

Trend and Pattern of Development in Education in the Blocks of Paschim Medinipur District of West Bengal during 2005-06 to 2014-15

Sanjoy Kumar Pattanayek, Debasish Mondal

ABSTRACT

Education is one of the fundamental indicators of social development as well as human development of a society. Development in education cannot be judged by a single dimension. The UNDP from its Human Development Report (1995) used the combined enrolment ratio and the adult literacy rate as the two basic dimensions of development of education and combined them in an education index by using arbitrarily 1/3 and 2/3 weights to the above two dimensions respectively. The present study examines the trend and pattern of development in education in the blocks of Paschim Medinipur District in West Bengal, India over the period 2005-06 to 2014-15 through the construction of Education Index (EI) by using Iterative Correlation Method (ICM) to attach proper weights to dimensional indices i.e., Enrolment Index (ENI) and Adult Literacy Index (ALI).

KEY WORDS: Enrolment Index, Adult Literacy Index, Education Index, Human Development, Iterative Correlation Method

JEL Classification: I25, O15

Introduction

Education is one of the concerning perceptual aspect leading to economic development in particular and human development in general of a country, state or region as human skill and gradual knowledge is sectioned as the consistent agglomerated part of economic development leading to population's efficiency to work more for gradual human and social

*Sanjoy Kumar Pattanayek, Faculty, Raja N. L. Khan Women's College, West Bengal, India.
Dr. Debasish Mondal, Professor of Economics, Vidyasagar University, West Bengal, India.*

development. Knowledge is crucial for economy's development because of its multi-facilitation properties that enlightens human capabilities and enlarges human opportunities. It not only imparts knowledge and skills that enable individuals to raise economic productivity but also furnishes values, ideas, attitudes and aspirations which act as the agents of economic and social recast. Presently education also orients a functional stage in improving personal skills, overcoming constraints, widening existing compilation of objectives and options for improving standard of living. As education is growing in a diversified way it professes a difficulty to sermonize achievement of knowledge by a single variable. It can be reflected by a number of partial achievements or procurements like enrolment ratio, dropout rate (inversely), transition rate, instructional days, working hours for teachers, literacy rate, adult literacy rate, female literacy rate, literacy rate of the weaker sections etc. and a number of instruments or accomplished means like availability and access to schools, pupil teacher ratio, teacher school ratio, student school ratio, student classroom ratio, proportion of professionally qualified teachers, male-female teacher ratio etc. and availability of basic amenities or infrastructures like classrooms, safe drinking water facility, proper toilet facilities for both boys and girls, ramp, kitchen-shed, library, computers, play-grounds etc. Keeping in mind the above mentioned issues two reliable and available indicators used by the UNDP have also been persuaded here to identify present status of education in the blocks of Paschim Medinipur District in West Bengal, India over the period 2005-06 to 2014-15. However, to attach proper weights to the above two indicators we have used Iterative Correlation Method for the assessment of educational development of the study area.

Government of India has adopted numerous education programmes during the plan period where The National Education Policy (NEP, 1968) was the first official document evidencing the India Government's commitment towards school education. The NEP went through a couple of amendments thereafter. A key milestone in the history came in possession for achieving access to education through the 86th Constitutional Amendment Act that was passed in December 2002 making education free and compulsory and a fundamental right for all the children in the age group of 6-14 years. The Right to Education (RTE) aims to improve education in India by focusing primarily on increasing funds for schools, mandating certain infrastructures, maintaining prescribed student teacher ratio, attendance of teachers and students and creating a variety of accountability mechanisms. Within RTE, children are treated as right holders rather than duty bearers. The act specifies that the compulsion

component is the obligation on the government rather than on children to ensure admission and enrolment of children in education providing a vast development to future generation and economy.

