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LIVELIHOOD STATUS INDEX: POVERTY AND INEQUALITY ASSESSMENT IN GUJARAT

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Abstract- The study has measured the level of livelihood status of the peoples in Gujarat at region as well as district level. Using Prem Narayan's methodology an integrated livelihood status index have been prepared by the optimum combination of five different sub-indices of Agricultural Status, Infrastructure Status, Health and Sanitation Status, Economic Status and Food Availability Status in respective regions and districts. The findings reveal that there exists wide regional disparity in Gujarat. The region of Kutchh has shown low value for most of the sub-indices including the integrated livelihood status index. Seven districts namely Bhavnagar, Panchmahal, Dahod, Surat, Banaskantha, Patan and Kutchh accounting for about 34 per cent of the total population of the state were found low developed in livelihood status. It was also found that these low developed districts account for most of the tribal population of the state, which is nearly 47 per cent. Composite indices of infrastructure and economic sectors were found highly associated with livelihood status index. For bringing about uniform regional development, model districts have been identified for low developed districts. It also explores different poor performed indicators in low developed districts that require improvement for enhancing the level of development of respective district.

Keywords- *Economic development, GIS map, Human development, Model districts, Regional disparity, Social indicators, Tribal population.*

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Introduction

Gujarat has made a noteworthy progress and outperformed all other states in the country in terms of economic growth during the recent decades [1]. But it is doubtful that the growth in Gujarat can reduce the level of poverty [2, 9]. Some observers are not sure that the economic growth alone can lead to poverty reduction and promises well-being of the people in the state [3,5,12]. The evidence of 36 poor villages in northeast Gujarat suggested that growth has at best only a partial influence on poverty reduction. Other forces, both economic and non-economic, are also important as much and perhaps more than the rate of economic growth, to reduce the level of poverty and improve the well-being of the peoples in foreseeable future [13].

Social indicators are statistical time series "... used to monitor the social system, helping to identify changes and to guide intervention to alter the course of social change." [14]. Composite indicators (CIs) which compare performance of countries are increasingly recognized as a useful tool in policy analysis and public communication. Such composite indicators provide simple comparisons of countries that can be used to illustrate complex and sometimes elusive issues in wide-ranging fields, *e.g.*, environment, economy, society or technological development [19]. The best known composite index of social and economic wellbeing is Human Development Index (HDI), developed by United Nations Development Program (UNDP) (1989) [22]. The basic aim of this index was a cross-national comparison. The concept of livelihood emerged in the mid-nineties closely associated with poverty reduction strategies. Understanding the livelihood systems of the poor is crucial to effective poverty reduction [10]. The development of livelihood security index is one of the most important social indicators for assessing the quality of life, coupled with meeting the basic needs of human-beings [20].

Gujarat located in western India, is one among several federal states in the union of India [21]. Today, it is one of the prosperous states of India, as is evident from the fact that with mere 5.96 per cent of geographical area and 4.99 per cent of the population of India [4], the State enjoys a high per capita income i.e. Rs. 75115 in 2010-11 as against Rs. 63549 in 2009-10, [8]. Though the incidence of poverty in the state is much lower (23.00 %) than incidence of poverty in India (29.80 %) in 2009-10 [7]. It is still significant, as it implies that almost every fourth person in the state is living in poverty.

The present study deals with the assessment of livelihood status of Gujarat at regions as well as districts level by constructing the composite indices of five sub-indices (Agriculture, Infrastructure, Health and Sanitation, Economic, and Food Availability). The knowledge of livelihood status will help in identifying the measures to be adopted in the development process and bridging the disparity gap.

Materials and Methods

Methodology and Sources Of Data

Indicators of Livelihood Measurement

The livelihood security has multidimensional aspects. It includes economic security, nutritional security, health security, food security, educational security, habitat security, community participation, environmental security, *etc.* Therefore, it is important to select parameters, which are representative indicators of all these sectors of human-life. The availability of authenticated secondary data at various levels also plays an important role in the identification of these indicators [20]. The livelihood status was measured with the help of total 69 indicators in the fields of (i) Agriculture (ii) Infrastructure (iii) Economic (iv) Health and Sanitation and (v) Food Availability. This clearly indicates that there is a need to develop five sub-

indices based on these categories and then an integrated livelihood index may be developed at regions as well as district level. The district-wise information on various indicators for the year 2006 to 2010 was collected and compiled from the reports published by the State Bureau of Economics and Statistics, Directorates of Agriculture, Horticulture and Animal Husbandry, Gandhinagar and WTO cell, Junagadh Agricultural University, Junagadh. Appendix provides information on the parameters included in the development of different sub-indices.

