44	1.86	4.49	1.68	3.89	85.73
Percentage of main workers	2000	45.22	31.19	38.55	40.32	42.09	42.29	29.09	14.52
Percentage of population registered in employment exchange	2000	1.75	3.62	14.08	1.27	4.43	1.68	3.89	85.73
Population per SSI (thousand0	2000	2.00	5.06	0.88	3.02	0.75	6.61	3.41	61.26
No. Of SSI per thousand hect.	2000	0.039	0.76	0.93	0.26	0.43	0.11	0.77	69.30
Per capita production from SSIs (Rs)	2000	383.35	---	162.66	152.11	213.04	103.06	107.25	38.70
Urbanization(Zge)	2000	12.38	11.10	27.52	18.60	46.10	17.21	15.30	53.11
Percentage of pucca houses to total houses (Rural/Urban)	2000 R U	7.30 47.80	N.A N.A	1.70 11.80	10.50 26.70	5.00 49.00	5.90 57.20	21.00 40.60	71.79 39.35
Per capita consumption of electricity (kwtt)	2000	128.30	91.00	140.40	159.40	126.10	100.00	83.90	21.65
Per capita consumption of petroleum Products(kg)	2000	86.71	41.58	38.65	65.92	46.38	44.63	25.75	37.31
Road (km./100 sq.km.)	2000	8.90	87.80	30.30	34.90	17.60	53.10	124.10	75.20
Percentage of surface road to total road	2000	33.19	15.73	40.52	37.42	34.19	77.70	34.19	44.67
Areas served by a Post Office (sq. Km.)	2000	311.15	22.31	33.33	44.65	56.00	56.11	15.08	125.15
Area served by a hospital	2000	4.64	0.29	0.89	2.81	1.51	0.53	0.46	93.22
Population served per hospital bed	2000	755	1968	1203	1055	627	979	1647	37.77
Literacy Rate	2000	32.87	43.20	49.00	39.15	67.36	51.09	49.86	21.31
Per Capita Budgeted Expenditure on Education (Rs.)	2000	512.50	217.41	433.93	436.81	670.75	605.55	453.83	28.28
Population (1000/bank)	2000	9.13	17.31	17.74	8.00	8.37	13.51	13.20	30.43
Per Capita NSDP (Rs. In current Price)	2000	5046	4014	3893	4530	4280	5006	3430	12.73

Source: Various sources mainly Basic statistics of North East region, NEC, 1995 some figures are Computed from the data collected from the above sources.

Three indicators have been selected for indicating the income and employment situation of the region. The percentage of main workers to the total population has been registered at 33 % in 1991 against 37.46 % for the whole country.

The primary sector of North-East economy due to small landholding, high cost of inputs and low yield rate is no more considered lucrative by the educated job seekers. Creation of employment in public organizations has already reached the point of saturation in terms of very high public servants to population

ratio. Jobs created in slow growing private industrial and service sector are inadequate to meet the demand for jobs and as a result the problem of unemployment has risen in all the states of the North-East region. The mismatch between jobs created and job seekers available has added to the problem (Panda, 1990). When we compare the problem of the region with India as a whole through the indicator of percentage of population registered in employment exchanges, it is found that the magnitude of the problem is more serious in North East region, (4.02% for North East India against 3.56% for India). With regard to per capita net SDP, it is observed that the magnitude of the indicator for India exceeds that for the region by around 25%.

In order to throw some light on population pressure on the industrial resources of the region, we have included three basic indicators; population per small industrial unit, number of SSIs per unit geographical area and per capita production from SSIs. As the situation of large and medium scale units in North-East India is still worse, indicators about SSIs can better reveal the industrial status of the region. Population per SSIs in North East India is 2.33 times greater than the same for India whereas per capita small industrial production in the region stands at only 27.44% of the figure for the country as a whole. While effecting on the industrial development process, it may be pointed out here that by 1988 when the nation has developed on an average 1.77 SSI per thousand hectares of land, North East region could go for only 0.37 SSI per same unit of land.

Two indicators have been incorporated to reflect on the educational status of the region. There is a silver lining that for both the indicator literacy and per capita budgeted expenditure, the North-East region out performs the nation as a whole. When we observe the quality aspects of education in terms of average distance traveled by school students to reach the nearest school in the rural area, number of teachers per school/college level of knowledge, status of the libraries, etc. the situation will seem reversed. In fact, the higher per capita expenditure reflects the pressure on our economic resources. Despite the higher per capita expenditure on education, the states are not in a position to provide quality education and reason being a good number of students going outside for both school and college education.