Objectives

In this paper we want to address following two basic objectives:

- a) To develop a suitable methodology for constructing a composite Education Index (EI) (composite of Enrolment Index (ENI) and Adult Literacy Index (ALI)) in the blocks of Paschim Medinipur District during the period 2005-2006 to 2014-2015. Under this objective, proper weights of dimension indices will be determined by using Iterative Correlation Method (ICM).
- b) To examine the trend and pattern of development in education across the blocks of Paschim Medinipur District of West Bengal over the time period from 2005-06 to 2014-15. Through this we shall be able to determine the relative ranks of the blocks of Paschim Medinipur district of West Bengal with respect to development in education over time.

Description of the Study Area

Paschim Medinipur, located in the southern part of West Bengal, has been carved from the erstwhile Medinipur district, then the largest district of India. It came into existence in the present form in January 2002 during the period of 10th Five Year Plan. It is situated between 22° 57' 10" and 21° 36' 35" North latitude and between 88° 12' 40" and 86° 33' 50" East longitude. It is bounded by Bankura district on the north, Purba Medinipur district on the east and south-east, Hoogly district on the east, and the states of Orissa and Jharkhand on the west and south-west. Located in the south-western part of West Bengal, Paschim Medinipur is one of the country's 250 most backward districts. Geographical area of the district is 9295.28 sq. km. There are 29 community development blocks and 8 municipalities distributed in 4 (four) sub-divisions in the district. As per Census of India, it ranks 2nd in the state in terms of geographical area (9295.28 sq. km.), next to South 24-Parganas (9960 sq. km.). Literacy rate of the district has been increasing at rapid rate over the census years. In 2001, literacy rate of the district was 70.41 per cent, which was higher than that of the State (68.64 percent). Again, in 2011 the district showed up higher propagation of literacy rate to 79.04 per cent as compared to that of the State (76.3 per

cent). In case of SC and ST, the literacy rates in the district were also higher than those in the whole of the State. Gender gap in literacy rate (i.e., difference between female and male literacy rates) is, however, substantial and higher in Paschim Medinipur district than that in West Bengal as a whole. The gender gap in literacy tends to increase in some blocks of the district. The work participation rates in this district across all castes are found to be higher than that of the State as a whole. Examining the demographic and socio-economic characteristics, the district presents a unique opportunity to understand and illustrate the issues associated with different aspects of development in education. Moreover, a block level study in this district in terms of education attainment and construction of education index has hardly been explored out.

How EI & EDI are Constructed

(a) Education Index (EI): The United Nations Development Programme (UNDP), in its Human Development Reports (HDRs), has introduced the concept of Education Index (EI) as a part of Human Development Index (HDI) to evaluate the level of educational attainment of different countries since 1990. In the first report (1990) adult literacy was the only variable in educational attainment. In the report of 1991 the mean years of schooling was added as a second component with 1/3 weight leaving 2/3 weight for adult literacy. From the report of 1995 to 2009 the mean years of schooling of the children from 6-14 years was replaced by gross enrolment ratio in primary, secondary and tertiary education. It combines the indices of these two indicators through a weighted average 1/3 weight to gross enrolment ratio and 2/3 weight to adult literacy. From the report of 2010 onwards the adult literacy was replaced by mean years of schooling and gross enrolment ratio by expected years of schooling. From 2010 to 2013, HDR used Geometric Mean (G.M.) method of aggregation in Human Development Index (HDI) as well as Education Index (EI). From the year 2014 onwards though geometric mean is used as the method of aggregation in Human Development Index (HDI) a simple arithmetic mean of mean years of schooling and expected years of schooling is used in the construction of education index. In the National Human Development Report of India (2003) only the general literacy rate was used for the calculation of educational attainment index because neither the enrolment ratios nor the adult literacy rates are available for the states of India. In the Human Development Report of West Bengal (2004) two indicators, viz., the general literacy rate and the percentage of children in the age group 6 to 14 years attending school were used for the calculation of educational attainment index

by attaching 2/3 weight to general literacy rate index and 1/3 weight to attendance index.

