



## **Modified poverty index of West Bengal: A human development approach**

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### **Abstract**

Every developing and developed country shall make policies and strategies for substantially reducing overall poverty in the shortest time possible, reducing inequalities and eradicating absolute poverty. Measurement of poverty is a step which is essential for managing it. Though there is a conflict among the regarding the way of measurement, the human development perspective of measurement of poverty is rather rational than the income perspective. This measurement strategy was reflected first on the Human Development Report 1997 by United Nations Development Programme. There after numerous attempts have been made to construct Human Poverty Index (HPI) modifying the original indices published in Human Development Report for different countries and states throughout the world. Being an agrarian state, West Bengal in India, also faces the problems of acute and hidden poverty. But a systematic preparation of poverty index of West Bengal is missing for long period. In this present endeavour a district-wise Human Poverty Index for the State of West Bengal have been prepared. It can seriously identify the area of hotspot of poverty and can play a reasonable role in policy making for poverty alleviation programmes.

**Keywords:** absolute poverty, hotspot of poverty, human poverty index, poverty alleviation programme

### **1. Introduction**

The great success in reducing poverty in the 20th century show that eradicating severe poverty in the first decades of the 21st century is feasible. This may seem an extraordinary ambition, but it is well within our grasp (UNDP, 1997) <sup>[1]</sup>. The Human Development Report (HDR) 1997 offers ideas for eradicating absolute poverty from a human development perspective not in an income perspective. The concept of Human Poverty Index (HPI) was also elaborated in this report. The HPI combines basic dimensions of poverty and reveals interesting contrasts with income poverty (Fukuda-Parr, 2003) <sup>[2]</sup>. Computation of HPI for a state like West Bengal, normally lacking behind the national average of general human development indicators and per capita income in past few years, is relevant enough to understand the spatial pattern of poverty in district level. Understanding poverty in only income perspective normally do not show the overall situation

related with all facets incorporated in it (Haq, 1995) <sup>[3]</sup>. A human development perspective of portraying poverty in the developing country like India is essential to examine the underlying situation related with poverty. So, an attempt has been made in this article to explore the district-wise poverty scenario of West Bengal in a human development perspective.

### **2. Study Area**

The area of this study is the state of West Bengal, located in the eastern part of India, extending between the latitudes 21°38' N to 27°10' N and longitudes 85°50' E to 89°50' E. The total geographical area of the state is 87759.42 sq. km. and it is mainly an agrarian state with a population of 91,347,736. Except some region of north and west the maximum area of the state is under Indo-Gangetic alluvial plain.



Fig 1: The Study Area

**3. Objectives of the Study**

The basic objectives of this study are to-

1. Understand the spatial pattern of poverty in West Bengal.
2. Rank the districts of West Bengal by various deprivation index and ultimately by Human Poverty Index.
3. Develop a strategy to address the problem of poverty at district level.

**4. Database and Methodology**

For this study various secondary database were used from Ministry of Human Resource Development, Government of India. Different reports like, Census reports of 2011 and District Level Household Survey report-4 also have been used to get the district level data for constructing the indices.

UNDP’s human development reports advocated that constructing a developing country’s HPI should differ from that of a developed country. Because “issue of poverty in the developing countries involve hunger, illiteracy, epidemics and the lack of health services or safe water- which may not be so

central in the more developed countries” [1]. The data sets used for constructing indices of HPI by UNDP are suitable in national level. The HPI concentrates on deprivation in three essential elements of human life reflected on HDI i.e. longevity, knowledge and a decent standard of living.

After examining the studies of Chelliah and Sudarshan (1999) [4], Ghosh and Chatterjee (2003) [5], Anand and Sen (2003) [6], the technical appendix of Human Development Report- 2002 [7] and also as per the availability of data, for constructing HPI for West Bengal in this study, three components of human deprivation have been selected, namely i) Knowledge deprivation, ii) Health services deprivation, iii) Provisioning deprivation. A similar study was done by the Government of West Bengal in District Human Development Report [8].