Regarding the consumption of electricity output, it is observed that the Indian per capita consumption of electricity is more than three times of the consumption level in North East region whereas the per capita consumption of petroleum products in the region stands at 61.25 % of the national figure for that. These two indicators to a great extent reveal the technological status of the people in NorthEast India.

Availability of infrastructural resources has also been ascertained through some selected indicators reflecting the facility. Two indicators included; road length per 100 sq. km to reflect availability and percentage of surface road to show the quality, are found to be smaller than their respective national figures in the year 1992. Area served by a post office in NorthEast region being higher than that of India as a whole reflecting the relative task difficulty of the post offices and thus the quality difference in postal service. The average population pressure per bank in the year 1992 is 35 % more than the pressure at national level.

The socio-political scenario is still worse. Frequent changes and instability in government, the move for separation by some strategic states, continuing law and order problem, interference of religion into politics, communal riots and the number of deaths therein, high expenditure of the home departments (police), corrupt administrative machinery, increase in the number of criminal incidents, degradation of human values, religious and intertribal conflicts are some of the factors prevalent in North East region adversely affecting the quality of life. The influence of ethno-linguistic elements on the resource distribution system poses some threats to quality of life particularly for the subordinated social group (Guhathakurta, 1994).

Evaluation of quality of life in terms of a few selected indicators that too by eliminating the subjective perception of the people towards the objective resource enjoyed by them gives a narrow scope for evaluation. As discussed in section II, the standard of living of the referent 'others' plays an important role in determining the aspired level of living. If the people of the other sister states are considered as referent others, it is imperative to analyze the interstate variation in the standard of living. Since the statistical units of the selected indicators differ along with a wide variation in their magnitudes, coefficient of variation is considered to be the appropriate statistical technique to analyse the interstate variation**.** The coefficient of variation computed for 25 indicators have been presented in Table-III. For five important indicators (20% of the total) the coefficient exceeds 75. Excluding only 4, the computed coefficients fall between 25 and 75 for the rest of the 16 indicators. High coefficients of variation reveal the intensity of the quality of life problem for, the aspiration level of the states where the people receive comparatively lesser resources will increase because of its positive association with the level of resources received by the people of referent states.

POPULATION DYNAMICS AND ENVIRONMENT

Many analysts blame the environmental crisis on poverty- population growth linkages (Bucs, 1992). They maintain that explosive population growth is responsible for environmental degradation. A high growth of population puts a pressure on the availability of resources, which in turn affects the per capita availability of Gross State Domestic Product. The poor masses allegedly degrade the environment by their uncivil and unscientific ways of using environmental resources to meet their needs for food, fuel, and fodder. Even more importantly, they do so by multiplying their numbers, and bringing the already scarce environmental resources under further strain. As such poverty abetted by ever growing population is the worst pollutant in developing world. The prescription that follows from this diagnosis is population control and/or slowing the pace of its growth.

Without denying the linkage between poverty- population and pollution, it is essential to point out that this formulation does not capture the entire complexity of the economy-ecology inter-connection.

Rao (1995) articulated an alternative explanatory formulation that seeks to account for environmental deterioration in India in terms of political economy. This formulation attributes environmental degradation not to growth *per se* but to inadequate growth. It is argued that the Indian State has followed largely a capitalist path of development, which is evident from the policy choices that have been taken in the sources of irrigation, energy and forestry. These policy decisions have contributed heavily to environmental contamination and are clearly indicative of an uneven pattern of development. Accordingly our development has degenerated into a process of state sponsored subsidized flows of resources to industrial elites and influential landlords.

In order to be really able to respond to the challenges of population growth-environmental crisis, the social order should satisfy the following three conditions;

(i) It must conceptualize an integrated global population control and environmental order

(ii) It must integrate nature into production mechanism and process of identifying the human needs-to improves quality of life.

(iii) It must recognize that human beings are multi-dimensional and can no longer be reduced to uni-dimensional labourers.

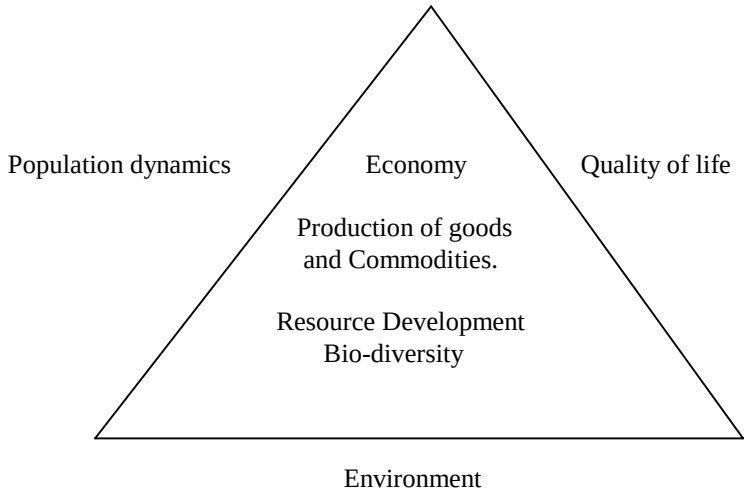
All these three conditions are inextricably linked with each other. The social order, in which we live in at both national and global level, is incapable of facing these conditions. It is because of the fragmented nature of decision-making and wide disparity among nations. The implementation of environmental protection measures come into direct conflict with the logic of private accumulation and underlying international order.