(b) Education Development Index (EDI): The UNESCO has developed the Education for All Development Index (EDI) in order to scrutinize each country's progress over time with regards to the EFA's goals set in the set in the Dakar Framework for action since 2000. The composite EDI measures four of the six EFA goals, selected on the basis of data availability which are evaluated using a specific indicator, and then each component is assigned an equal weight in the overall index. Thus EDI for a given country is the arithmetic mean of the four indicators i.e., (i) total primary net enrolment ratio (ii) adult literacy rate (iii) survival rate to Grade V and (iv) average of three gender parity index for primary education, secondary education and adult literacy. In India, the National University of Educational Planning and Administration (NUEPA), New Delhi, through its District Information System for Education (DISE) and the Government of India (MHRD, Department of School Education and Literacy) have introduced and calculated a composite Educational Development Index (EDI) across state and district separately for Primary and Upper Primary levels of education and also a composite index for the entire elementary education since 2005-06. The National University of Educational Planning and Administration (NUEPA) apprehended a composite Educational Development Index (EDI) (composite of Assess Index (AI), Infrastructure Index (II), Teacher's Index (TI) and Outcome Index (OI)) across state and district separately for Primary and Upper Primary levels of education and also a composite index for the entire elementary education based exclusively on the DISE data by using Principal Component Analysis (PCA). From the time period 2005-06 to 2011-12 NUEPA and MHRD have identified 23 indicators, then from the period of 2012-13 onwards approached for 25 indicators for computing EDI.

Data and Methodology

In the present paper we articulated Iterative Correlation Method (ICM) for calculation of EI across the blocks of Paschim Medinipur District. We procured three reliable sources for data i.e., Census of India for population related data, District Information System for Education (DISE) for education related data and District Statistical Hand Books for general data. Further, we professed only two indicators to capture all aspects of development in education by assimilating proper weightage to Enrolment Index (ENI) and Adult Literacy Index (ALI) in Education Index (EI) through Iterative Correlation Method (ICM). As DISE data are available only from 2005-06 we construct EI from 2005-06 to 2014-15. Absolute

enrolment figures given in the DISE data are of no use unless we have the number of potential children for primary, upper primary education in different blocks in the relevant years. On the other hand, the Census data provide information on general literacy in the age group six years and above and do not provide reliable data on adult literacy rate.

By using Census data on rural population, literacy rates and age-wise distribution of the rural population we have calculated projected population in the age-group of 5 to 14 years and in the age group of 15 years and above. To calculate projected population, we have used the following log quadratic equation $\text{Log}Y = a + bt + ct^2$, where Y stands for population in a particular block and t stands for time. a, b and c are calculated by using population for the block in the years 1991, 2001 and 2011. Population in any other year is then estimated by taking the antilog of the calculated value of $\text{Log}Y$ for corresponding value of t. Enrolment ratio is then calculated as the ratio between the enrolment figures obtained from DISE and the projected population in the age group of 5 to 14 years. From this the number of children never attending school is subtracted and the subtracted value is subtracted from the projected literates for the said years to arrive at an estimate of adult literates. Adult literacy rate is calculated as the ratio between this and projected population in the age group of 15 years and above.

These two rates are combined for arriving at the EI by using the Iterative Correlation Method (ICM). Before combining, they are normalized to the index values by prospering functional projection from the concerned year as before and after 5 years and then they are fixed for meaningful trend analysis of the EI. With goalpost made fixed from future projection, the cross-section analysis became less meaningful than that with goalposts determined by observed maxima and minima, and the inter-temporal analysis becomes dependent on the time span and method of projection. But if maxima and minima, is not observed in a particular year but over all the years for which the comparison is desired, then this cross-section and inter-temporal analysis can be made meaningfully. The maximum and minimum values for enrolment rate have been taken as 100 (Keshpur, 2014-2015) and 19.06 (Kharagpur-II, 2000-2001) whereas for adult literacy rate maximum and minimum values have been taken as 90.57 (Daspur-II, 2019-2020) and 50.14 (Nayagram, 2000-2001).