Knowledge Deprivation (*P1*) is the weighted average of total illiteracy rate and percentage of children not transmitted to upper primary level from primary, when the weights are 2/3 and 1/3 respectively. Health Service Deprivation (*P2*) is simply the proportion of non-institutional deliveries and

Provisioning Deprivation ( $P_3$ ) is the arithmetic mean of (i) the proportion of households having no electricity connection, (ii) the proportion of households having no latrine facilities within the premises and (iii) the proportion of households having no access to safe drinking water.

After calculating the indices in percentage, three deprivations ( $P_1$ ,  $P_2$  and  $P_3$ ) have been made standardizing the percentage value as each deprivation ( $P$ ) is not constructed by same number of indices. To standardize the index value the percentage values have been multiplied by 1/100.

Here HPI is defined as,  $HPI = [(1/3) P_1^\alpha + (1/3) P_2^\alpha + (1/3) P_3^\alpha]^{1/\alpha}$  (Where  $\alpha = 3$ )<sup>[6]</sup>

In this measure of poverty the relative impact of the deprivation of each would increase as the level of deprivation becomes sharper. This property would be satisfied if  $\alpha$  is greater than 1, because if  $\alpha$  is equal to 1, HPI would be the simple average of three indicators of deprivation,  $P_1$ ,  $P_2$  and  $P_3$ . Usually  $\alpha$  is taken as 3 for all practical purposes to give additional but not overwhelming weight to areas of more acute deprivation.

Different statistical methods and cartographic techniques have been used. Spatial mapping has been done by GIS based software (Arc GIS version 10.2.3) to portray a spatial image of the state in respect of different indices of HPI.

## 5. Result and Discussion

After analyzing the data in the prescribed methodology, a clear picture about the spatial pattern of human poverty can be observed. Human development is a key factor of this kind of spatial pattern.

### Human poverty index of West Bengal

Three deprivation indexes are constructed in three different tables. Table-1 reflects the district-wise status of index of knowledge deprivation where Purba Medinipur ranked first with an index value of 0.117 and Uttar Dinajpur ranked last with 0.316. In case of percentage of total illiteracy Kolkata, Purba Medinipur, North 24 Parganas are the districts much ahead with more literacy rate than Uttar Dinajpur, Madah, Puruliya and Murshidabad but in case of percentage of children not transmitted to upper primary level from primary level the difference among the districts are not as much as the illiteracy rate. Though Kochbihar, Birbhum, South 24 Parganas have a lower transmission rate than the other districts. These two indicators of knowledge deprivation can clearly depict the real scenario of development of education in the districts of West Bengal. Actually percentage of children not transmitted to upper primary level from primary is a proxy indicator of drop-out.

**Table 1:** District-wise knowledge deprivation ( $P_1$ )

Sl. No.	District	Percentage of Total Illiteracy (2011)	Percentage of Children not Transmitted to Upper Primary Level from Primary (2011)	Index of Knowledge Deprivation	Rank
1	Darjiling	20.08	21.10	0.204	8
2	Jalpaiguri	26.21	20.60	0.244	13
3	Koch bihar	24.51	23.80	0.243	12
4	Uttar Dinajpur	39.87	15.00	0.316	19
5	Dakshin Dinajpur	26.14	17.70	0.233	10
6	Maldah	37.29	18.40	0.310	18
7	Murshidabad	32.47	16.30	0.271	15
8	Birbhum	29.10	23.40	0.272	16
9	Barddhaman	22.85	19.10	0.216	9
10	Bankura	29.05	19.50	0.259	14
11	Puruliya	34.62	15.30	0.282	17
12	Hugli	17.45	18.00	0.176	5
13	Haora	16.15	18.60	0.170	3
14	Paschim edinipur	20.96	16.40	0.194	6
15	Purba Medinipur	12.34	10.30	0.117	1
16	South 24 Parganas	21.43	21.70	0.215	7
17	North 24 Parganas	15.05	19.30	0.175	4
18	Kolkata	12.86	14.20	0.133	2
19	Nadia	24.42	22.80	0.239	11
20	West Bengal	22.92	18.50	0.215	-

