

# INTERPRETING ECONOMIC INEQUALITY WITH THE MICRO SPATIAL DATASETS: A STUDY IN THE DISTRICT OF PURULIA, WEST BENGAL, INDIA

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*Unequal development and its trend of steady magnification results into multiple social and economic depreciations in India. The disparities in human development at macro level, i.e. national and state level has been well focused whereas analysis of micro-level disparities in this aspect has yet to be explored significantly. The development plans, at presents, rely on decentralized planning processes where the micro level sectoral and spatial variation of 'surplus' and 'deficit' in different dimensions of development should be given immense importance. The preparation of a management plan with a view of repairing the lacunas of underdevelopment and equalizing distribution of impulse of development require the detailed profile of existing pattern of development in different socio-economic dimensions of the target region as well as the spatial variation of the level of development achieved therein. Purulia district is one of the most backward districts in West Bengal in perspective of human development accompanied with the disparity at a considerable magnitude. The present study attempts to analyse this micro-level i.e. intra-district level economic development with suitable statistical measurement and graphical representation as well as examines different determinants leading to the present pattern of development in this district.*

**Keywords:** Disparities; Wellbeing; Human resources; Working classes

## INTRODUCTION

The developing nations, at present, are experiencing the multi-faced economic, social and cultural metamorphism at an accelerating rate. Indian society and economy also have not succeeded to prove itself to be indifferent from this global trend. The quest of economic growth cannot be denied in one hand, as well as the hard reality of unequal growth is seemed to be the toughest challenge for the policy makers, intellectuals and social researchers. The causes of this unequal development are multi-dimensional but the consequences are very clear and undoubtedly they are potential enough to weaken the social stability. Admittedly all of the social endeavors do not lend themselves to easy explanations which seem to be hardly irrelevant for the context of unequal development. The uncontrolled unequal development is strong enough to increase vulnerability of prevailing poverty if the poverty is considered as the function of relative differentiation of stock of resources, access to resources, physical quality of life, share of power in economics, social and political decision making etc. between different individuals, groups, communities or societies. Development has been appropriately conceptualized as a process, which improves the quality of life of people. The history of development plans in India, both centralized and decentralized could not show the enthusiastic result as most of the plans has been terminated through the partial fulfillment of the target. In most of the cases the lack of flexibility in the planning has been exposed as the tough challenge in gaining holistic success of the plans where the primary emphasis should have to be given in this sector; as India is the country of varieties of social, cultural, economic, lingual and religious group. The

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failure of a plan in this respect would have every possibility to carry the benefits to a narrow part of population by depriving the rest and the inequality tends to increase away. Regional disparities in India have widened day by day (Joshi, 1997; Krishnan, 2001; Singh, 2006). Unchecked and uncontrolled process of growth leads to this regional disparities (Rao, 1984). It was Fourth Five Year Plan (1969-74) which marked for the initiation of decentralization of national planning by introducing the district level plan. Further district level plan was decentralized at block level, during the Sixth Five Year Plan (1980-85). The seventh plan (1985-90) emphasized local area planning by stressing on demographic decentralization. The eighth plan (1992-97) emphasized on building, and strengthening people's institutions and making people active participation within liberalization and privatization frame work. The main focus was on population control, environmental protection and infrastructural development. The ninth plan (1997-2002) aimed at growth with social justice and equity. The Planning Commission in its tenth plan (2002-2007) advocates the area approach and aims to strengthen decentralization of planning. Thus, the decentralized planning policy procedure was adopted to prepare village plans by collecting village requirements at block levels and finally they were put together at district level for district plans. But such attempts were confined only on paper. Removal of regional imbalances in development has remained the avowed goal of planning in India (Mohan, 2005). It is the fact that effort of decentralization in planning procedures in India is mostly limited to the allotment of financial support up to the micro level administrative unit and their expenditure through the local governments. One of the most aspired goals of decentralized plans or local level plans is to mould the structure of plans necessarily as it would be best fitted with the local demand and be capable enough to satisfy the problems at local level. But these targeted goals are found to remain unsatisfied for almost all the plans when they are judged as micro level study or research work. In such scenario it is important to identify the backward regions of the county, state and even at district level in terms of development of major components as well as to measure the level of disparities amongst different regions. Therefore, present paper attempts to investigate regional disparities in terms of social, economic and other opportunities. This is likely to helpful for the planning to chalk-out meaningful strategy to curb the problem and promote balanced development among different regions of the country in general and micro level in particular.

## **STUDY AREA**

Purulia, the western-most district of West Bengal at present was included as Manbhum district in state of undivided Bihar during independence. The district of Purulia was formed and merged with West Bengal on 1<sup>st</sup> November 1956 by separating areas under 16 police stations of the then Bihar as per the recommendation of the State Reorganization Commission. The district of Purulia has been selected as the study area for assessing and mapping of economic inequality. The district is extended between 22.70295° N to 23.71335° N latitude and 85.82007° E to 86.87508° E longitude, covering a total area of 6259 sq. Km and accommodates 2,930,115 populations with an average population density of 468 persons per sq. Km (Census of India, 2011).

## **DATA & METHODS**

The present study is based on the primary data collected through household survey with a pre-printed survey schedule. The district of Purulia is constituted with 20 C.D. Blocks and a total of 170 Gram Panchayats (GPs) within the jurisdiction of these Blocks. The survey is designed to estimate simple proportions without any cross-classifications in a large population with using the following formulae to determine the size of the sample:

$$n_x \geq \frac{(Z_{1-\alpha})^2 \left(\frac{p_E}{p_x}\right) \left(1 - \frac{p_E}{p_x}\right)}{c^2} \dots\dots\dots (1)$$

Where,  $n_x$  = Sample size for  $x$  set of population;  $Z_{1-\alpha}$  = Z value at  $\alpha$  significance level;  $p_x$  = Population within set  $x$ ;  $p_E$  = Expected population to have the attributes those are being estimated from the survey;  $c$  = Confidence interval

For the present study, the ratio  $\left(\frac{p_E}{p_x}\right)$  is assumed to be unknown and has been set to 0.5 (i.e. 50%), as this produces a conservative estimate of variance. The value of Confidence Interval ( $c$ ) has been set as 0.05 for the present study. The required numbers of sample has been collected from each C.D. Blocks in a simple random basis, provided that the sample is distributed at least 50% of the Gram Panchayats of each blocks for ensuring a better representativeness of the entire blocks.

**Sources of Secondary Dataset:** The Census of India provides required dataset for generating required variables associated with the statistical estimation of the level of Human Development in different part of the district of Purulia. The datasets of Census of India 2001 and 2011 has been utilized for the analysis of a decadal changing pattern of development perspective in the district.

**Analysis of Income Distribution:** The annual per capita income data collected through the household survey are fitted with normal distribution and the curve for each of the targeted attributes and interpreted accordingly. This has efficiently exhibited graphically the differences in income distribution between different social, religious classes and genders to identify the areas of considerably higher magnitude of differences that requires careful observations and further investigation.

The distribution of income of the individuals is assumed to follow the normal distribution which is expressed as:

$$P(X) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}} \dots\dots\dots (2)$$

Where,  $X$  = Values of continuous random variable;  $\mu$  = Mean of the normal random variable;  $\sigma$  = Standard Deviation of the normal random variable;  $e$  and  $\pi$  = Mathematical constant.