The choice of weights is the most crucial problem in the construction of EI. This study offers an alternative measure for estimating EI and its dimension indices which is based on Iterative Correlation Method (ICM). It proposes the weights of individual components

that are proportional to the correlation with the final index. This method is able to attach proper weights to the groups. The detailed methodology is as follows:

Let, I_1 , I_2 and I_3 are the three indices of a composite index to be developed on the basis of I_1 , I_2 and I_3 . We propose that the weight of any dimension index should be proportionate to its correlation with the final composite index. As the final index cannot be calculated unless the weights are determined and as the weights (or the correlations) cannot be calculated unless the final index is determined, they are calculated simultaneously through an iterative process. The process starts with some arbitrarily fixed weights of the individual indices, preferably equal weights for all. On the basis of these weights a development index is determined. In the third step correlations of the individual indices with the development index are obtained and these are used as weights to arrive at the new development index. In the next step new correlations and new weights and so another new development index is obtained. The process is repeated until the correlations converge to their earlier values and the final weights along with the final development index are obtained. Thus for the calculation of education index we pertain 58.1% weightage to adult literacy rate index and 41.9% weightage to combined primary and secondary gross educational enrolment ratio index.

Results and Discussion

6a. Trend of Education Index (EI) in the blocks of Paschim Medinipur District during 2005-06 to 2014-15

We procured our assessment on overall position in the blocks of Paschim Medinipur District in West Bengal on the basis of the composite Education Index (EI) (with 41.9% weightage of Enrolment Index (ENI) and 58.1% weightage of Adult Literacy Index (ALI)) over the period 2005-06 to 2014-2015 in Table 1.

Table 1: Trend of Education Index for the blocks of said district during 2005-06 to 2014-15

Block	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	% of Growth	P-value
Jhargram	0.445	0.460	0.492	0.492	0.634	0.651	0.670	0.674	0.698	0.723	5.95	3.1E-05
Binpur-I	0.395	0.413	0.449	0.432	0.556	0.561	0.567	0.540	0.597	0.622	5.10	1.0E-04
Binpur-II	0.404	0.423	0.443	0.444	0.590	0.613	0.637	0.642	0.648	0.673	6.40	6.2E-05
Jamboni	0.412	0.423	0.440	0.429	0.545	0.549	0.558	0.623	0.640	0.655	5.82	7.3E-06
Nayagram	0.258	0.279	0.302	0.320	0.520	0.501	0.525	0.539	0.550	0.582	9.94	1.3E-04
Sankrail	0.448	0.466	0.487	0.475	0.656	0.669	0.662	0.677	0.692	0.714	5.82	2.0E-04
Gopiballavpur-I	0.297	0.317	0.337	0.356	0.469	0.495	0.502	0.528	0.577	0.606	8.44	2.0E-06
Gopiballavpur-II	0.412	0.430	0.451	0.457	0.537	0.549	0.581	0.592	0.628	0.669	5.52	1.5E-07
Salboni	0.469	0.490	0.511	0.530	0.676	0.684	0.688	0.638	0.736	0.753	5.45	1.3E-04
Keshpur	0.468	0.492	0.515	0.539	0.716	0.723	0.738	0.723	0.772	0.790	6.36	8.8E-05
Garbeta-I	0.458	0.477	0.498	0.518	0.695	0.713	0.715	0.686	0.738	0.768	6.23	1.6E-04
Garbeta-II	0.483	0.503	0.541	0.531	0.644	0.673	0.684	0.665	0.695	0.736	4.78	3.4E-05
Garbeta-III	0.438	0.455	0.474	0.459	0.653	0.682	0.710	0.687	0.721	0.733	6.72	2.1E-04
Medinipur	0.362	0.383	0.404	0.406	0.569	0.579	0.621	0.628	0.652	0.681	7.82	2.6E-05
Debra	0.617	0.630	0.647	0.661	0.786	0.809	0.796	0.758	0.840	0.866	3.90	1.4E-04
Pingla	0.704	0.715	0.741	0.732	0.828	0.853	0.858	0.864	0.903	0.925	3.25	5.7E-06
Keshiary	0.493	0.514	0.539	0.556	0.585	0.632	0.668	0.702	0.737	0.770	5.14	2.4E-10
Dantan-I	0.448	0.462	0.463	0.464	0.644	0.655	0.646	0.615	0.696	0.733	5.89	2.6E-04
Dantan-II	0.597	0.614	0.635	0.624	0.821	0.835	0.813	0.783	0.864	0.889	4.75	3.6E-04
Narayangarh	0.537	0.552	0.569	0.585	0.777	0.803	0.811	0.809	0.842	0.857	6.02	1.2E-04
Mohanpur	0.621	0.633	0.663	0.641	0.758	0.774	0.772	0.769	0.811	0.834	3.45	4.9E-05
Sabong	0.715	0.733	0.750	0.752	0.858	0.866	0.876	0.860	0.881	0.902	2.74	1.2E-04
Kharagpur-I	0.558	0.516	0.451	0.391	0.524	0.549	0.571	0.548	0.599	0.623	2.54	9.4E-02
Kharagpur-II	0.481	0.498	0.524	0.504	0.666	0.678	0.672	0.655	0.715	0.767	5.28	1.1E-04
Chandrakona-I	0.562	0.581	0.598	0.615	0.710	0.717	0.725	0.716	0.781	0.827	4.21	4.7E-06
Chandrakona-II	0.458	0.482	0.506	0.501	0.621	0.643	0.651	0.690	0.740	0.787	6.21	8.9E-07
Ghatal	0.610	0.626	0.640	0.652	0.720	0.735	0.735	0.719	0.785	0.805	3.06	9.1E-06
Daspur-I	0.652	0.670	0.689	0.675	0.748	0.754	0.773	0.792	0.820	0.846	2.96	7.4E-07
Daspur-II	0.741	0.751	0.762	0.769	0.785	0.792	0.797	0.802	0.811	0.817	1.08	6.0E-08