**Source:** Col.2- Census-2011, Col.3 – Ministry of Human Resource Development, Government of India

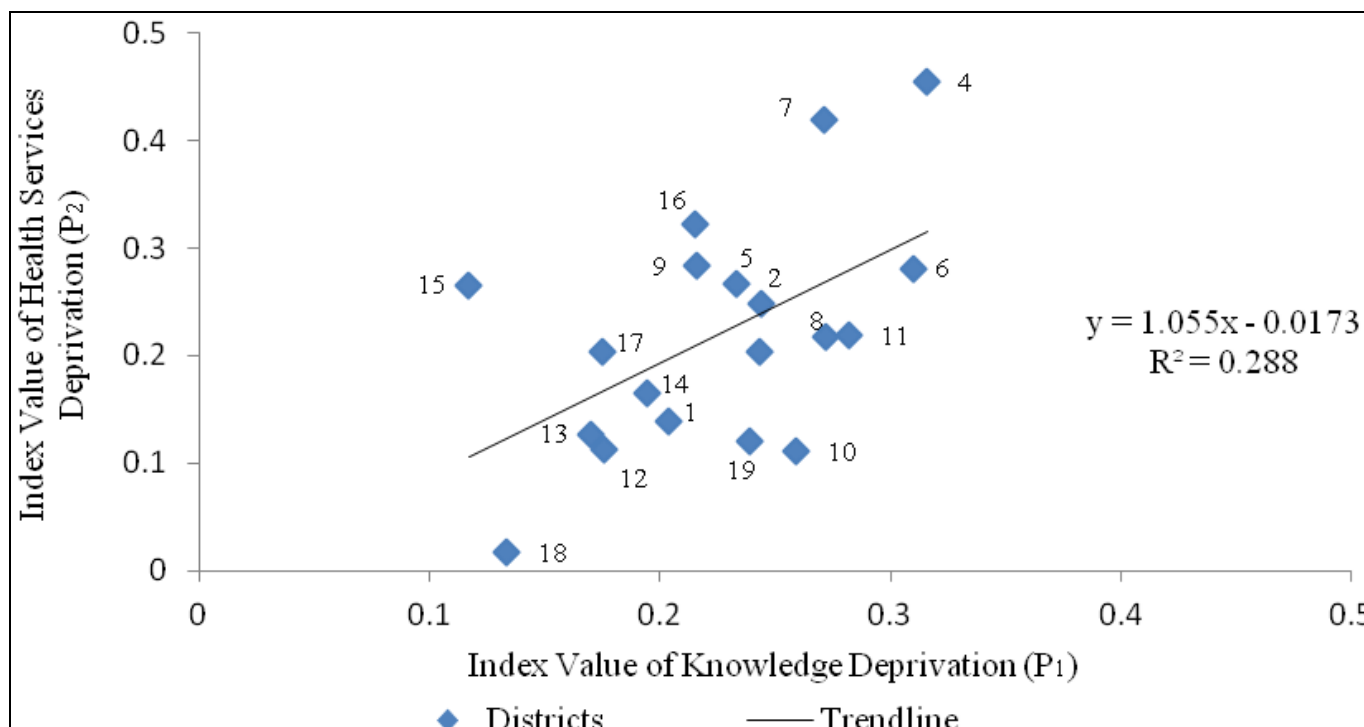
Table-2 reflects the district-wise status of health services deprivation on the basis of percentage of non-institutional deliveries. Non institutional deliveries not only means there are lack of necessary health infrastructure especially for the pregnant, but also denote the overall poor condition of health services. Kolkata with a score of 0.017 ranked first in this index on the other hand Uttar Dinajpur is far behind with a score of 0.455. Percentage of non-institutional deliveries

generally increases with the lack of health care infrastructure and poverty. Kolkata, Bankura, Hugli and Nadia are the districts where occurrences of non-institutional deliveries are much lower than Uttar Dinajpur, Murshidabad, South 24 Parganas and Bardhaman. There are serious relationship between knowledge deprivation and health service deprivation. Because non-institutional deliveries are also happen due to lack of awareness among the households.