Now, considering the area under the curve corresponding to a normal distribution equal to unity, regardless of the particular number of observations involved, the equation of a normal curve corresponding to a particular distribution that is independent of  $N$  with a given value of sample mean ( $\bar{X}$ ) and sample standard deviation ( $\sigma$ ) is thus given by,

$$y_i = f(x_i) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\left(\frac{x_i - \bar{X}}{2\sigma}\right)^2} \dots\dots\dots (3)$$

Therefore, the relative frequency ( $f_R$ ) of a class having class-width of  $\Delta x$ , fitted with the normal distribution corresponding to given  $\bar{X}$  and  $\sigma$  can be given as:

$$f_{R, x \sim (x+\Delta x)} = \frac{1}{\sigma\sqrt{2\pi}} \left[ e^{-\left(\frac{(x+\Delta x) - \bar{X}}{2\sigma}\right)^2} - e^{-\left(\frac{x - \bar{X}}{2\sigma}\right)^2} \right] \dots\dots\dots (4)$$

Hence, the theoretical frequency ( $f_E$ ) fitted with the normal distribution of the same class can be calculated through multiplying the total of observed frequency ( $f_O$ ) with the calculated relative frequency ( $f_R$ ) for the target class as:

$$f_{E, [x \sim (x+\Delta x)]} = (f_{R, [x \sim (x+\Delta x)]}) \left( \sum_{i=1}^n f_{O i} \right) \dots\dots\dots (5)$$

**Inequality and the Relative Deprivation:** The classical definition of relative deprivation can be given by referring Runciman (1966) as ‘the magnitude of a relative deprivation is the extent of the difference between the desired situation [e.g., the income of the richer] and that of the person desiring it’. Let, the relative deprivation of an individual with income  $Q(p)$ , when comparing himself with another individual with income  $Q(q)$ , be given by (following Duclos and Gregoire, 2001):

$$\delta(p, q) = \begin{cases} 0, & \text{if } Q(p) \geq Q(q) \\ Q(q) - Q(p) & \text{Otherwise} \end{cases} \dots\dots\dots (6)$$

Now, assuming  $p_x$  as different percentile value of the distribution of income for the present study, the relative deprivation curve can be computed along those percentiles as,

$$\bar{\delta}(p_x) = \int_0^1 \delta(q, p_x) dq \dots\dots\dots (7)$$

**The Principal Component Analysis (PCA):** The process of decision making by analyzing a large numbers of socio-economic variables through some smaller numbers of underlying dimensions is a vital issue in connection with the analysis of the spatial pattern of human development. The process of human development is a multi-dimensional phenomena, and the estimation of this multi dimensional phenomena required a suitable technique to handle the large number of variables. The Principal Component Analysis (PCA) is a technique, designed primarily to synthesize a large number of variables into a smaller number of general components which maximum amount of descriptive ability (Mahmood, 1977). It permits a more economical description of a given set of a structural variables and suggest some underlying dimensions, accounting for the statistical relationship among them; so, it can be treated as a method of unfolding those hidden factors which might have generated the dependence or covariance among the variables (Morrison. 1967). The SPSS 17 software has been used for Principal Component Analysis of the study area.

## Results and Discussion

### *Scenario of Economic Inequality between Different Caste & Categories*

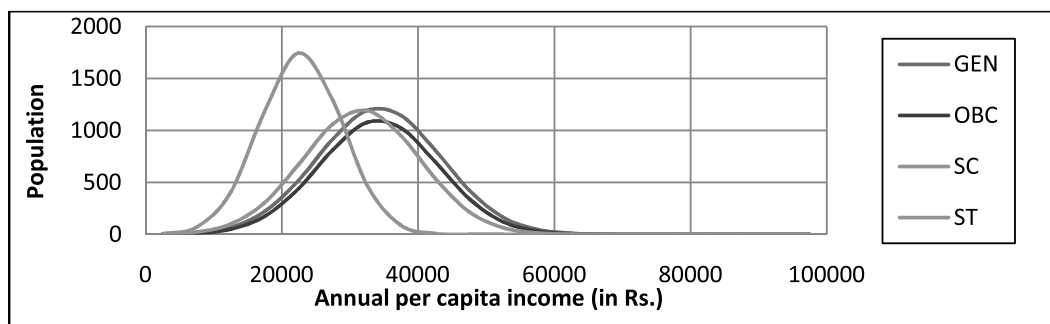
The income inequality in varying degree among different social classes is a common phenomena in each and every part of India. The sample population of the district has been classified into four broad categories, i.e. General, Other Backward Classes (OBCs), Scheduled Castes (SCs) and Scheduled Tribes (STs) and the income distribution within each category has been fitted with the normal curve (see Fig. 1). Within the district of Purulia, there is a predominance of the hereditary skills in occupation and the inter generational shift of occupation is found more frequent at the lower edges of economic classes and mostly among the tribal peoples residing within the district.

There is a sharp difference of income and occupation between the tribal and non-tribal population in the district of Purulia. The data collected from the sample survey (*see Table 1*) shows that the average per capita income among the tribal population is around Rs 22800 annually where as the households belong to the non-tribal population have the average per capita income more than Rs 31000 annually. Not only the difference in per capita income, rather the values of standard deviation of the income is also a figure that seeks due consideration. The values of standard deviation of income among the tribal population is calculated as Rs 5838.98 where as it is around Rs 8500 for the non-tribal population. The income among tribal population with low mean income and low standard deviation indicates a greater participation of this group of population to the lower edge of economy and there is a lower scope of gaining better income for the population in this group if the present occupational pattern is followed hereditary. On the other hand there is a wider income range for the non-tribal sample households, indicating the existence of a greater intra-group inequality as well as diversified opportunity of income and occupation.

**Table 1: Annual per Capita Income among Different Caste & Categories in Sample Population**

Class	Annual per capita income (Rs.)			
	Minimum ( $X_{\text{MIN}}$ )	Maximum ( $X_{\text{MAX}}$ )	Mean ( $\sigma$ )	SD ( $\mu$ )
General	2650	167833	34325.15	8968.89
OBC	2500	132550	34236.61	8569.56
SC	1633	133600	31679.95	8447.48
ST	1638	96300	22801.67	5838.98

**Fig. 1: The distribution of annual per capita income fitted with normal curve within different categories of sample population in Purulia District**



### *The Scenario of Income Inequality between different Religious Groups*

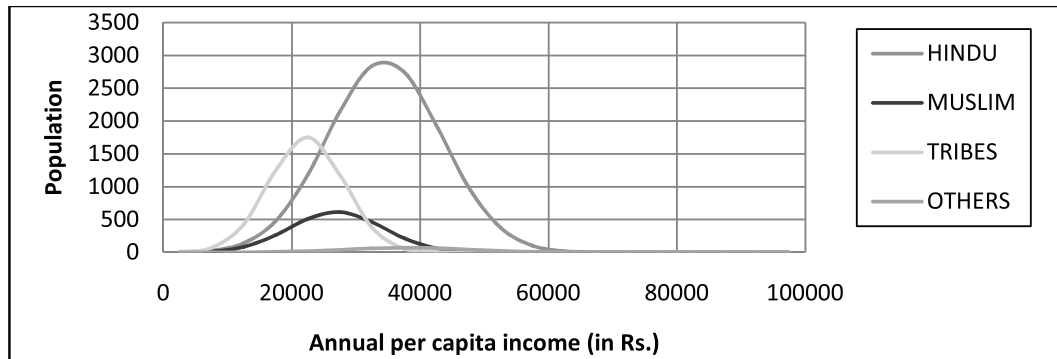
The religious groups of the district exhibit a significant differences in income distribution pattern in the district. The data of the Census of India, 2011 states that district is mostly the abode of peoples belongs to the religious groups like Hinduism (80.99%) and Islam (7.76%); whereas the Christianity, Buddhism, Jainism and Sikhism and other organized religious group in together cover only 0.43% of the total population, leaving 10.55 % of the population of the district who belong to the traditional tribal religious belief which involves ancestor worship or the worship of spirits of natural features like the tribes of other part of the country (NCERT, 2009); and needless to say that there is one

more thing common also: the tribal population are under constant pressure from the major organized religions (Heitzman and Worden, 1995). Some of this pressure is intentional, as different missionaries work among tribal groups to gain converts. However, most of the pressure, comes from the process of integration within a national political and economic system that brings tribes into increasing contact with other groups with different and ‘prestigious’ belief systems. Practically, the tribal population of the district has made the transition away from hunting and gathering and toward sedentary agriculture or mining activities as low-status labourers find their ancient religious forms in decay and those places are being filled by practices of different organized religious beliefs. However, the tribal religious groups are lagged behind by any other religious groups in the district in terms of the economic status.