Source: (i) Government of India, Census of India, 1991, 2001, 2011

(ii) Government of India, DISE-2005-06 to DISE-2014-15.

It shows that the growth rate of Education Index (EI) is highest in Nayagram (9.94%) with higher level of significance at 1.3E-04 level followed by Gopiballavpur-I (8.44%) and the lowest in Daspur-II (1.08%) preceded by Kharagpur-I (2.54%). However, Jamboni and Sankrail illumine same rate of growth in EI by 5.82 % with different level of significance within the block. Further it's been enunciated that blocks with higher initial value of EI show low percentage of growth rate and the blocks with lower initial value of EI are gradually proposing higher growth rate so as to satisfy the convergence hypothesis over time. The said EI for all the blocks of Paschim Medinipur District taken together is 0.630 which implies

that rural area of concerned district has attained 63.0% success in education (a more than 3/5th success) and the remaining 37.0% is yet to be achieved. Analysing the absolute values of the EI, we observe that 4 blocks in 2005-06, 6 blocks in 2006-07, 7 blocks in 2007-08 and 2008-09, 19 blocks in 2009-10, 21 blocks in 2010-11, 22 blocks in 2011-12 and 2012-13, 24 blocks in 2013-14 and 25 blocks in 2014-15 had absolute value of EI greater than 0.630(average EI of all EI) which implies an overtime improvement in the district.