**Table 2:** District-wise health services deprivation (P2)

Sl. No.	District	Percentage of Non-Institutional Deliveries (2012-13)	Index of Health Service Deprivation	Rank
1	Darjiling	13.9	0.139	6
2	Jalpaiguri	24.8	0.248	12
3	Koch bihar	20.5	0.204	9
4	Uttar Dinajpur	45.5	0.455	19
5	Dakshin Dinajpur	26.7	0.267	13
6	Maldah	28.0	0.280	15
7	Murshidabad	41.9	0.419	18
8	Birbhum	21.7	0.217	10
9	Barddhaman	28.4	0.284	16
10	Bankura	11.1	0.111	2
11	Puruliya	21.9	0.219	11
12	Hugli	11.2	0.112	3
13	Haora	12.6	0.126	5
14	Paschim Medinipur	16.5	0.165	7
15	Purba Medinipur	26.5	0.265	14
16	South 24 Parganas	32.3	0.323	17
17	North 24 Parganas	20.4	0.204	8
18	Kolkata	01.7	0.017	1
19	Nadia	12.0	0.120	4
20	West Bengal	25.4	0.254	-

Source: Col. 2 – DLHS-4:2012-13



Source: Computed by the authors

**Fig 2:** Relationship between Knowledge Deprivation and Health Services Deprivation in the Districts of West Bengal, 2011-12

It is evident from fig. 2 that there is a positive relationship between two different deprivation index namely knowledge deprivation and health services deprivation. As the index value of knowledge deprivation increases, the index value of health services deprivation also increases depicting the clear relation. Lower the index value of these two deprivation indices indicates a comparatively higher rank with developed

situation. Kolkata, Haora, Hugli and Darjiling are the districts where both the index value are lower indicating a higher rank in the indices whereas, districts like Uttar Dinajpur, Murshidabad and South 24 Parganas are ranked lower in both indices. This nature of ranking clearly denotes that level of education has a strong impact on access and availing health services in the districts.