The incorporation of the environment dimension into regulation of economic choices is only possible in the context of a decentralized democratic set up with social context. It is only under this framework that the individualism can be reconciled with humanism. Now we realize that if man has to exist in this finite system, then he has to operate with the rules of the nature, under which he himself has evolved. He has to work within a complex of dynamic inter-related system of which he is an integral part. Therefore, what is urgently required is to develop an intergenerational set of criteria entailed by an ecosystem approach to achieve a rapid and sustainable development.

The following figures explain the various intergenerational criteria and components of sustainable growth. Population dynamics, quality of life and environment are three components of a given economy to achieve sustainable economic growth. It consists of all the objectives of narrow economic system.

Environment undoubtedly provides the resource base essential for the human beings in their struggle for existence. The environment is to be harnessed, utilised and transformed for human use that depends on the stage of development, mode of production, technological know-how and above all the institutional arrangements. It is this dimension that gets affected by the dynamics of the population-demographic situation that cannot be easily distinguished from social, economic and political spheres. The man-environment relation thus is crucially dependent on demographic reality and

INTERGENERATIONAL CRITERIA



each of the component affect and is affected by the other in the process of development that takes a dialectical path. Growth in population while causing irreversible changes in the environment is also responsible for improvements in technology that protect the environment from further degradation. It is this complex association between environment and population dynamics that influences the quality of life, which depends on the judicious use of the environment on a sustainable basis.

This approach necessarily has to have a decentralized pattern of development. This approach is not anti-life, nor welfare reducing. Its fundamental objectives are total well-being of the society at the present and in future. We believe this is the only approach, which can ensure a sound and sustainable balance between a productive environment and a protective environment. In view of the protection and preservation, the negative effect of the rise in material welfare requires re-orientation with respect to certain prevailing economic tendencies so that in addition to economic development, the protection of environment and preservation of natural resources have to be convinced as of an explicit aim in planning and in political decision making. Decentralization is the most appropriate movement, which can reconcile the contradiction between quality of life and environment.

CONCLUSION

In mid eighties we have had a shift in our assumption about human resources by considering them not only as a means but also as an end in the whole socio-economic developmental process. Accordingly, task of improving quality of life as the ultimate aim of our developmental process rests with the people, particularly in generating various kinds of resources in terms of quality of life indicators and make them available for their own consumption, this task is becoming difficult year by year in North East region due to increase in population. The benefits of planned development in the region have been offset by rapid population growth and only a marginal part of the development contributes towards improving our standard of living.

Our discussion on quality of life in North-East India clearly reveals a lower standard of living in the region as compared to the living standard of the country as a whole. Most of the indicators incorporated in the study are population based and therefore, it is inferred that there is a mismatch between the population dynamics and the developmental process. The increasing mismatch between these two components in our quality of life framework can be reduced by means of suitable population corrective and responsive policies. The alternatives available are;

-To change the perception of the people by providing educational inputs so that they will equalize the perceived level of resources received with the aspired level of resources that should be received. This alternative deals with peoples' attitude about life and their perception of the environment where they live in.

-To provide adequate resources (in terms of quality of life indicators by managing existing resource base through sustainable developmental process (Sharma, 1996) and socio-cultural system) so as to equalize perceived level of resources received with the aspired level of resources. This alternative deals with management of resources including human resources. Stress is on optimizing resources so as to keep quality of life at the highest possible point. This is what one of the Asian tiger China has followed (Resources/population=well being)

Both the alternatives call for people participation. At the same time government agencies are not free from responsibilities.

Government, both at the centre and the state level has to pay sufficient consideration to the high variation in the magnitude of quality of life indicators across the states in North-East region while assigning priority for their developmental process. This is an inclination towards equity perspective for sustainable development that breaks the vicious of poverty. At the same time the efficiency perspective cannot be ignored where stress is on mobilization of resources by maintaining both vertical and horizontal harmony. Hence, a mixed approach may be developed to tackle the situation by putting a check on unsustainable

patterns of production and consumption and promoting quality of life through socially equitable, ecologically viable and economically efficient developmental process.

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