Table 2: Relative Ranks in the blocks of said district in EI during 2005-06 to 2014-15

Block	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
Jhargram	21	21	18	18	19	19	17	17	18	20
Binpur-I	26	26	24	24	24	24	26	27	27	27
Binpur-II	25	24	25	23	21	22	22	20	23	23
Jamboni	23	25	26	25	25	26	27	23	24	25
Nayagram	29	29	29	29	28	28	28	28	29	29
Sankrail	19	19	19	19	15	17	19	16	21	21
Gopiballavpur-I	28	28	28	28	29	29	29	29	28	28
Gopiballavpur-II	24	23	23	22	26	27	24	25	25	24
Salboni	15	16	15	14	13	13	14	21	15	16
Keshpur	16	15	14	12	10	10	9	9	11	11
Garbeta-I	18	18	17	15	12	12	12	15	13	14
Garbeta-II	13	13	11	13	18	16	15	18	20	17
Garbeta-III	22	22	20	21	16	14	13	14	16	18
Medinipur	27	27	27	26	23	23	23	22	22	22
Debra	6	6	6	5	4	4	6	8	5	4
Pingla	3	3	3	3	2	2	2	1	1	1
Keshiary	12	12	12	11	22	21	18	12	14	13
Dantan-I	20	20	21	20	17	18	21	24	19	19
Dantan-II	8	8	8	8	3	3	3	6	3	3
Narayangarh	11	10	10	10	6	5	4	3	4	5
Mohanpur	5	5	5	7	7	7	8	7	7	7
Sabong	2	2	2	2	1	1	1	2	2	2
Kharagpur-I	10	11	22	27	27	25	25	26	26	26
Kharagpur-II	14	14	13	16	14	15	16	19	17	15
Chandrakona-I	9	9	9	9	11	11	11	11	10	8
Chandrakona-II	17	17	16	17	20	20	20	13	12	12
Ghatal	7	7	7	6	9	9	10	10	9	10
Daspur-I	4	4	4	4	8	8	7	5	6	6
Daspur-II	1	1	1	1	5	6	5	4	8	9

Source: From Table 1

6b. Relative Ranks in the Blocks of Paschim Medinipur District in Education Index during 2005-06 to 2014-15

Here the assessment proposes an explanation based on the pattern showing the overall concerning situation through their respective ranks in the blocks of Paschim Medinipur District in West Bengal on the basis of the Education Index (EI).