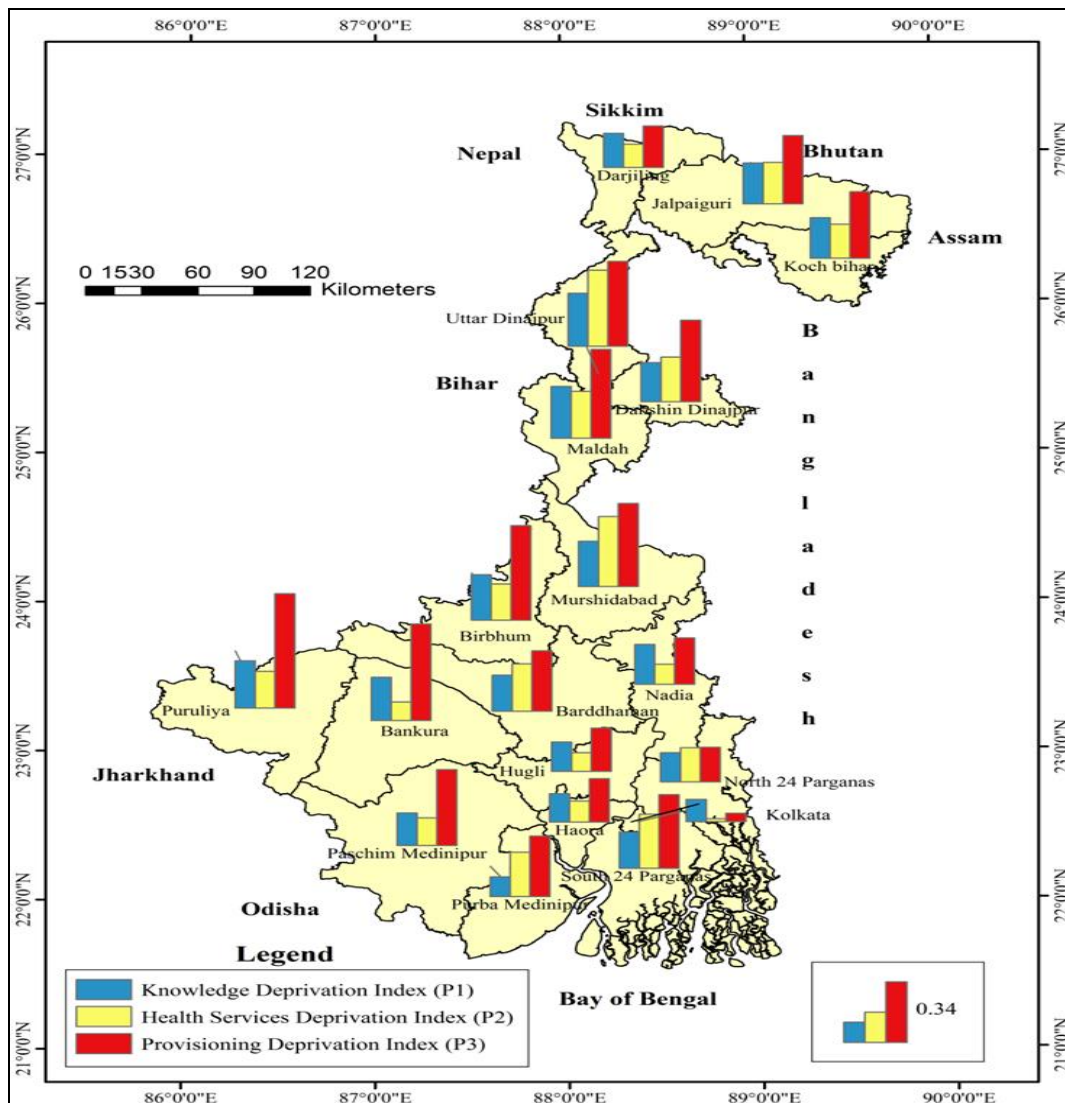
**Table 3:** District-wise provisioning deprivation (P3)

District	Percentage of Household Having No Electricity (2011)	Percentage of Household Having No Latrine Facilities within the Premises (2011)	Percentage of Household Having No Access to Safe Drinking Water (2011)	Index of Provisioning Deprivation	Rank
Darjiling	18.99	27.70	27.69	0.248	3
Jalpaiguri	55.60	50.25	16.67	0.408	10
Koch bihar	72.37	40.76	06.40	0.398	9
Uttar Dinajpur	66.68	72.48	12.91	0.507	15
Dakshin Dinajpur	57.58	63.16	25.42	0.487	13
Maldah	64.51	68.26	27.52	0.531	16
Murshidabad	65.35	60.47	25.28	0.497	14
Birbhum	58.95	75.92	35.03	0.566	17
Barddhaman	38.44	44.32	25.88	0.362	8
Bankura	55.76	79.70	37.84	0.578	18
Puruliya	66.64	88.15	50.52	0.684	19
Hugli	23.96	28.79	24.91	0.259	4
Haora	22.56	25.31	30.14	0.260	5
Paschim Medinipur	47.41	53.86	34.83	0.454	12
Purba Medinipur	51.73	14.72	41.87	0.361	7
South 24 Parganas	52.67	37.41	42.24	0.441	11
North 24 Parganas	29.55	12.50	20.06	0.207	2
Kolkata	03.79	05.07	06.06	0.050	1
Nadia	49.37	22.41	11.69	0.278	6
West Bengal	45.51	41.15	26.64	0.378	-