Development of Integrated Livelihood Status Index

The methodology for development of integrated livelihood index is based on the statistical background suggested by Narain *et el*, (1991) [15]. Let a set of n points represents districts 1,2,...,n having information on K parameters. Let $[X_{(R)ij}]$, where j= 1, 2,...,j_R represent the value of i^{th} parameter of j^{th} district falling in R^{th} region. The district level parameters (indicators) were converted in to region level by weighted average method with the help of equation (1):

$$X^*_{(R)i} = \frac{\sum_{j=1}^{j_R} W_{(R)j(T)} X_{(R)ij}}{\sum_{j=1}^{j_R} W_{(R)j(T)}} \quad ...[1]$$

Where, T= types of parameters, and j_R is the total no of district falling in R^{th} region. Since the parameters (indicators) included in the analysis are in different unit of measurement, thus, to arrive at single composite index relating to the dimension in question, the indicators were standardized as shown below:

$$R_{(R)i} = \frac{X^*_{(R)i} - \bar{X}^*_{(.)i}}{S_{(.)i}} \quad ... [2]$$

Where,

$$S_{(.)i^2} = \sum_{R=1}^{5} \left(X^*_{(R)i} - \bar{X}^*_{(.)i}\right)^2$$

$$\bar{X}^*_{(.)i} = \sum_{R=1}^{5} \frac{X^*_{(R)i}}{5} \qquad (i=1,2,...,k)$$

Here, $[R_{(R)i}]$ denotes the matrix of standardized indicators. The best region for each indicator (with maximum or minimum standardized value depending upon the direction of the indicators) was identified and from this, deviation in the value of each indicator was considered for all the indicators using the equation given below:

$$C_{(R)} = \left\{\sum_{i=1}^{k} (R_{(R)i} - R_{(0)i})^2\right\}^{1/2} \quad ... [3]$$

Where, $R_{(0)i}$ is the standardized value of the i^{th} indicator of the best region and $C_{(R)}$ denotes the pattern of development is useful in identifying the regions that serves as 'models'. The status index of the R^{th} region was obtained through formula given below:

$$D_{(R)} = \frac{C_{(R)}}{C} \quad ... [4]$$

Where,

$$C = \bar{C} + 2S$$

$$\bar{C} = \sum_{R=1}^{5} \frac{C_{(R)}}{5}$$

$$S = \left\{\sum_{R=1}^{5} \frac{(C_{(R)} - \bar{C})^2}{5}\right\}^{1/2}$$

The final value of the index was obtained as per following equation:

$$D^*_{(R)} = 1.0 - D_{(R)} \quad ... [5]$$

The value of status index is non-negative and lies between 0 and 1. The value of index closer to one indicates the higher level of development, while that closer to zero indicates the lower level of development in respective district. With the help of above method the composite indices have been obtained separately for agricultural status (ASI), infrastructure status (ISI), health and sanitation status (HSSI), economic status (ESI), and food availability status (FASI) for all the regions and districts. The Livelihood Status Index (LSI) was obtained by combining the above indices using optimum weights as shown below:

$$D^*(R)(L) = \left\{\frac{\sum_T \sigma^*_{DR}(T) D^*(R)(T)}{\sum_T \sigma^*_{DR}(T)}\right\}$$

Where,

T = {Infrastructure, Agriculture, Health and sanitation, Economic and Food availability}

The values will lie between 0 and 1. The value of index closer to one indicates the higher level of livelihood status and if the value is closer to zero, it indicates that the livelihood status in respective district is poor. The same methodology has been used by Rai *et el,* (2008) [20] for calculating the livelihood status indices for different agro-climatic zones of India.

After working out the indices, grouping of the districts into high, medium and low development was done employing the following formula:

$$\text{Level of development} = \bar{X} \pm 0.5\text{SD}$$

The regions as well as districts having the value of index more than or equal to (Mean + 0.5 S.D.) are of high level of status, value of index less than or equal to (Mean - 0.5 S.D.) are low level of status and value of index between (Mean + 0.5 S.D.) and (Mean - 0.5 S.D.) are characterize as of medium level of status.

Model districts for low developed districts have been identified on the basis of composite index of development and the development distance between different districts. Model districts are better developed districts

Result and Discussions

Socio-Economic Profile and Inter-State Comparison

The process of development, in any society, should ideally be viewed and assessed in terms of what it does for an average individual [6].Inclusive development incorporates the objective of reduction of inter-state and inter-regional disparities. Gujarat is one of the large states in India known for sustained levels of development. It is one of the few states where income earning opportunities have always been better and praiseworthy.