**Table 2: Annual per Capita Income among Different Religious Groups in Sample Population**

Group	Annual per capita income (Rs.)			
	Minimum ( $X_{\min}$ )	Maximum ( $X_{\max}$ )	Mean ( $\sigma$ )	SD ( $\mu$ )
Hindu	1633	167833	34467.18	8810.52
Muslim	2288	89160	26987.66	7081.65
Tribes	1638	96300	22301.90	5640.68
Others	8020	105367	38060.40	9790.51

**Fig. 2: The distribution of annual per capita income fitted with normal curve within different religious groups of sample population in Purulia District**



The sample household data (*see Table 2*) shows that the mean per capita income annually for the tribal population of the district is as low as Rs 22301 where this is Rs 26987 for Muslims, Rs 34467 for Hindus and remarkably Rs 38060 for the population belong to other religious groups. Besides, the standard deviation of income is the lowest for the tribal and highest for the ‘others’. This ‘other’ religious group in the district shows a wider range of income distribution (*see Fig. 2*); within which, the lower edges of income is generated by mostly tribal population converted to Christians or Buddhist as well; where, the upper end of the income are gained by the medium to large scale business families of Sikh or Jain religious group whose ancestors have migrated into the district from outside the states. On the other hand, the higher incoming households of the tribal families are mostly found receiving the income from salary by rendering services to Government Offices or Government aided institutions. The income distribution among Muslims shows a relatively worse scenario than that of the Hindus and other non-tribal religions residing in the district evidenced by

the upper extreme of the per capita income within this religious group is even lower than that of the tribal sample households. The issue of lower per capita income among Muslims may be linked with the high population growth within this religious group in comparison with other religious groups in the district. The Census of India (1991, 2001 and 2011) data shows (*see Table 3*) that the growth rate of the among Muslims in the district is considerable higher than that of the average population growth rate in the district since 1991. The higher growth rate results into a higher dependency ration which ultimately come into force of lowering the per capita income figure of the Muslim religious group in the district.

**Table 3: Population Growth Rate among Different Religious Groups in the Sample Population**

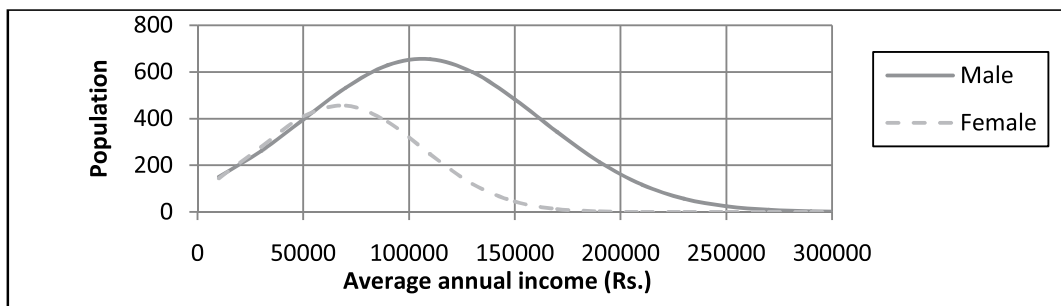
Population	Population			Growth (%)	
	1991	2001	2011	1991 to 2001	2001 to 2011
Hindu	2023143	2116037	2373120	4.59	12.15
Muslim	133119	180694	227249	35.74	25.76
District	2224577	2536516	2930115	14.02	15.52

**The Gender Gap of Income:** The data from the household survey also reveals that there is considerable gap of income between the two genders in the district (*See Fig. 3*). *Table 3* shows that the mean value of the average income generated by male working population (i.e. Rs. 106117) is far higher than that of females (i.e. Rs. 67752); and, the range of income of male working population is also wider than that of the females. Like the other parts of India, the district of Purulia also witness the deprivation of unorganized labourers form wages; and, a degree of injustice is reported by the respondents to happen in the wage and employment of female marginal workers engaged in agricultural, household, construction or mining sectors in different parts of the district. The female marginal workforce are mainly utilized for the low-end daily wage based jobs; and, moreover the female labourers are paid lower amount of wage than that of the male workers engaged in the same sector and performing the job with similar status of skills and labours.

**Table 4: Average Income of the Incoming Persons in the Sample Households Annually**

Gender	Average income of the incoming persons annually (Rs.)			
	Minimum ( $X_{\min}$ )	Maximum ( $X_{\max}$ )	Mean ( $\sigma$ )	SD ( $\mu$ )
Male	9650	439800	106117.00	55687.26
Female	8300	202900	67762.53	37616.81

**Fig. 3: Distribution of Male and Female Working Population by the Average Annual Income Contributed to the Household**





**The Inequality of Income among Different Field of Workers:** Another issue in this concern is the mode of participation of the population in income generating process. The working population are classified into two broad categories – main and marginal workers. The two categories has been ascribed as their nature of involvement to the economy. Ministry of Statistics and Programme Implementation, Govt. of India has defined ‘main workers’ as ‘those workers who had worked for the major part of the reference period (i.e. 6 months or 180 days) or more’; and ‘marginal workers’ as ‘Those workers who had not worked for the major part of the reference period’ (Manual on Labour Statistics (I), 2012). Whatever the definition may be, the issue of marginality in involvement in the economic system is not a mere data-field in the census report, rather it has a greater socio-economic implication. The Merriam-Webster’s dictionary defines ‘marginalization’ as “to relegate to an unimportant or powerless position within a society or group”. Marginalization typically involves some degree of exclusion from access to power and/or resources; it indicates a group at the periphery or at the edge of the society in virtual sense, i.e., those who are marginalized do not get to enjoy the full or typical benefits that those who are closer to the center tend to receive (Maynard & Ferdman, 2009). The presence of marginalization can be conceptualized as the existence of some degree of social exclusion within the region. Beside this, the spatial pattern of share of marginal workers within the population in a region has significant scope to provide a meaningful insight into the ongoing economic process of the region.

**Table 5: Income Distribution among Different Field of Workers Specified with the Genders**

Worker Type	Category	Gender	Mean Annual Income in Rs. (X̄)	Standard Deviation of Annual Income in Rs. (σ)
Main Workers	Cultivators	Male	132500	33562.6
		Female	88600	14628.75
	Agricultural labourers	Male	56400	8265.35
		Female	47280	7812.58
	Household Industry Workers	Male	95600	27568.6
		Female	72510	15450.65
	Other Workers	Male	159650	35690.6
		Female	138550	32255.56
Marginal Workers	Cultivators	Male	30425	8346.7
		Female	19565	5428.4
	Agricultural labourers	Male	21765	5688.4
		Female	18250	4505.5
	Household Industry Workers	Male	21565	6228.4
		Female	15465	4522.6
	Other Workers	Male	25755	7652.6
		Female	12560	2987.5

In synchronization with the classification of working population in the Census of India since 1991, the sample working population ( $P'_w$ ) has been categorized into the following classes on the basis of gender i.e. males ( $M$ ) and females ( $F$ ); degree of work participation i.e. main workers ( $MW$ ) and marginal workers ( $RW$ ); and the field of work i.e. cultivators ( $CL$ ), agricultural labourers ( $AL$ ), household industry workers ( $HH$ ) and other workers ( $OT$ ). Hence, all the occupational sub-groups within total working population can be written as,

$$\begin{aligned}
 P'_w = & [P'_{M,MW,CL} + P'_{M,MW,AL} + P'_{M,MW,HH} + P'_{M,MW,OT} + P'_{M,RW,CL} + \\
 & P'_{M,RW,AL} + P'_{M,RW,HH} + P'_{M,RW,OT} + P'_{F,MW,CL} + P'_{F,MW,AL} + P'_{F,MW,HH} + \dots \dots \dots (8) \\
 & P'_{F,RW,OT} + P'_{F,RW,CL} + P'_{F,RW,AL} + P'_{F,RW,HH} + P'_{F,RW,OT}]
 \end{aligned}$$