**Source:** Col. 2, 3, 4 – Census-2011

Table-3 shows us the district-wise provisioning deprivation, a direct indicator of poverty. (Anand and Sen 1994) [9]. In this study, three indicators i.e. electricity, latrine facility and access to safe drinking water have been taken. These facilities are necessary for a household to maintain a safe and hygienic life, but acute poverty plays a significant role constructing barriers for the people to access those services. In case of West Bengal, Kolkata being the capital ranked first scoring 0.050. Puruliya scored 0.684 clearly indicating the district level situation in terms of having electricity, latrine and safe drinking water. Besides Puruliya, Bankura, Birbhum and Maldah are in the same lacking position in provisioning deprivation. But North 24 Parganas, Darjiling, Hugli and Haora are in a good situation in terms of having the facilities. These provisioning deprivations are highly related with the income level and significantly play a role of human development.

These indicators of provisioning deprivation index are most basic needs of an individual to sustain a healthy life. Human development always related to education and health which is naturally dependent on essential sanitation and safe drinking water. So, a society with these basic amenities can play a vital role in developing the human development situation. In this study, it is evident that poverty always linked with human development and a society with educated and healthy population can act as a catalyst to break the vicious cycle of poverty especially from the developing countries. Fig-3 shows the district-wise spatial pattern of three indexes selected for constructing the HPI. Showing the map any one can easily understand the situation of knowledge deprivation, health services deprivation and provisioning deprivation in the districts. The higher value of three different indices indicates the low level of human development and vice-versa.



Source: Computed by the author

Fig 3: District-wise Spatial Pattern of Different Deprivation Indexes in West Bengal, 2011-12

In the Table-4 the HPI is calculated with the help of three indexes. Kolkata ranked first in the HPI with a score of 0.067 clearly showing the reduced level of human poverty. Hugli, Haora, North 24 Parganas and Darjiling are also in a significantly good situation than the other districts. But, Uttar Dinajpur, Murshidabad, Puruliya and Maldah these four districts remain in the most deprived situation scoring higher