An inter-state comparison of socio-economic variables of major selected state including Gujarat based on available indicators from different sources is given in [Table-1]. The table shows that Kerala was best performing state in terms of four indicators *i.e.* decadal growth of the population (4.91 per cent), literacy rate (93.91 per cent), poverty headcount ratio (7.1 per cent) and infant mortality rate (12 per 1000 live birth). Whereas, Bihar was found worst performance in terms of decadal growth of the population (25.42 per cent), literacy rate (63.82 per cent) and poverty headcount ratio (33.7 per cent) and Madhya Pradesh was found worst performance in case of infant mortality rate (56 per 1000 live birth). Gujarat state was found eleventh and fifth position in the decadal growth of the population (19.28 per cent) and literacy rate (79.31 per cent), respectively and eight position in terms of two indicators *i.e.* poverty headcount ratio (16.6 per cent) and infant mortality rate (38 per 1000 live birth). Decadal growth of the population in Gujarat was found higher than the national growth rate of the population (17.69 per cent), whereas in terms of literacy rate, poverty headcount ratio and infant mortality rate Gujarat was found better performing state as compared to national average.

In case of scheduled tribe (ST) population, lowest tribal population was found in Himachal Pradesh (392126) and highest tribal population was found in Madhya Pradesh (15316784). Gujarat state distant twelfth with the tribal population of 8917174. The best performing state in the decadal growth of the tribal population was found Assam (17.40 per cent) and Uttar Pradesh was found highest decadal growth of the tribal population (950.61 per cent). The decadal growth in the tribal population of the Gujarat state was found 19.20 per cent, which was lower than the national decadal growth rate of the tribal population (23.66), and it is placed fourth in decadal growth of ST among all the selected states.

Highest per capita income was found to Haryana (120352 Rs.) and Bihar was found lowest position in their per capita income with Rs. 28774.

Gujarat state was found fifth position in per capita income (96976 Rs.) among all the selected states in India. Bihar was found the best performing state in terms per capita income growth 2012-13 (13.9 per cent) whereas, Gujarat was found at fourth position (6.6 per cent) after Bihar, Madhya Pradesh and Kerala. Rajasthan has the lowest per capita income growth in 2012-13 (2.9 per cent).

Inter-Regional and Inter-District Disparity in Livelihood Status

The development of status indices was based on the average of secondary data for the year 2006 to 2010, collected from different organizations on the factors indicated in Appendix. Data related to all the parameters were considered for development of composite indices separately for agricultural status (ASI), infrastructure status (ISI), health and sanitation status (HSSI), economic status (ESI), and food availability status (FASI) and finally an integrated livelihood status index has been developed for all the regions as well as districts of Gujarat.

Table-1 *Socio-economic profile and inter-state comparison*

Name of State	Decadal* growth of Population (2001-2011) (%)	Tribal@ Population 2011	Decadal@ growth of Tribal population (2001- 2011) (%)	Literacy* rate (%) 2011	Absolute# Per Capita income 2012-13(Rs.)	Per# Capita Income Growth 2012-13 (%)	Poverty** Headcount ratio 2011-12	Infant* Mortality Rates (per 1000 live births) 2012
Andhra Pradesh	10.98	5918073	17.79	67.66	78958	4.5	9.2	41
Assam	17.07	3884371	17.40	73.18	40475	4.6	32	55
Bihar	25.42	1336573	76.25	63.82	28774	13.9	33.7	43
Gujarat	19.28	8917174	19.20	79.31	96976	6.6	16.6	38
Haryana	19.9	-	-	76.64	120352	5	11.2	42
Himachal Pradesh	12.94	392126	60.32	83.78	83899	5.1	8.1	36
Karnataka	15.6	4248987	22.66	75.60	77309	4.2	20.9	32
Kerala	4.91	484839	33.13	93.91	88527	7.7	7.1	12
Madhya Pradesh	20.35	15316784	25.2	70.63	44989	8.6	31.6	56
Maharashtra	15.99	10510213	22.54	82.91	107670	5.8	17.4	25
Odisha	14.05	9590756	17.75	73.45	49241	5.2	32.6	53
Punjab	13.89	-	-	76.68	86106	3.9	8.3	28
Rajasthan	21.31	9238534	30.16	67.06	59097	2.9	14.7	49
Tamil Nadu	15.61	794697	22.01	80.33	98550	3.5	11.3	21
Uttar Pradesh	20.23	1134273	950.61	69.72	33137	3.6	29.4	53
West Bengal	13.84	5296953	20.2	77.08	62509	6.4	20	32
India	**17.69**	**104281034**	**23.66**	**74.04**	**67839**	**2.1**	**21.9**	**42**

Source: * Office of the Registrar General of India
** Planning Commission
# Central Statistical Organisation
@ Statistical Profile of Scheduled Tribes in India 2013.

The composite indices of development for different regions as well as districts are given in [Table-2 and 3], respectively. The Agricultural Status Index [Table-2] revealed that region of Saurashtra was found highly developed with index value of 0.3199 followed by Middle Gujarat (0.3147) and the region of Kutchh (0.0023) was found least developed. In case of Infrastructure Status the Middle Gujarat was found to be highly developed with index value of 0.3947 and the South Gujarat region with index value of 0.1259 was found least developed.s

Health and Sanitation Status Index indicated that the North Gujarat region followed by the region of Kutchh to be highly developed with the index values of 0.6701 and 0.5129, respectively and Middle Gujarat region was found least developed showing the index value of 0.1577.