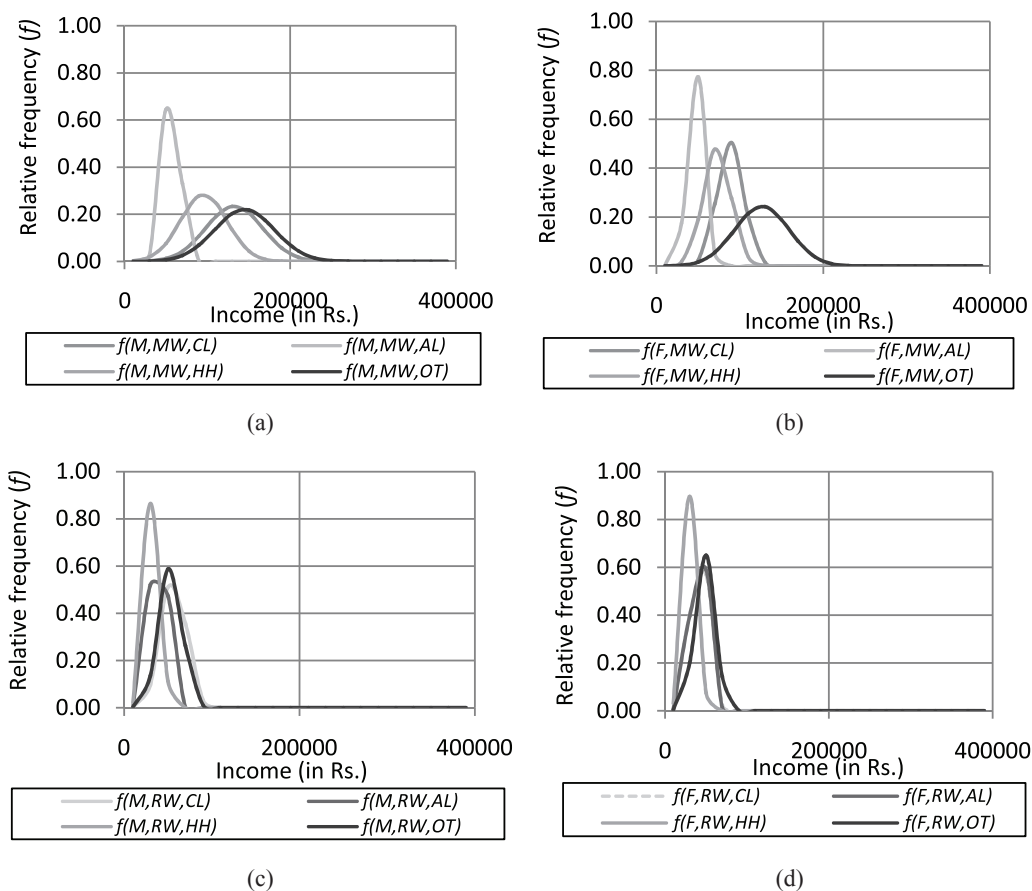


From each group of sample population, the sample mean ( $\bar{X}$ ) and sample standard deviation ( $\sigma$ ) of income has been calculated (see Table 5); by which the normal curves fitted with the income distribution of each of the sixteen occupational groups mentioned above can be defined using equation (iii) mentioned previously; and, from this, the relative frequency of different income classes of each group is calculated as mentioned in equation (iv) above.

The diagram of the income distribution among different working classes specified by genders (Fig. 4) exhibits a very distinct scenario of differences of income between different sectors within the district. Besides, a noticeable feature is viewed from the diagram that, there is a marked differences of income gaining between two different genders at each and every field of occupations; and also, the field of occupations showing higher magnitude of income also showing the existence of difference of income between genders at higher magnitude.

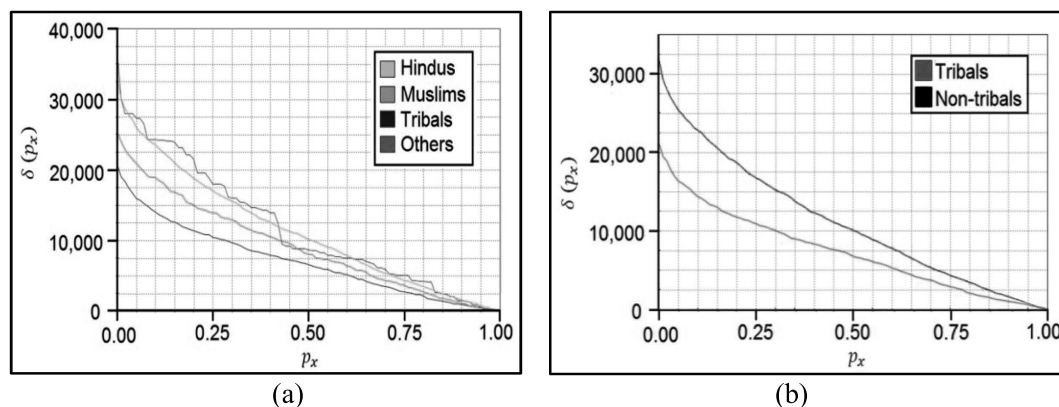
**Fig. 4: Relative Frequency Distribution of Income of Sample Working Population Grouped by Occupation as Presented in Census of India since 1991**

(i.e. cultivators, agricultural labourers, household industry workers and other workers) classified on the basis of gender and nature of work participation as: (a) Male main workers, (b) Female main workers, (c) Male marginal workers and (d) Female marginal workers.



**The Relative Deprivation of Income:** The above discussion of the income gained by different social and religious group in the district has viewed the entire matter from the standpoint of an absolute sense of relating income with well being; however, social status of an individual which, indeed, do play a very important role in the determination of his personal assessment of well being (Weiss and Fershtman, 1998). The notion of relative deprivation can be given following Runciman (1966) that a person can be considered as relatively deprived of X when he does not have X or he sees some other person or persons, which may include himself at some previous or expected time, as having X or he sees it as feasible that he should have. Kakwani (1984) introduced the relative deprivation curve as a useful graphical device, to represent the gaps between the individual's income and the incomes of all individuals richer than him, as a proportion of mean income, and proved that the area under this curve is the Gini coefficient. Duclos (2000) has shown that a generalization of Gini, the s-Ginis, could be interpreted as indices of relative deprivation. In the present study, the relative deprivation curve for different social classes or religious groups drawn, following Duclos (2000) with the income data collected from the household survey of the study area which allows the objective comparison of the persons of a particular group living at a certain percentile standard of income with the rest of the group. For the present case, the relative deprivation curve is drawn on individual's income by equally distributing the total household income over the members of the households.

**Fig. 5: Percentile Income wise Distribution of Intra group Relative Deprivation within**  
(a) different religious groups in the district of Purulia and (b) a crude comparison between the tribal and non-tribal population within the district in terms of the relative distribution of income.



The relative deprivation curve in Fig. 5 clearly indicates that the social groups or religious classes having greater share of income exhibit higher magnitude of deprivation of income. The tribal population of the districts manage to attain the lowest amount of income and the magnitude of relative deprivation among tribes are found least than that of any other social or religious groups along a certain percentile levels of income thereto. At the lowest income strata of the district, the value of relative deprivation for non-tribal population is as high as more than Rs 32,000 whereas for the tribal groups it is just above Rs 20,000. Considering the average household size of 5.17 in the district (Census of India, 2011), a tribal household at the lowest stratum of the economy should feel a deficit of income of more than one lakh annually whereas a non-tribal household at the similar standard of economy feels a deprivation of more than Rs 1.6 lakh within their group. This gap of relative deprivation decreases at the upper income level; and at the 75<sup>th</sup> percentile level the relative deprivation value is reduced by around 1/10<sup>th</sup> form the initial level; which is a clear indication of the higher concentration of income and wealth at the upper income level of the society depriving the lower strata of the economy.