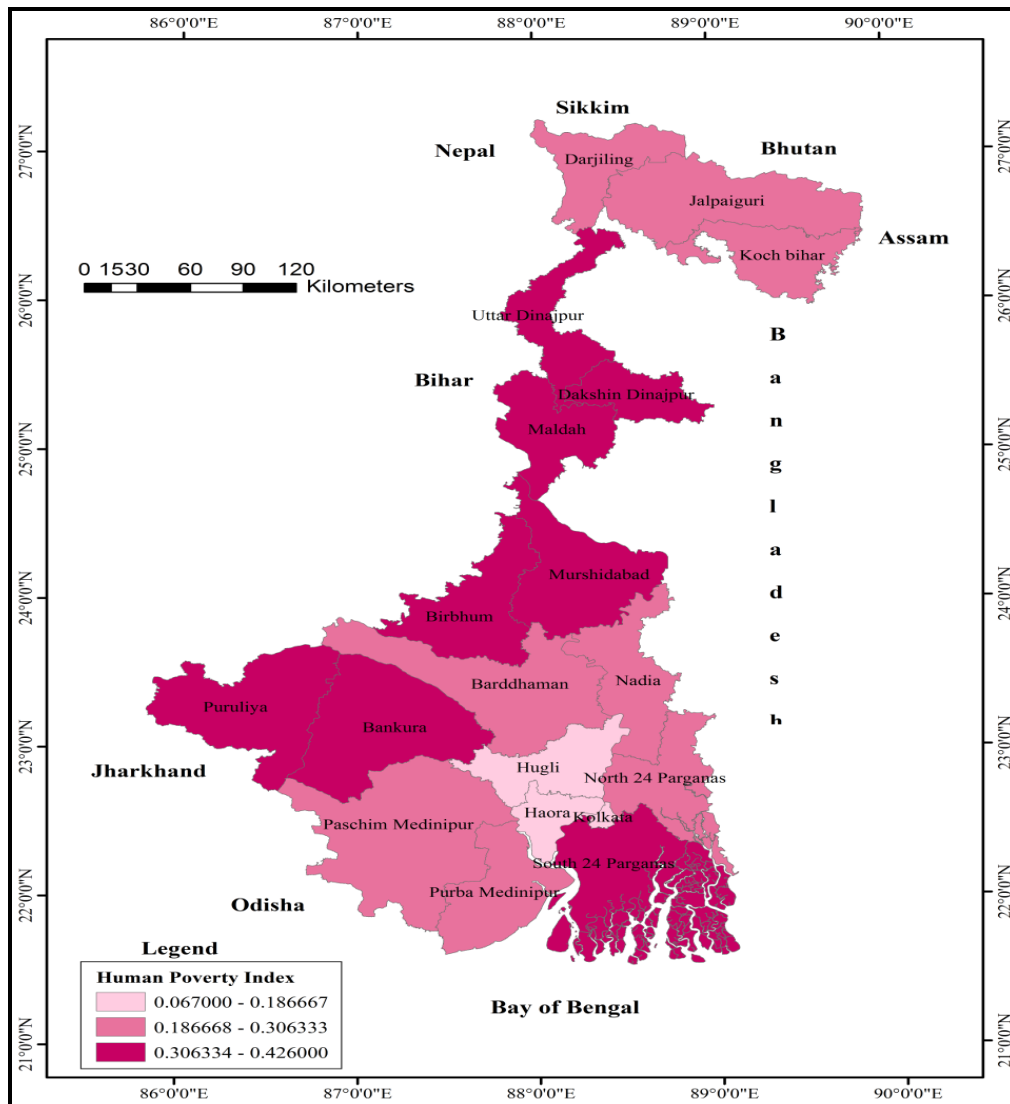
index value indicating the situation of acute human poverty. It is evident that the surrounding districts of Kolkata are in a comparatively developed situation except South 24 Parganas, but the districts away from this developed centre are still in a condition of low level of human poverty. But the districts in the extreme north such as Jalpaiguri or Darjiling are in a comparatively good situation.

Table 4: District-wise Human Poverty Index (HPI) of West Bengal, 2011-12

District	Knowledge Deprivation Index (P1)	Health Services Deprivation Index (P2)	Provisioning Deprivation Index (P3)	Modified Human Poverty Index	Rank
Darjiling	0.204	0.139	0.248	0.197	5
Jalpaiguri	0.244	0.248	0.408	0.300	11
Koch Bihar	0.243	0.204	0.398	0.282	9
Uttar Dinajpur	0.316	0.455	0.507	0.426	19
Dakshin Dinajpur	0.233	0.267	0.487	0.329	14
Maldah	0.310	0.280	0.531	0.374	16
Murshidabad	0.271	0.419	0.497	0.396	18
Birbhum	0.272	0.217	0.566	0.352	15
Bardhaman	0.216	0.284	0.362	0.287	10



Bankura	0.259	0.111	0.578	0.316	12
Puruliya	0.282	0.219	0.684	0.395	17
Hugli	0.176	0.112	0.259	0.182	2
Haora	0.170	0.126	0.260	0.185	3
Paschim Medinipur	0.194	0.165	0.454	0.271	8
Purba Medinipur	0.117	0.265	0.361	0.248	7
South 24 Parganas	0.215	0.323	0.441	0.326	13
North 24 Parganas	0.175	0.204	0.207	0.195	4
Kolkata	0.133	0.017	0.050	0.067	1
Nadia	0.239	0.120	0.278	0.212	6
West Bengal	0.215	0.254	0.378	0.282	-