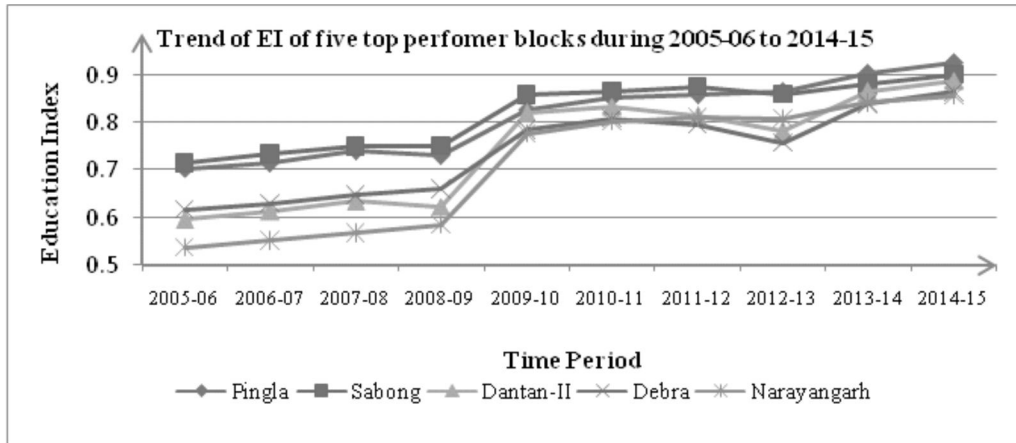


Figure 1

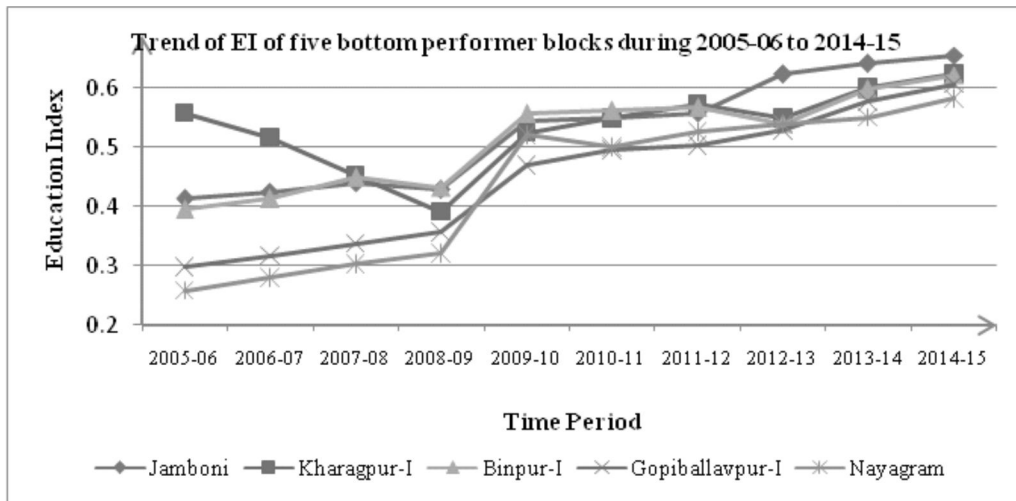


Figure 2

Here the study contradicts the rank-wise variation in the assessed blocks where Daspur-II showed a positive proposition at first but suffered a gradual decrement in 2009-10 which preceded its position 9th in 2014-15 whereas Pingla gradually attained an increment from 3rd place to 2nd place and reached to 1st position in the 2014-15. In the same observed years we propounded that Nayagram has been continuously prospering a bad attainment towards education oscillating between last two positions trying to develop over-time whereas Sabong profuse a constant position throughout till 2008-09 then it attained 1st position showing a gradual improvement in education allotment and again attained 2nd position in 2014-15. Gopiballavpur-I in reverse to Nayagram showed a gradual slight improvement oscillating between last two places i.e. on 28th position till 2008-09 afterwards attaining 29th position till 2012-13 and again propelling to 28th position. Kharagpur-I here invigilates a radical behavior by gradually perceiving a decrement in its educational status throughout the assessing year i.e., variating its position from 10th in 2005-06 to 26th position in 2014-15. Here we considered five top performer blocks and five bottom performer blocks to show trend of EI during the time period 2005-06 to 2014-15 for assessing growth rate in EI.

In figure-1 we contradict trend of EI of five top performer blocks during 2005-06 to 2014-15 where we adrift that Pingla precluding second position continuously occupied 1st position abruptly for the time period 2013-14 and 2014-15 consecutively reprimanding Sabong which was continuously rising till 2011-12 obscured 2nd position in the same time span. Narayangarh here showed improvement overtime by rising gradually but failed to apprehend above 5th position.

Similarly, we can archive comprehensible concept of the five bottom performer blocks from the time period 2005-06 to 2014-15 in figure-2. Here Nayagram had occupied 29th place from the bottom with gradual striking crest and trough showing gradual increment in education status over the time 2005-06 to 2014-15 whereas Kharagpur-I proposed an accidental decrement in 2008-09 from a sensual position in initial year and kept on shrinking showing declining education prospects but around 2014-15 it is suppressed to improve its educational scenario. Binpur-I initially propelled a constancy showing sudden rise in 2009-10 again maintaining constancy showing equal educational attainment as Kharagpur-I.

Conclusion

In this study we have constructed a suitable Education Index (EI) (composite of Enrolment

Index (ENI) and Adult Literacy Index (ALI) by using Iterative Correlation Method (ICM) to attribute proper weight to the twodimension indices of development in education in the blocks of Paschim Medinipur District in West Bengal, India over the period 2005-06 to 2014-15. Among the blocks Pingla, Sabong, Daspur-II, Daspur-I are the overall top performers and Nayagram, Gopiballavpur-I, Binpur-I, Jamboni are bottom performers in attainment of education. Our study further reveals that most blocks of Paschim Medinipur District have achieved improvement in respect of attainment in education over time.

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