**Relative Backwardness of Tribal Population than Others:** The cause of distinct economic backwardness of the tribal population in the district in contrast with the non-tribal section can be

accessed through the history of typical interaction of the tribal community with the development processes prevailing therein for the last two centuries. The district of Purulia possesses a unique physio-ecological setting and it is subject to change gradually due to the continuous human intervention over this natural set-up. This process of human intervention leads to drastic transformation in the sustainable 'man-society-environment' relationship established and nourished by the aboriginal communities in this district, mainly learned through the 'trial and error' method, being harmonized with the ethics of forest based livelihood from the distant past. Physiographically, most part of the district is included in the first step of the gradual descent of the elevated plateau of Chotanagpur proper towards the Gangetic alluvial plain and also a part of Ranchi peneplain. The hills and valleys dominate the districts bordered by Hazaribag and Santhal Parganas at the north, to the south by Singhbhum (Coupland, 1911). Almost all the province of pre-colonial Purulia (i.e. the then Manbhum) was covered with moist tropical deciduous forest characterized by tall trees rising up to 40 meters to form the top-most layer of canopy, a lower second storey of many species with some evergreens; and a mantle of shrubs below, entangled by a network of climbers (West Bengal District Gazetteers: Purulia, 1985). After all, this natural forest was intimately linked with the indigenous and tribal people (i.e. Adivasi) of the whole of the 'Jangal Mahal' (Mahato, 2016). This scenario began to change during the first few decades of nineteenth century, when the British rulers started to imbricate the colonial policy of expanding the cultivable areas in their colonies to ensure supplying sufficient amount of raw materials for the cotton textile industries in Great Britain. The large scale forest clearance, accompanied by the carnage of wild animals made a havoc ecological transformation in this area (Mohapatra, 1991). This process was further stimulated by the establishment of Bengal-Nagpur Railway through Kharagpur and Jhargram in 1898, followed by a narrow gauge tract between Purulia and Ranchi in 1908 (Coupland, 1911). Production of sufficient numbers of wooden railway slippers instigated the felling of a huge numbers of matured Sal trees. Not only that, the opening of railway link made the interior part of the 'Jangal Mahal' including Purulia (i.e. Manbhum) to become more accessible which leads to shift the forest from 'resource' to 'commodity' (Directorate of Forests, W.B., 1964). Successive modification of the colonial forest policy made the adivasis to lose their traditional rights on forestland by the end of nineteenth century. The zamindars (i.e. landlords) has been conferred the power to collect fees for utilizing forest resources (Damodaran, 2002). Forest resource based livelihood faced a severe challenge. The responsibility of sustainable utilization of forest resource was thus transferred from the foster community to the clutch of zamindars who actually acted as the intermediaries between the colonial rulers and the local communities. The hunter-gatherer indigenous people like the Savars and Birhors could not assimilate themselves with the changing scenario and became ecological refugees (Mahato, 2010).

***The Changing Socio-economic Scenario Since Independence and Development:*** The district of Manbhum was included within the province of Bihar during the independence of India. As the consequence of the movement of Bengali speaking peoples at the major portion of the district, the areas under 16 Police Stations were included with West Bengal as the district of Purulia vide the Transfer of Territory Act of Govt. of India on 1st November, 1956 (Mahato, 2007). Purulia got the recognition of new district, separated from Manbhum, however, the mineral resource affluent and mine based industry prospective areas were excluded from it to face a new economic challenge for the peoples of Purulia. Post-independent Purulia experiences a rapid growth of population. Around 15% decadal growth rate of population found for the decades of 1951-61(16.33%), 1961-71(17.86%), 1971-81(15.65%), 1981-91(20%), 1991-2001(14.02%) and 2001-2011(15.52%) as reflected in the Census of India in different years. This addition of a high volume of population adds surplus pressure on land and forests in the districts. Forests were cleared rapidly to remit the growing demand of agricultural land and establishing settlement. As a result, the extensive forest coverage has been gradually transforming into isolated forest patches, dissected by human settlement and

agricultural tracts. 1159 Km<sup>2</sup> of forest covered area (i.e. 18.51% of total area) of the district in 1991 (W.B. State Forest Report, 2006-07) has been reduced to 750.48 Km<sup>2</sup> (i.e. 11.99% of total area) in the year of 2011 (Economic Review, W.B., 2010-11). Most part of the agricultural fields are characterized by shallow to moderately deep loamy red lateritic soil (including the very shallow gravely loamy red lateritic soil at hill slopes) with least water holding capability and insufficient humus content. Under this soil condition, the agricultural output has limited scope to be increased through enhancing the productivity of the soil with proper management. Moreover, only 711.3 Km<sup>2</sup> area (11.37% of total area) of the district is facilitated with irrigation Agriculture Contingency Plan, 2011); hence, in most part of the district the agriculture is a seasonal activity which is absolutely dependent to the 'whimsical' monsoon rainfall.

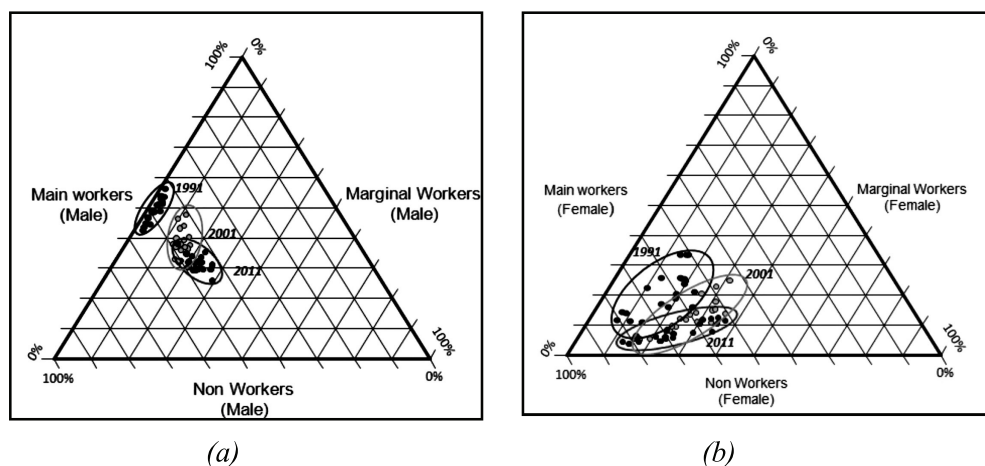
**Table 6: Decadal Change of Total Population as well as Main, Marginal and Non-working Population in different Blocks of Purulia District during Census year of 1991, 2001 and 2011**

BLOCKS	Rate of decadal change (in %)							
	Population		Main workers		Marginal workers		Non-workers	
	1991 to 2001	2001 to 2011	1991 to 2001	2001 to 2011	1991 to 2001	2001 to 2011	1991 to 2001	2001 to 2011
Arsha	15.39	19.81	-18.93	-2.15	167.16	30.36	140.35	27.09
Bagmundi	13.70	20.57	-12.98	-19.67	145.27	45.75	135.35	34.22
Balarampur	14.34	17.91	-16.48	-10.64	66.20	42.77	160.06	22.80
Barabazar	7.76	16.61	-36.79	3.82	289.08	20.64	128.46	21.33
Bundwan	14.58	6.26	-8.48	-41.15	198.75	55.53	127.52	22.46
Hura	12.06	12.66	-22.61	-3.34	130.49	38.87	138.12	9.87
Jhalda - I	17.01	10.38	7.11	-28.14	95.49	25.58	144.93	31.45
Jhalda - II	18.17	9.78	-2.53	-5.66	155.18	-8.07	141.09	28.53
Jaipur	18.03	10.13	-15.51	-13.85	115.95	-5.63	140.86	28.58
Kashipur	13.65	5.65	-36.70	-6.78	338.54	23.45	163.49	3.34
Manbazar - I	8.55	13.28	-34.02	-19.48	160.15	55.76	148.52	9.40
Manbazar - II	7.98	13.97	-28.65	-16.59	201.41	54.39	128.09	12.95
Neturia	1.64	6.92	-29.34	-0.41	260.66	28.91	129.67	3.54
Para	15.87	3.26	-22.03	-7.03	233.33	16.29	167.44	2.81
Puncha	12.17	14.54	-25.62	6.74	238.57	59.00	153.98	1.36
Purulia - I	14.39	16.10	-11.92	-17.97	110.63	45.48	151.21	22.04
Purulia - II	16.50	10.62	-15.46	-17.07	154.74	36.05	150.26	13.59
Raghunathpur - I	26.10	3.11	-22.42	0.72	485.19	-14.51	191.26	9.60
Raghunathpur - II	4.46	28.58	-32.30	15.40	246.08	46.29	142.89	27.83
Santuri	9.42	4.31	-9.16	-13.86	153.95	0.59	132.19	13.22
<b>Total</b>	<b>13.22</b>	<b>12.08</b>	<b>-20.49</b>	<b>-10.86</b>	<b>173.71</b>	<b>29.37</b>	<b>146.43</b>	<b>16.24</b>

The labour surplus theory of Lewis, Fei and Ranis (Lewis, 1958; Fei & Ranis, 1961) still forms the fundamental concept to explain the internal functions within a traditional subsistence agricultural sector. Increasing trend of population results into gradual overcrowding at the rural agricultural fields of occupation which leads to gradual declination of per capita food production due to natural constraints in the productivity and spatial limitation of the land. As a result, the marginal productivity of labours in this sector declines ultimately falling to zero, that is, if a labourer is removed from his job in agriculture, the production does not declines, that is, his contribution in the production system was zero (Lewis, 1958; Fei and Ranis, 1961). The existence of such excess labours signifies disguised unemployment. It can be identified by the more rapid growth of non-working population volume than that of the total population volume.