Source: Computed by the author

Fig 4: Spatial Pattern of Human Poverty in West Bengal, 2011-12

Fig-4 clearly depicts the spatial pattern of poverty in the districts of West Bengal. The western part of the state with some portion of north Bengal is in worst situation in terms of human poverty. On the other hand south Bengal centering Kolkata and the hilly district Darjiling significantly standing in a relatively good situation in terms of human poverty. Two western districts Puruliya and Bankura along with Birbhum, Murshidabad, Maldah, North and South Dinajpur in north and

South 24 Parganas in south are in worst situation. Comparatively Darjiling neighboring Jalpaiguri and Koch bihar ranked better but Kolkata, Haora and Hugli these three districts shows a lower human poverty. So, there are significant pattern of human poverty across the state. Mainly absence of different human development factors such as, health, education and some basic amenities are the real cause of those districts standing far behind than the others. It is clear

from the study that those districts ranked high in the poverty index i.e. Uttar Dinajpur, Maldah, Murshidabad and Puruliya with a score of greater than 0.350 are in much poor situation as the state average index value is 0.282. Bankura, Bardhaman, Jalpaiguri and Paschim Medinipur are near the state average. Darjiling, Hugli, Haora, North 24 Parganas and Kolkata are much ahead than the state average indicating the impressive situation in terms of human poverty.

### 6. Possible Strategy to Eradicate Human Poverty

The present situation of human poverty of West Bengal can overcome through developing the conditions responsible for poverty in the state. Human poverty does not depend on only economic criteria, others factors of human development shall also be addressed to get rid of the situation. Here a five point strategic plan has made to eradicate human poverty.

- Universal public education: Universal public education has some role in preparing youth for basic academic and technological skills. Education for women shall also be spread to create a balanced social system. Proper implementation of different government educational schemes like, 'Sarba Siksha Abhiyaan', 'Mid-day Meal' for the primary and upper primary students will surely reduced the level of illiteracy and drop out in the educationally backward districts.
- Securing health as a basic right: A well planned health care infrastructure shall always have a trickledown effect on health condition of people of a state. A healthy person is able to create human wealth by which poverty can be erased from the society.
- Proper sanitation and maintenance of public health: Proper sanitation always helps people to maintain their public health and it also reflects the capabilities of a household. Access to safe drinking water is a big challenge to the state to fulfill. Government schemes like 'Swachha Bharat' in national level and 'Nirmal Bangla' in the state level are aimed to create a properly sanitized society.
- Women empowerment and gender equality: The empowerment of women has relatively recently becomes a significant area of discussion with respect to development of human poverty. Gender equality through empowerment of women is a qualitatively significant poverty reduction strategy.
- Awareness and political participation: Awareness of rights and more political participation will make the government schemes of poverty eradication more relevant and accountable. And then the inter district inequality regarding human poverty will be eradicated successfully.

### 7. Conclusion

Like many other concepts, human poverty is larger than any particular measure, including the HPI. As a concept human poverty includes many aspects that can't be measured or are not being measured. It is difficult to reflect them in a composite measure of human poverty (Anand and Sen, 1994)<sup>[10]</sup>. From this study it is clear that poverty has a spatial pattern according to the index of deprivation around the state. Though, human poverty generally not matches with the pattern of income poverty but somehow they are linked with

each other (Anand and Sen, 1997)<sup>[11]</sup>. Uttar Dinajpur, Murshidabad, Maldah and Puuliya the four districts in West Bengal are lagging behind the other districts because of lacking of the basic human development components. Government shall implement its schemes properly to uplift the status of human poverty in these districts and minimize the differences among others. Further work can explore how the HPI could be enriched and made more relevant in situations where a wider range of data on different aspects of poverty and human development are available.

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