Middle Gujarat with its highest index value (0.7794) among all the regions of Gujarat was found at first position in economic status followed by South Gujarat (0.6275), whereas the region of Kutchh (0.2217) was found at last position in economic status of Gujarat. Food Availability Status Index indicated the North Gujarat (0.3162) to be highly developed followed by Saurashtra (0.2873) and South Gujarat to be least developed with the index value of 0.0444. On the basis of Livelihood Status Index, Middle Gujarat region followed by North Gujarat, wasfound highly developed, whereas the region of Kutchh was least developed. The values of Livelihood Status Indices varies from 0.2448 (Kutchh) to 0.4042 (Middle Gujarat).

The district level indices in [Table-3] revealed that, the districts of Anand (0.2781) and Patan (-0.0176) ranked first and last position, respectively in agricultural sector. Higher resource availability with respect to the lower proportion of population become the major responsible factors to place the Dang district at first position in case of infrastructure with the index value of 0.4399 and health & sanitation sectors with the index value of 0.7548. The district of Dahod (0.0505) ranked last position in infrastructure sector and in case of heath & sanitation sector the district of Ahmedabad (-0.0180) ranked last position. In case of economic sector Ahmedabad district (0.8957) and the district of Dahod (0.0032) occupied the first and last position, respectively. The district of Banaskantha with the index value of 0.2386 ranked first position in food availability sector whereas the district of Ahmedabad with the index value of -0.0031 ranked at last position. The district of Dang, which was being, concerned backward and tribal district of Gujarat ranked first position in livelihood status among all the districts of Gujarat followed by Vadodara district and the districts of Dahod ranked at last position.

Table-2 *Composite indices and ranking of different regions*

Sr. No.	Regions	ASI		ISI		HSSI		ESI		FASI		LSI	
		Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
1	Saurashtra	0.3199	1	0.1273	4	0.3917	3	0.3786	3	0.2873	2	0.3252	3
2	Middle Gujarat	0.3147	2	0.3947	1	0.1577	5	0.7794	1	0.1556	4	0.4042	1
3	South Gujarat	0.2711	4	0.1259	5	0.1944	4	0.6275	2	0.0444	5	0.3085	4
4	North Gujarat	0.3021	3	0.2341	2	0.6701	1	0.2229	4	0.3162	1	0.3667	2
5	Kutchh	0.0023	5	0.1449	3	0.5129	2	0.2217	5	0.1744	3	0.2448	5

Table-3 *Composite indices and ranking of different districts*

Sr. No.	Districts	ASI		ISI		HSSI		ESI		FASI		LSI	
		Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
I	Saurashtra												
1	Amreli	0.0671	22	0.1306	16	0.4531	4	0.2891	17	0.1497	10	0.2671	14
2	Bhavnagar	0.1884	7	0.0904	22	0.2092	21	0.3317	14	0.1835	5	0.2236	20
3	Jamnagar	0.1397	15	0.1425	13	0.2785	18	0.3516	11	0.1455	11	0.2477	16
4	Junagadh	0.1741	10	0.1712	11	0.2831	16	0.3040	16	0.2225	3	0.2514	15
5	Porbandar	0.1401	14	0.1029	20	0.2985	13	0.3397	13	0.1528	8	0.2441	17
6	Rajkot	0.1744	9	0.2346	8	0.1846	23	0.4880	4	0.1264	12	0.2815	11
7	Surendranagar	0.0700	21	0.1291	18	0.3741	7	0.2656	18	0.1228	13	0.2343	18
II	Middle Gujarat												
1	Anand	0.2781	1	0.1300	17	0.2489	20	0.4041	8	0.2288	2	0.2804	12
2	Ahmedabad	0.0948	18	0.2585	7	-0.0180	25	0.8957	1	-0.0031	25	0.3331	3
3	Panchmahal	0.1376	16	0.1491	12	0.3351	9	0.2481	19	0.0652	21	0.2226	21
4	Vadodara	0.1560	12	0.2079	9	0.2926	14	0.6916	2	0.0604	22	0.3630	2
5	Kheda	0.2122	3	0.2609	6	0.2495	19	0.3504	12	0.1765	6	0.2706	13
6	Dahod	0.0714	20	0.0505	25	0.3145	11	0.0032	25	0.0882	19	0.1173	25
III	South Gujarat												
1	Bharuch	0.0296	24	0.2793	4	0.4042	6	0.4825	5	0.0727	20	0.3255	4
2	Narmada	0.1525	13	0.1393	14	0.5860	2	0.2366	21	0.1096	15	0.2956	7
3	Dang	0.0745	19	0.4399	1	0.7548	1	0.2424	20	0.1213	14	0.3857	1
4	Navsari	0.1578	11	0.1351	15	0.4202	5	0.3810	9	0.0908	18	0.2923	8
5	Surat	0.2029	4	0.0991	21	-0.0140	24	0.4711	6	0.0223	24	0.1894	22
6	Valsad	0.0949	17	0.2017	10	0.2829	17	0.4992	3	0.0409	23	0.2883	10
IV	North Gujarat												
1	Gandhinagar	0.1917	6	0.2912	3	0.3284	10	0.4459	7	0.1509	9	0.3229	5
2	Banaskantha	0.1922	5	0.0783	24	0.1916	22	0.1175	24	0.2386	1	0.1551	23
3	Mehsana	0.1840	8	0.2723	5	0.3632	8	0.3258	15	0.1648	7	0.2922	9
4	Sabarkantha	0.2167	2	0.2939	2	0.5143	3	0.2223	22	0.2101	4	0.3148	6
5	Patan	-0.0176	25	0.1248	19	0.2879	15	0.1322	23	0.1049	16	0.1538	24
V	Kutchh												
1	Kutchh	0.0390	23	0.0824	23	0.2989	12	0.3538	10	0.0985	17	0.2269	19