Table 6 shows a detailed information of the decadal change of population itself and the different working classes for the last two decades in different part of the district. The population of the district gets a moderate positive increase for both the decades of 1991-2001 (13.22%) and 2001-2011 (12.08%). On the other hand, the main working population has been decreased by 20.49% between 1991-2001; and by 10.86% between 2001-2011 decade. On contrary, both the marginal and non-working population have been increased drastically between 1991-2001 and at a comparatively slow pace during 2001-2011. However, there is a considerable difference at block levels regarding the rate of change of population and its different counter parts which may take a very important role in determining the spatial distribution pattern of income and economic well-off throughout the district.

**Fig. 6: Share of Main, Marginal and Non-working Population among (a) male and (b) female population in the district of Purulia during Census Years 1991, 2001 and 2011**



(Data source: Census of India, Different years)

The gender specific trend of work participation and its change during last three decades has clearly been reflected in Fig. 6. The block wise data of the male population of the district, when plotted on a triangular diagram, shows (see Fig. 6a) that around 45-55% were main workers; and there are less than 10% of male population of every blocks who were enumerated as marginal workers; rest were (mainly children and old) seen as non-working males. But the scenario changes rapidly for the following decades. The share of marginal workers in the male population increase gradually compensating the share of main workers with retaining the non-working population share nearly constant (somehow between 40 to 50% of the males). Moreover, all the twenty blocks in the district shows a similar kind of trend altogether regarding this phenomena. The similar trend is similarly found for the case of female working population also (see Fig. 6b). More than half of the female population of every blocks were enumerated as non-workers during 1991 and some of the blocks dominated with non-tribal population e.g. Raghunathpur I & II, Neturia, Santuri, Para etc shows more than two third of the female population as non-workers. Whereas, the majority of the remaining working female were marginal workers during 1991 census. But the share of marginal workers within female population increases rapidly with a decrease in main workers' share is viewed clearly for the following census years of 2001 and 2011.

**The Spatial Perspective of Human Development:** Beside income, economy, employment and access to resources, there are some other dimension of the term 'Human Development' – which is

mainly the social dimensions. The level of Human Development of a particular place can be assessed by the level of standard of living of the residents of an area, the status of educational attainment, health condition of the population and the civic, educational and health services provided to the population by the government. As a whole, there is a number of variables to be considered for the interpretation of the level of human development achieved by a place, or the magnitude of disparity in development existed therein.

The Principal Component Analysis (PCA) allow the researchers to handle a set of variables to reach to a optimum decision. The variable used for the Principal Component Analysis for the present study is listed in *Table 7*.

**Table 7: The variables considered for Principal Component Analysis (PCA)**

Variable expression	Variable name
$x_1$	Gross Literacy Rate (% to total population)
$x_2$	Literacy Among Female (% to total female population)
$x_3$	No. of Primary School per 10,000 population
$x_4$	No. of High and Higher Secondary School per 10,000 population
$x_5$	No. of Special and Non-Formal School per 10,000 population
$x_6$	No. of Teachers per 1000 of Students in Primary schools
$x_7$	No. of Teachers per 1000 of Students in High schools
$x_8$	No. of PHC per 100,000 population
$x_9$	No. of Beds per 100,000 population
$x_{10}$	No. of Doctors per 100,000 population
$x_{11}$	No. of Public family welfare centre per 100,000 population
$x_{12}$	Net Sown Area as percentage to Total Area
$x_{13}$	Irrigated area as percentage to cultivable area
$x_{14}$	Area under more than one crop as % to Net Sown Area
$x_{15}$	Aman Rice Production per Head (in Kg)
$x_{16}$	No. of ADAC per 100000 livestock creatures
$x_{17}$	No. of Banks per 100,000 population
$x_{18}$	Population density (No. per sq. km)
$x_{19}$	Sex ratio (No. of female per thousand male)
$x_{20}$	Working population as % to total population
$x_{21}$	Main worker as % to total population
$x_{22}$	Female share to main working population (%)
$x_{23}$	Female participation in marginal working population (%)
$x_{24}$	% of main workers involved in non-agri fields of occupation
$x_{25}$	% of marginal workers involved in non-agri fields of occupation

The block levels values of all the variables required for PCA are collected and tabulated from the Primary Census Abstract and Directory of Village Amenities of the Census of India 2011 (*Brief data for PCA is given in Appendix Table A*). The first step of the PCA is to prepare the correlation coefficient matrix (R) which is the matrix of internal correlation between each and every variables to be used for the Principal Component Analysis. As the present study includes 25 variables for the PCA, then a 25x 25 correlation matrix is prepared.



Table 8: The Correlation Coefficient Matrix (R)

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	x17	x18	x19	x20	x21	x22	x23	x24	x25
x1	1	.967	.297	.556	.371	.438	.519	-.011	.176	.135	.382	-.297	.156	.081	-.154	.013	.418	.093	-.093	-.275	-.251	-.170	-.335	.173	-.036
x2	.967	1	.387	.679	.358	.490	.552	.072	.295	.230	.403	-.272	.188	.134	-.068	.017	.394	-.017	.008	-.204	-.188	-.118	-.339	.157	-.016
x3	.297	.387	1	.699	.583	.834	.463	.564	.092	.134	.331	-.076	-.175	-.287	.390	-.169	-.036	-.816	.732	.597	.519	.483	.311	-.213	-.131
x4	.556	.679	.699	1	.397	.675	.683	.503	.324	.286	.288	-.129	.124	-.013	.150	.045	.167	-.365	.396	.207	.153	.023	-.218	.072	.018
x5	.371	.358	.583	.397	1	.629	.434	.601	.190	.267	.664	-.251	-.051	-.195	.104	-.203	.167	-.488	.318	.315	.453	.331	.125	.174	.167
x6	.438	.490	.834	.675	.629	1	.609	.708	.145	.237	.352	-.206	.081	-.214	.179	.040	.377	-.540	.420	.488	.373	.237	.030	-.013	-.072
x7	.519	.552	.463	.683	.434	.609	1	.491	.563	.589	.551	-.178	.238	-.149	-.167	.209	.344	-.085	.121	.107	.088	-.101	-.289	.249	.106
x8	-.011	.072	.564	.503	.601	.708	.491	1	.213	.322	.411	-.166	-.115	-.236	.179	.014	.164	-.457	.195	.557	.426	.286	.087	.011	.074
x9	.176	.295	.092	.324	.190	.145	.563	.213	1	.901	.471	.239	.522	.059	.000	.176	.068	-.020	-.045	-.228	-.153	-.119	-.315	.240	.065
x10	.135	.230	.134	.286		.237	.589	.322	.901	1	.490	.169	.481	-.083	.030	.199	.094	-.022	.015	-.039	-.012	-.069	-.155	.169	.037
x11	.382	.403	.331	.288	.664	.352	.551	.411	.471	.490	1	-.179	.044	-.096	.141	.208	.149	-.225	.142	.071	.108	.267	.124	-.087	-.087
x12	-.297	-.272	-.076	-.129	-.251	-.206	-.178	-.166	.239	.169	-.179	1	.222	-.149	.343	.104	-.275	-.088	.097	-.317	-.380	.019	.141	-.361	-.358
x13	.156	.188	-.175	.124	-.051	.081	.238	-.115	.522	.481	.044	.222	1	.056	-.109	.513	.342	.296	-.208	-.405	-.207	-.364	-.466	.336	.176
x14	.081	.134	-.287	-.013	-.195	-.214	-.149	-.236	.059	-.083	-.096	-.149	.056	1	-.093	-.325	.391	.325	-.104	-.382	-.292	-.359	-.540	.379	.349
x15	-.154	-.068	.390	.150	.104	.179	-.167	.179	.000	.030	.141	.343	-.109	-.093	1	.087	-.368	-.621	.443	.138	.132	.480	.534	-.566	-.293
x16	.013	.017	-.169	.045	-.203	.040	.209	.014	.176	.199	.208	.104	.513	-.325	.087	1	.231	.159	-.207	-.073	-.192	-.216	-.051	-.286	-.414
x17	.418	.394	-.036	.167	.167	.377	.344	.164	.068	.094	.149	-.275	.342	.391	-.368	.231	1	.261	-.280	-.046	-.070	-.464	-.611	.401	.168
x18	.093	-.017	-.816	-.365	-.488	-.540	-.085	-.457	-.020	-.022	-.225	-.088	.296	.325	-.621	.159	.261	1	-.735	-.648	-.628	-.571	-.499	.303	.139
x19	-.093	.008	.732	.396	.318	.420	.121	.195	-.045	.015	.142	.097	-.208	-.104	.443	-.207	-.280	-.735	1	.585	.566	.547	.505	-.335	-.143
x20	-.275	-.204	.597	.207	.315	.488	.107	.557	-.228	-.039	.071	-.317	-.405	.382	.138	-.073	-.046	-.648	.585	1	.852	.500	.485	-.219	-.067
x21	-.351	-.188	.519	.153	.453	.373	.088	.436	-.153	-.012	.108	-.380	-.207	.292	.132	-.192	-.070	-.628	.566	.852	1	.538	.407	.077	.332
x22	-.170	-.118	.483	.023	.331	.237	-.101	.286	-.119	-.069	.267	.019	-.364	-.359	.480	-.216	-.464	-.571	.547	.500	.538	1	.848	-.558	-.164
x23	-.335	-.339	.311	-.218	.125	.030	.289	.087	-.315	-.155	.124	.141	-.466	.540	.534	-.051	-.611	-.499	.505	.485	.407	.848	1	-.765	-.419
x24	.173	.157	-.213	.072	.174	-.013	.249	.011	.240	.169	-.087	-.361	.336	.379	-.566	-.286	.401	.303	-.335	-.219	.077	-.558	-.765	1	.829
x25	-.036	-.016	-.131	.018	.167	-.072	.106	.074	.065	.037	-.087	-.358	.176	.349	-.293	-.414	.168	.139	-.143	-.067	.332	-.164	-.419	.829	1



