CHANGING TRENDS OF AGRICULTURAL EFFICIENCY (Ei) IN PURBA BARDHAMAN DISTRICT, WEST BENGAL, INDIA

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Abstract:

Agriculture continued to be remained as the most important mode of production system that symbolizes the food and economic security as a whole for any nations especially in India. India posses a vast agricultural tracts and nearly $\frac{1}{6}$th of the world population where agricultural plays a crucial role to control food production directly and to influence deeply over economic, political, social and cultural pursuits of the nation. Therefore, agricultural productivity and efficiency plays a very vital role to focus the growth of the Indian economy and societies as well.

This study analyses agricultural productivity and efficiency index and its blocks wise variation, changing trends in between 2004-05 and 2014-15 in Purba Bardhaman district, West Bengal. Secondary data have been collected from relevant sources which have calibrated properly and supporting field visit have done for verification . It is observed that most of the blocks have improved their agricultural efficiency (Ei), due to improved irrigation systems, technological breakthrough and rural infrastructural development and over all increasing demand of food grains. But some blocks are suffering from decreasing agricultural efficiency (Ei) rates due to adverse effect of urbanization, large scale land acquisition for non-agricultural purpose; productive crop-lands are converting into low to medium agro-blocks and high agricultural efficiency (Ei) blocks with reducing trends of yield rate. Here, Bhatia (1967) method has applied for calculating agricultural efficiency index (Ei). The study concentrates mainly on the changing agricultural efficiency rate of the district not purely on the causes of it.

Keyword: - Agriculture Efficiency, Productivity, Measure, Changing trends, Causes.

Introduction:

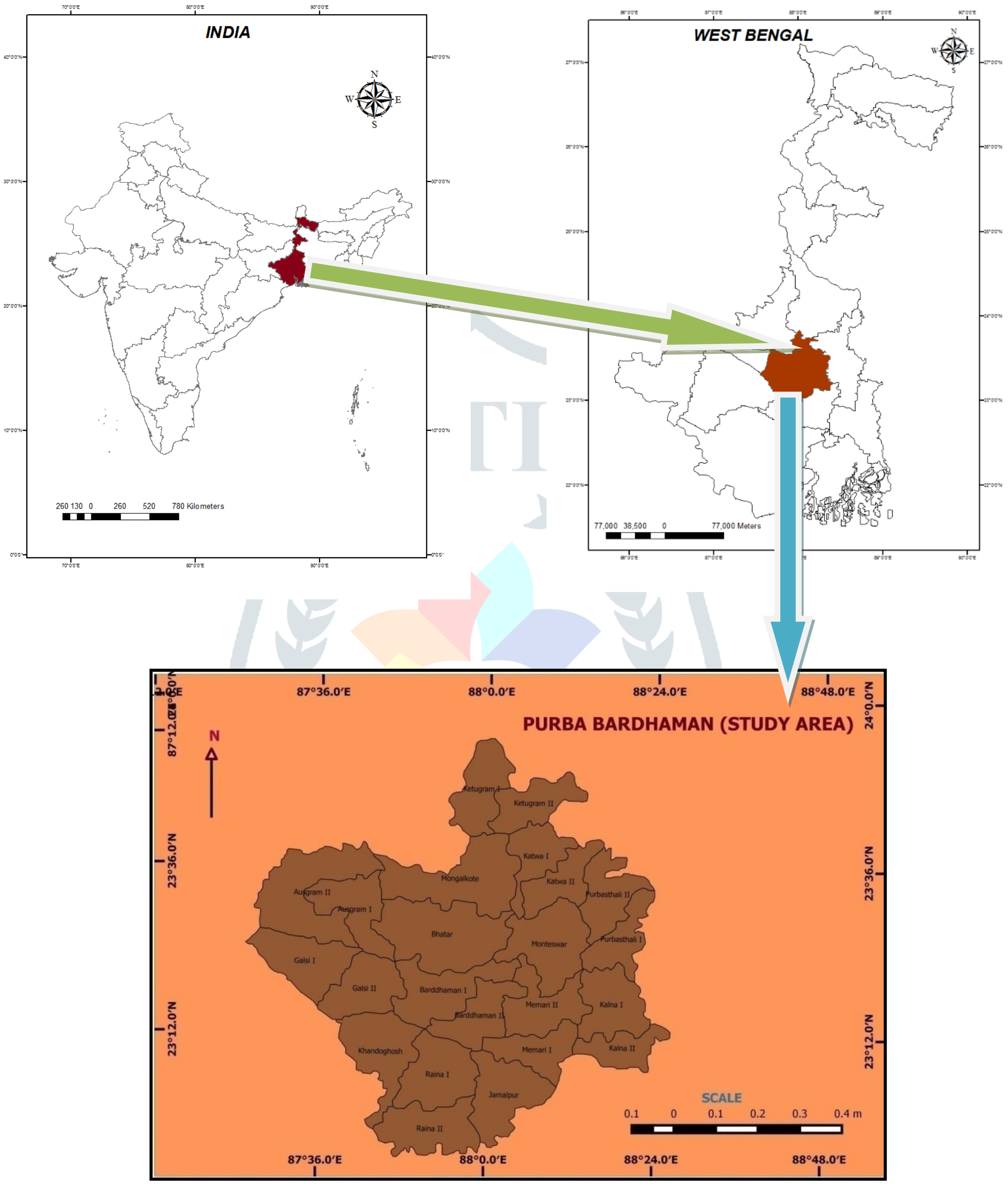
Agriculture is the backbone of Indian economy. Agriculture has been playing a vital role to change the socio-economic status of our society. Union minister for agriculture, Shri Radha Mohan Singh (2016) said that, “India has been transformed from a food deficient country to a food exporting country about the last six decades”. Actually agriculture cannot wait, it is a dynamic process. It is transformed towards diversification with the influence of different eco-climatic condition, various technological input and socio-economical infrastructure. Agricultural development can be measured by different ways. Agricultural efficiency is one of the most important agronomic techniques to understand over all development of agriculture. In geography agricultural efficiency is related to the productivity of per unit area of land (Dutta, 2012). That is a scientific technique to calculate per unit of output of various crops in overall performance (Bhatia, 1967).