The first position of Dang district could be attributed mainly due to the highest position of the Dang district in infrastructure and health and sanitation sectors, whereas the second position of Vadodara district could be mainly attributed due to the greater value of indices in infrastructure and economic sector.

Table-4 *Area and population of districts under different levels of livelihood status*

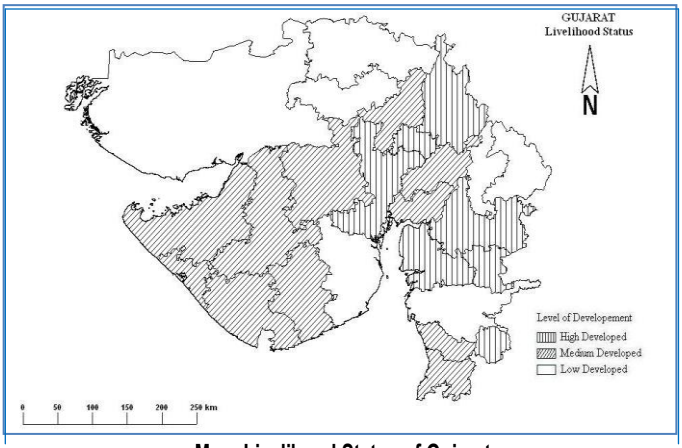
Sector	Level of status	No. of district	Area (%)	Total Population		ST Population	
				Absolute	(% to total population)	Absolute	(% to total ST population)
LSI	High level	7	18.56	16719406	29.20	2985058	33.47
	Medium level	11	36.21	21174292	36.97	1762594	19.77
	Low level	7	45.23	19383686	33.83	4169522	46.76
Total		25	100	57277384	100	8917174	100
Source: Census 2011, Office of the registrar General of India.							

The values of integrated livelihood status indices varied from 0.1173 (Dahod) to 0.3857 (Dang). It may be concluded from the result that there exist wide disparity in the livelihood status of the peoples in Gujarat. Rai *et el* (2008) [20] in their study of different agro-climatic zones of India indicated regional disparity in the development process and livelihood status of the people in India.

Regional Imbalances and Classification of the Districts

A suitable classification of the districts from the assumed distribution of the mean of the development indices would provide a more meaningful characterisation of different stages of development [11]. An attempt is made to classify the districts of different regions of Gujarat on the basis of their level of livelihood status. An important aspect of the study was to find out the share of population affected under different levels of livelihood status in the state. The GIS map has been used to identify the districts of Gujarat having different levels of livelihood status

The [Table-4] shows the proportion of area and population accounted for different levels of livelihood status in the state. It can be seen from the map that, two districts of Middle Gujarat *viz*., Ahmedabad and Vadodara, three districts of South Gujarat *viz.,* Bharuch, Narmada and Dang, and two districts of North Gujarat *viz.,* Gandhinagar and Sabarkantha were found high developed. The proportion of area and population accounted for these seven high-developed districts were about 19 and 29 per cent of the state, respectively and these districts further account for about 33 per cent of total scheduled tribe (ST) population of the state [Table-4].



Map: Livelihood Status of Gujarat

All the districts of Saurashtra except Bhavnagar, two districts of Middle Gujarat *viz.,* Anand and Kheda, two districts of South Gujarat *viz.,* Navsari and Valsad and the district of Mehsana were categorized under medium level of livelihood status. The table shows that these eleven districts of Gujarat account for about 36 and 37 per cent of the total area and population of the state, respectively and about 20 per cent of the total ST population of the state. Similarly, the districts of Bhavnagar, two districts of Middle Gujarat *viz.,* Panchmahal and Dahod, two districts of North Gujarat *viz.,* Banaskantha and Patan and the districtsof Surat and Kutchh were categorized under low level of livelihood status. Since, these seven low developed districts account for about 45 and 34 per cent of the total area and population of the state, respectively and 47 per cent of the total ST population of the state, the Gujarat government should pay special attention to these hitherto low developed areas.