**Table 9: Eigen values and extracted variance of the data matrix to Principal Components**

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.756	27.023	27.023	6.756	27.023	27.023
2	5.583	22.333	49.357	5.583	22.333	49.357
3	3.002	12.007	61.363	3.002	12.007	61.363
4	2.062	8.248	69.612	2.062	8.248	69.612
5	1.624	6.497	76.109	1.624	6.497	76.109

**Table 10: Component matrix of PCA**

Variables		Components				
		1	2	3	4	5
<i>x1</i>	Gross Literacy Rate (% to total population)	.144	<b>.699</b>	.075	-.616	.069
<i>x2</i>	Literacy Among Female (% to total rural female population)	.234	<b>.725</b>	.104	-.547	.156
<i>x3</i>	No. of Primary School per 10,000 population	<b>.918</b>	.129	-.035	-.162	.137
<i>x4</i>	No. of High and Higher Secondary School per 10,000 population	<b>.570</b>	.565	.062	-.216	.159
<i>x5</i>	No. of Special and Non-Formal School per 10,000 population	<b>.679</b>	.363	-.187	.062	.039
<i>x6</i>	No. of Teachers per 1000 of Students in Primary schools	<b>.765</b>	.434	-.048	-.142	-.152
<i>x7</i>	No. of Teachers per 1000 of Students in High schools	.421	<b>.747</b>	.138	.092	-.124
<i>x8</i>	No. of PHC per 100,000 population	<b>.678</b>	.253	-.108	.267	-.226
<i>x9</i>	No. of Beds per 100,000 population	.101	<b>.580</b>	.467	.501	.276
<i>x10</i>	No. of Doctors per 100,000 population	.209	.527	.438	<b>.558</b>	.113
<i>x11</i>	No. of Public family welfare centre per 100,000 population	<b>.483*</b>	.413	.265	.062	-.054
<i>x12</i>	Net Sown Area as percentage to Total Area	-.117	-.271	<b>.646</b>	.195	.343
<i>x13</i>	Irrigated area as percentage to cultivable area	-.250	<b>.521</b>	.373	.358	-.041
<i>x14</i>	Area under more than one crop as % to Net Sown Area	-.415	.266	-.301	-.130	<b>.484*</b>
<i>x15</i>	Aman Rice Production per Head (in Kg)	<b>.464*</b>	-.373	.389	-.044	.339
<i>x16</i>	No. of ADAC per 100000 livestock creatures	-.078	.147	.606	.069	<b>-.631</b>
<i>x17</i>	No. of Banks per 100,000 population	-.126	<b>.656</b>	-.197	-.145	-.340
<i>x18</i>	Population density (No. per sq. km)	<b>-.845</b>	.236	.027	-.054	-.198
<i>x19</i>	Sex ratio (No. of female per thousand male)	<b>.729</b>	-.248	-.037	-.014	.309
<i>x20</i>	Working population as % to total population	<b>.724</b>	-.275	-.355	.161	-.355
<i>x21</i>	Main worker as % to total population	<b>.659</b>	-.186	-.519	.345	-.152
<i>x22</i>	Female share to main working population (%)	<b>.669</b>	-.490	.027	.019	.106
<i>x23</i>	Female participation in marginal working population (%)	<b>.524</b>	-.745	.184	-.028	-.061
<i>x24</i>	% of main workers involved in non-agri fields of occupation	-.323	<b>.611</b>	-.575	.334	.138
<i>x25</i>	% of marginal workers involved in non-agri fields of occupation	-.159	.321	<b>-.681</b>	.413	.259