Demographic profile of these seven low developed districts, which account for about 47 per cent of the total tribal population of the state, is given in the [Table-5]. It can be seen from the table that no of rural families was found highest in Banaskantha (399061) and lowest in Patan district (163562) among all the low developed districts of Gujarat.

The district of Dahod was found highest percentage (80.8 per cent) in families below poverty line followed by Panchmahal (69.92 percentage) and Surat (48.21 percentage), which was also greater than the state average 40.39 per cent). Dahod district also account for most of the tribal population of the state (17.73 per cent) followed by Surat (17.23 per cent) and Panchmahal (8.09 per cent). The tribal population of the Gujarat state (14.79 per cent) was found higher than the national average (8.61 per cent).

In case of absolute population Surat district was highest (6079231) and the district of Patan was found lowest (1342746) population among all the low developed districts. Whereas, the district of Dahod was found highest ST population (1580850) and Bhavnagar was lowest (9110). The literacy rate in all the low developed districts except Surat (86.65 per cent) was found lower than the state average (79.31 per cent) and except Surat and Bhavnagar (86.65 per cent and 76.84 per cent, respectively) it was even lower than the nation average (74.04 per cent). While the average literacy rate of the state was higher than the national average. Further it is shown in the table that Surat district was registered with highest no of infant death (1320) followed by Kutchh (310) and Bhavnagar (264) and the district of Banaskantha with lowest no of infant death (91) among all the low developed districts of the state [Table-5].

Table-5 *Demographic profile of low developed districts of the state*

Name of regions	Low Developed districts	No. of $ Rural families (2000)	% of rural $ Families Below poverty line (2000)	Absolute # population (2011)	Absolute# scheduled tribal population (2011)	% of # total ST (2011)	Literacy # Rate (2011)	No. of @ infant death registered (2011)
Saurashtra	Bhavnagar	243917	29.7	2877961	9110	0.1021624	76.84	264
Middle Gujarat	Panchmahal	318224	69.92	2388267	721604	8.09	72.32	135
	Dahod	238770	80.8	2126558	1580850	17.73	60.6	132
South Gujarat	Surat	406044	48.21	6079231	856952	17.23	86.65	1320
North Gujarat	Banaskantha	399061	33.98	3116045	284155	3.1866037	66.39	91
	Patan	163562	34.38	1342746	13303	0.149184	73.47	102
Kutchh	Kutchh	221577	33.05	2090313	24228	0.2717004	71.58	310
Gujarat		5766738	40.39	60383628	8917174	14.79*	79.31	8468
India		-	-	1210193422	104281034	8.61*	74.04	178172

* Per centage of total population.
Source: $ BPL census 2000
Census of India 2011, Office of the Registrar General of India.
@ Vital Statistics of India, Office of the Registrar General of India.

Inter-Relationship among Different Sectors of Economy

It is quite important and essential that impact of development in different sectors of economy should be in proper direction which may improve the level of living of the people. The development in different sectors should flourish together in the State [18].

The correlation coefficients between the composite indices of agricultural,

infrastructural, health & sanitation, economic, food availability and livelihood status are given in [Table-6]. The correlation coefficient between agricultural status and the composite indices of food availability status was found positively significant. It shows that improvement in agricultural status has positive impact on food availability in the state. Infrastructure in respect of drinking water, transport, education and banking facilities was positive significantly correlated with health & sanitation sector. The correlation coefficient of composite indices of Economic status with health & sanitation status and food availability status was fond significantly associated in negative direction. The correlation coefficient between livelihood status and the status of agriculture, health and sanitation sectors was found positive. There is very high association between livelihood status and the composite index of infrastructure and economic sectors. Similar result of very high correlation coefficient of infrastructural facilities with the socio economic development in the state was found by Narain*et el*., (2000) [16] in his study of "Regional Disparities in Socio-Economic Development in Tamil Nadu".

Table-6 *Correlation Coefficient*

	ASI	ISI	HSSI	ESI	FASI	LSI
ASI	1	0.037	-0.218	0.111	0.502*	0.141
ISI		1	0.404*	0.317	-0.038	0.799**
HSSI			1	-0.457*	0.216	0.391
ESI				1	-0.490*	0.599**
FASI					1	-0.114
LSI						1
*. Correlation is significant at the 0.05 level (2-tailed).						
**. Correlation is significant at the 0.01 level (2-tailed).						

Identification of Model Districts

For making improvement in the level of development, it is quite important to identify the districts, which might be considered as model for low developed districts. This will provide an avenue for making improvement in the developmental indicators of the low developed districts. Model districts will be better developed as compared to low developed districts. The identification of model districts has been made on the basis of composite index of development and developmental distances between different districts [17].

List of model districts for these low developed districts is given in [Table-7]. It was clear from the table that, the districts of Vadodara, Valsad, Amreli, Junagadh, Kheda and Sabarkantha were found model districts for most of the low developed districts. Further, the indicators, which have low value in different low developed districts, are identified and shown in [Table-8]. These are the different poorly performed indicators that require improvement in their performance for enhancing the level of livelihood status of respective districts.

Table-7 *Model district for different low developed districts*

Name of regions	Low developed districts	Model districts
Saurashtra	Bhavnagar	Amreli, Jamnagar, Junagadh, Rajkot, Vadodara, Kheda, Valsad
Middle Gujarat	Panchmahal	Vadodara, Kheda, Narmada, Valsad, Sabarkantha
	Dahod	Panchmahal, Valsad
South Gujarat	Surat	Ahmedabad, Vadodara, Bharuch, Navsari, Valsad
North Gujarat	Banaskantha	Mehsana, Sabarkantha
	Patan	Amreli, Junagadh, Kheda, Valsad, Gandhinagar, Mehsana, Sabarkantha
Kutchh	Kutchh	Amreli, Jamnagar, Junagadh, Rajkot, Vadodara, Valsad

Table-8 *Poor performed indicator in different low developed districts*

Bhavnagar	Panch Mahals	Dahod	Surat	Banaskantha	Patan	Kutchh
LST (1144.23)	ML (344.30)	ML (196.70)	WL (1.21)	LYR (26.46)	WL (1.19)	ML (304.85)
GNP (1291.20)	EG (156.74)	EG (131.30)	SHP (0.55)	ONP (27106.13)	LST (1136.79)	EG (135.81)
OLP (1114.26)	SHP (1.62)	WL (1.26)	GNP (1409.72)	PLP (544.42)	LYR (6.79)	LYR (3.67)
SGP (7138.75)	RCP (841.29)	SHP (2.73)	NCA (7.06)	SPP (1307.71)	BJP (590.71)	ONP (27098.31)
TFA (15.22)	WHP (1674.29)	RCP (795.58)	II (114.98)	INSTSHSE (12.25)	CTP (283.23)	FGP (969.45)
II (117.82)	BJP (967.05)	WHP (2042.01)	CI (112.84)	CWR (2.73)	PTP (22219.27)	PLP (457.03)
CPBF (0.0006)	MZP (946.74)	MZP (994.98)	CPBF (0.0004)	TWR (28.00)	FGP (822.53)	VGP (10400.62)
MLCS (0.34)	CTP (389.04)	CTP (433.53)	PACS (0.46)	CBO (3.29)	PLP (486.51)	SPP (1177.47)
MLCC (0.03)	PTP (21932.68)	OLP (1156.35)	CSB (65.17)	BDM (4424479.78)	CRP (1117.23)	TFA (25.79)
CSB (78.42)	ONP (27006.43)	CRP (1191.15)	INSTPME (48.92)	CRSCB (3985.11)	SPP (754.54)	II (117.14)
INSTPME (55.54)	CRP (966.37)	VGP (13103.24)	INSTSHSE (11.69)	EMP (1513.87)	NPK (77.38)	CI (107.27)
RM (0.49)	VGP (10905.05)	FRP (5325.86)	TRR (236.63)	UNEMP (1082.32)	CWR (2.73)	NPK (72.35)
ALM (2.71)	NCA (12.30)	NCA (10.92)	RM (0.55)	LTRCY (61.37)	TWR (27.43)	MLCS (0.05)
AYHM (1.12)	CI (107.26)	NPK (80.36)	ALM (1.96)	FLTRCY (46.38)	EMP (1129.34)	PACS (0.52)

PCHC (2.13)	INSTHE (0.73)	PACS (0.30)	AYHM (0.81)	EGA (1809.49)	EGA (370.78)	INSTSHSE (12.20)
PTGM (63226.48)	CWR (3.19)	MLCC (0.02)	PCHC (1.52)	MZA (7.27)	VGA (36.99)	V (91.94)
MZA (0.81)	RM (1.20)	CSB (64.72)	PTGM (35816.60)	PLA (9.82)	FRA (9.57)	RM (0.43)
FGA (80.09)	CBO (4.04)	INSTHE (0.73)	BDM (4475157.42)	FRA (13.31)		EGA (140.30)
PLA (1.53)	CRSCB (2653.25)	CWR (1.58)	UNEMP (1022.97)			CRA (68.73)
SPA (3.96)	WHA (14.31)	TWR (34.24)	MLA (73.09)			VGA (33.55)
	BJA (3.89)	TRR (219.50)	WHA (3.62)			
	GNA (1.86)	CBO (3.42)	BJA (0.09)			
	CTA (9.16)	BDM (4649322.00)	MZA (0.46)			
	PTA (1.98)	CRSCB (1773.05)	GNA (4.08)			
	OLA (4.14)	EMP (752.35)	CTA (2.65)			
	VGA (17.09)	LTRCY (55.53)	OLA (4.24)			
	FRA (14.59)	FLTRCY (42.93)	FGA (46.75)			
	SPA (8.50)	MLA (82.79)	PLA (5.97)			
		RCA (18.43)	CRA (40.79)			
		BJA (0.02)	SPA (4.67)			
		GNA (1.21)				
		CTA (0.77)				
		OLA (1.73)				
		VGA (40.43)				
		FRA (14.93)				