**Table 11 : Score of Principal Components for different blocks of Purulia District**

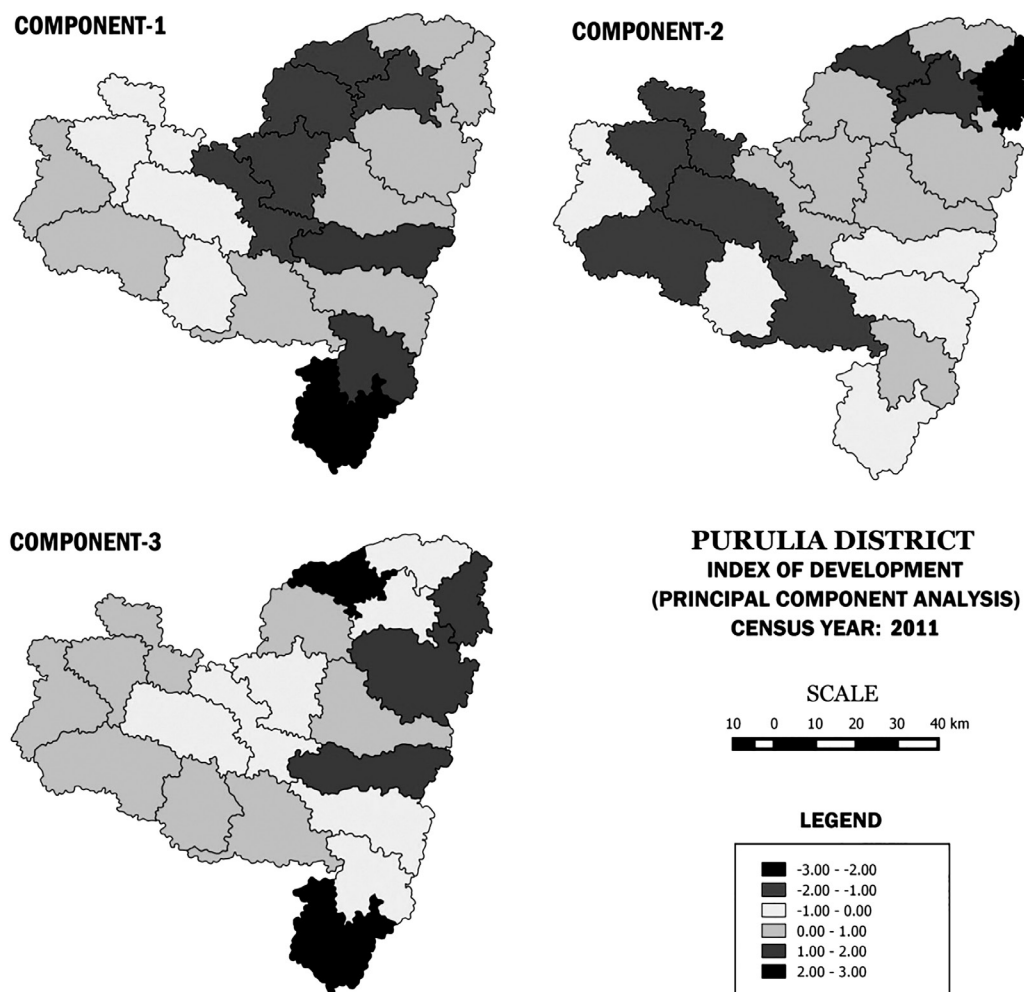
BLOCK	Score of Principal Components					
	Component-1	Component-2	Component-3	Component-4	Component-5	Component-6
Arsha	-0.41028	-1.69416	-0.17902	0.83111	0.17667	0.01542
Baghmundi	0.05863	-1.33219	0.59592	0.44155	0.16327	0.62606
Balarampur	-0.45255	-0.65218	0.16704	0.61979	-0.1098	-0.76936
Barabazar	0.37704	-1.05262	0.08898	-0.96195	0.66077	0.26276
Bundowan	2.02195	-0.03227	-2.47598	1.54643	1.04525	-0.59088
Hura	0.52639	0.59885	0.30178	-1.15542	1.03577	1.45537
Jaypur	-0.85691	-1.10849	0.21056	0.17205	-0.24327	-1.05368
Jhalda-I	0.15801	-0.56264	0.04366	-0.81608	-0.69698	-0.26413
Jhalda-II	-0.96513	-1.12496	0.68506	1.27746	-0.57118	0.44988
Kashipur	0.98673	0.58001	1.48278	-0.96912	0.29188	-2.92323
Manbazar-I	0.17078	-0.20603	-0.42814	-0.4309	-0.07574	0.5502
Manbazar-II	1.87986	0.05259	-0.29967	0.13494	-0.91379	1.31293
Neturia	0.47072	0.77371	-0.46928	0.24395	-3.07278	-0.56293
Para	-1.07835	0.33633	0.10629	0.22764	0.32269	-0.56227
Puncha	1.21816	-0.15131	1.18168	-1.63311	0.24602	0.55949
Purulia-I	-1.05411	0.82729	-0.2312	0.00646	1.3293	0.01714
Purulia-II	-1.11843	0.05254	-0.3692	-0.50883	0.48434	0.90561
Raghunathpur-I	-1.17122	1.43338	-0.17653	-0.41031	-1.41059	0.97883
Raghunathpur-II	-1.08654	1.14503	-2.05279	-0.95766	0.53206	-0.80274
Santuri	0.32527	2.11711	1.81808	2.342	0.80611	0.39551

All the Eigen values from the Matrix *R* have been extracted and arranged in descending orders. There are first six Eigen values which are greater than unity (*see Table 9*); and, among them, first five Eigen values are considered for further analysis as these Eigen values accounts for more than 75 per cent of the total variations of the data matrix. The Eigen vectors corresponding the five Eigen values considered above are normalized to unity for working out the scores of first to fifth principal components; the 25 elements of each of the five Eigen vectors are used as weights of the standardized values of the given 25 variables in the data matrix. Now, multiplying each element of these Eigen vectors by the square root of their Eigen values, the factor loadings are calculated. This calculation results into the construction of Component Matrix of the PCA (*Table 10*). At the final stage spatial unit wise (i.e. Block wise) scores of each of the five Principal Components have been worked out (*Table 11*). All the scores are fed to QGIS 2.8, the open source GIS software to prepare the Principal Component maps of the Purulia district.

The factor loading of the First Principal Component show that it has positive correlation with 'No. of Primary School per 10,000 population' (x3), 'No. of High and Higher Secondary School per 10,000 population' (x4), 'No. of Special and Non-Formal School per 10,000 population' (x5), 'No. of Teachers per 1000 of Students in Primary schools' (x6), 'No. of Primary Health Centre (PHC) per 100,000 population' (x8), 'Sex ratio' (x19), 'Working population share to total population' (x20), 'Main worker share to total population' (x21), 'Female share to main working population' (x22),

'Female participation in marginal working population (%)' (x23); and negative correlation with 'Population density' (x18). Besides, the variables 'Aman Rice Production per Head (x15)', 'No. of Public family welfare centre per 100,000 population (x11)' has in positive relationship (insignificant) with this components. These last two variables are considered here as there are no stronger correlation of these variables with other four components in the component matrix. All these variables have a common notions that they indicate the availability of basic physical infrastructures for health and education services and the availability human resources for development activities. The availability of these infrastructures should be adequate in terms of the volume of population linked with them. The map of 1<sup>st</sup> Component score (*Fig. 7*) shows a lower score of this first component is assigned for those blocks where the population size is larger.

**Fig 7: Scores of Principal Components 2011 (First, second and third components)**



The Second Principal Component shows positive correlation with 'Gross literacy rate' (x1), 'Literacy among female (x2)', 'No. of Teachers per 1000 of Students in High schools' (x7), 'No. of Beds per 100,000 population' (x9), 'Irrigated area as percentage to cultivable area' (x13), 'No. of Banks per 100,000 population' (x17) and 'Share of main workers involved in non-agricultural fields of occupation' (x24). The urban centers and peripheral areas show the highest level score for this component.

The Third Principal Component is in positive correlation with the variables 'Net Sown Area as percentage to Total Area' (x12), and in negative correlation with the 'Share of marginal workers involved in non-agricultural fields of occupation' (x25). These two variables are associated with agricultural parameters. The Fourth Principal Components shows significant positive correlation with only one variable- 'No. of Doctors per 100,000 population' (x10). So, this is an index of adequacy of doctors availability in terms of population size. The Fifth Principal Component shows significant positive correlation with 'No. of ADAC per 100000 livestock creatures' (x16) and insignificant but positive correlation with the variable 'Area under more than one crop as % to Net Sown Area' (x14).

The above Principal Component Analysis shows that there are a considerable magnitude of inter block level inequalities exists in the district in terms of different social and economic parameters. The complicated interactions of all these variables leads to a heterogeneous development scenario all over the districts.

## CONCLUSION

The process of development in India has long been equated with the agricultural growth; and the generalization of this idea may have misled the planning procedure, especially the vast rural areas of the country where agriculture has a degree of environmental and functional limitations (like the present study area). Now, development is required to be conceptualized as a strategy designed to improve economic and social life of a specific group of people, necessarily sticking to a 'pro-poor' approach. Hence, the essence of future development lies in spontaneous people's participation in the development process and creating the capacity of the people through the empowerment of the community for sustained development with the rational utilization of ambient natural and social resources. This poses a great challenge for planner not only to plan for even dispersal of social infrastructures all through the government but also prepare specific planning strategy for the backward area/blocks so as to enable them to come up to the level of presently comparatively advanced units, failing which growth will pass sizeable chunk of the district population keeping them perpetually in the backward of development. No doubt, certain areas are more conducive to fetch overall prosperity to the people of those areas in comparison of other areas. A concerned effort is paramount in order to enhance the overall economy of all the blocks of the district. In fact, district is a very small region therefore much attention is not paid pertaining to the issue of regional disparities in development. However, the analysis demonstrated that the issue cannot be ignored further. The district of Purulia itself is one of the most backward districts in the state of West Bengal and it ranked 16<sup>th</sup> out of 17 districts under calculation with a poor value of HDI. Within such a district with depressed level of human development, the magnitude of inter-block level disparity in different aspect of socio economic development is undoubtedly an issue worthy to be further investigation. Admittedly, unequal development is often seen more depreciative than that of the slow rate of equal development in social and economic context. The development planning for societal and economic betterment to be chalked out in such a way that it should ensure the development of each and every sector equally as far as possible. Considering district as a unit of development during plan preparation may result into a wrong outcome from the plan execution. Each and every part of

the districts is equally neither developed nor backward in all the dimensions of development. During planning formulation and fund allocation, the micro-spatial differentiation of existing development status require to be analyzed carefully leading to ensure the distribution of developmental thrust as proportional to the existing rate of underdevelopment of different micro-spatial units; which, obviously requires a complete demarcation of the backward sectors and spatial units beforehand.

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