Note: Present value of the indicators are given in bracket

Conclusion

The level of development in Gujarat is not uniform in terms of spatial distribution and across sectors. To strike a balanced regional development, an integrated approach for sustainability of livelihood of these disadvantaged people has become imperative. The study revealed wide disparity in the level of livelihood status of the peoples in Gujarat. The region of Kutchh, which has shown low value for most of the sub-indices, including the integrated livelihood status index needs an urgent attention of policy makers as well as of the state government especially in the field of agricultural sector as balanced growth in agricultural sector is essential for overall stability of the economy. Seven districts, which were found to be low developed accounting for about 34 per cent of the total population and about 47 per cent of the total scheduled tribe population of the state, require special attention while implementing the rural development programmes. Medium developed districts were found thickly populated as compared to other groups of districts. Highly significant correlation was found between livelihood status and the composite index of infrastructure and economic sectors. In order to reduce the disparities in the development process model districts have been suggested. Further, poor performed indicators in low developed districts have also been identified that require improvement for enhancing the level of development of respective district.

Conflict of Interest: None declared

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Appendix

Different sub-indices and the parameters of their development

Sub-Indices Parameters

Agriculture Status Index (ASI)

Per animal productivity of milk (ML)
Per animal productivity of wool (WL)
Per layer productivity of eggs (EG)
Number of livestock per 1000 ha of gross cropped area (LST)
Number of layers per 1000 person (LYR)
Number of sheep per 1000 person (SHP)
Net cropped area per 100 person (NCA)
Irrigation intensity (II)
Cropping intensity (CI)
NPK consumption per ha of net cropped area (NPK)
Per centage of total area under food grains to total gross cropped area (TFA)
Number of milk chilling centers per lakh livestock (MLCC)
Number of cattle and poultry breeding farm per 1000 ha of gross cropped area (CPBF)
Number of primary agricultural credit societies per 1000 ha of gross cropped area (PACS)
Number milk and livestock co-operative societies per 1000 ha of gross cropped area (MLCS)
Per hectare productivity of 16.rice (RCP), 17.wheat (WHP), 18.bajara (BJP), 19.maize (MZP), 20.groundnut (GNP), 21.cotton (CTP), 22.potato (PTP), 23.onion (ONP), 24.oilseed (OLP), 25.foodgrain (FGP), 26.pulses (PLP), 27.sugarcane (SGP), 28.cereals (CRP), 29.vegetables (VGP), 30.fruits (FRP) and 31.spices (SPP).

Infrastructure Status Index (ISI)

per centage of villages having drinking water facilities (V)
no. of cars and station wagons registered per 1000 population (CWR)
no. of two wheeler registered per 1000 population (TWR)
no. of tractor registered per lakh population (TRR)
no. of regulated market (including sub-yard) per lakh population (RM)
no. of commercial bank offices per lakh population (CBO)
no. of co-operative societies and banks per lakh population (CSB)
no. of institutions in higher education per lakh population (INSTHE)
no. of institutions in primary and middle education per lakh population (INSTPME)
no. of institutions in secondary and higher secondary education per lakh population (INSTSHSE)

Health and Sanitation Status Index (HSSI)

no. of allopathic medical institutions per lakh population (ALM)
no. of ayurvedic and homeopathic institutions per lakh population (AYHM)
no. of primary and community health centers per lakh population (PCHC)
no. of patients treated in govt. medical institutions per lakh population (PTGM)
no. of beds in medical institutions per lakh population (BDM)

Economic Status Index (ESI)

per capita credit from scheduled commercial banks (CRSCB)
per centage literacy rate (LTRCY)
per centage female literacy rate (FLTRCY)
no. of unemployed on the live-register per lakh population (UNEMP)
no. of estimated employment in public and private sector per lakh population (EMP)

Food availability Status Index (FASI)

Per capita availability of milk (MLA), egg (EGA), rice (RCA), wheat (WHA), bajra (BJA), maize (MZA), groundnut (GNA), cotton (CTA), potato (PTA), onion (ONA), oilseed (OLA), foodgrain (FGA), pulses (PLA), sugarcane (SGA), cereals (CRA), vegetables (VGA), fruits (FRA) and spices (SPA).