The undivided Bardhaman district was the largest producer of rice in West Bengal which was designated as '***Rice bowl of the state***'. Now greater portion of this area is covered in Purba Bardhaman district. So, agricultural productivity and efficiency are very significant criterion to evaluate of agricultural development in PurbaBardhaman district. This paper is trying to measure and chalk out the variation of agricultural efficiency in blocks-level and agricultural efficiency has been calculated in between 2004-05 and 2014-15 cropping year. The study area covers diversified cropping pattern and variety of crop like paddy, wheat, potato, onion, pulses, mustard, til, spices etc. Several workers have done on the agricultural efficiency (Ei) in the international, national & regional level. Like, Kendall (1939) has calculated agricultural efficiency on the basis of output per unit of different crops and adopted ranking co-efficient. Stamp (1960) has explained international comparison of the agricultural efficiency of twenty countries on the basis of Kendall method. Shafi (1960) attempted to use previous method to measure agricultural efficiency in Uttar Pradesh. Bhatia (1967), highlights on measurement of agricultural efficiency of 47 district in Uttar Pradesh & identify the spatial variation, changes and trends of agricultural efficiency (Ei) in UP. Christensen (1975) has described concepts and measurement of agricultural productivity. B.E. Bravo, et al (1993), emphasized on to quantify the level of efficiency for a sample of peasant farmers in Eastern Paraguay. Others scholars likes Hemchandra (1993), Darku (2015), have highlighted on agricultural zoning, country wise comparative analysis in agricultural efficiency (Ei) and total factors of productivity. Chatterjee and Maitrya (1964), measured agricultural productivity on rice and wheat in W.B. Micro level studies were done by Siddiqui (1999), Chaskar (1987), Aktar (2015), Dutta (2012) who's emphasized on agricultural efficiency in different spatial scale. Many scholars from geography, economic and allied disciplines have developed techniques for measurement of agricultural efficiency (Ei) among them Ganguli (1938), Kendall (1939), Shafi (1960), Khusro (1964), Horing (1964) Sharma (1965), Bhatia (1967) and Jasbir singh (1979) have done remarkable contribution. But there is the lack of studies highlighting on changing trend of agricultural efficiency (Ei) in the Purba Bardhaman district.

Study area:

The study area covers Purba Bardhaman district in West Bengal. It has come into existence on 7^{th}April 2017, after bifurcation of erstwhile Burdwan district and its head quarters is Bardhaman. Purba Bardhaman is an agriculturally prosperous district of West Bengal. This part of the West Bengal is traditionally familiar as the agriculturally developed is known as the ***'granary of the West Bengal'***. The study area extended from 22˚15´08˝N to 23˚15´17˝N latitudes and 87˚13´17˝E to 88˚7´22˝E longitudes. It contain an area 5432.69 km^2(2097.57 sq miles) as ascertained by the bifurcation, and population (according to 2011 census) is 4835532, density of population is 890/km^2.The district lies mainly between the river Ajoy, the Bhagirathi and the Damodar .It bounded on the north by Birbhum district and Murshidabad district, on the east by Hooghly district, on the south by Hooghly-Bankura district and west by the Paschim Bardhaman district.

Purba Bardhaman district is a flat alluvial plain area that divided into four prominent topographical regions. On the northern part of the district, Ausgram - Ketugram plain lies along the Ajoy which joins the Bhagirathi. Bardhaman plain occupies the central area of the district with the Damodar River on the south and south–east, on the southern part is the Khandoghosh plain. The Bhagirathi flows along the eastern boundary of the district and the Bhagirathi basin lies on the eastern part of the district. The undulating lateritic topography of Paschim Bardhaman extended up Ausgram area of the district. (Map no.1)



Map no. 1 Location map of the study area (Purba Bardhaman district)

Objectives:

The present studies have been conducted to achieve following objectives
i.To examine the C.D block wise variation in agricultural efficiency of Purba Bardhaman district.
iiTo portray comparative analysis in agricultural efficiency in between 2004-05 and 2014-2015 of Purba Bardhaman district.

Data base and Methodology:

The present work is based on secondary data. The data has been collected from following sources and supporting field visit have been done for verification.

- Burdwan District Statistical Hand Book- 2005 & 2015.
- Census of India 2011.
- Data has been collected from office of the Deputy Director of Agriculture (Administration), Purba Bardhaman.
- Interview of farmers of some selected blocks in Purba Bardhaman district.

Methods of calculation of agricultural efficiency (Ei):

Agricultural efficiency (Ei) can be measured by four ways (Bhatia, 1967)
a. Output per unit area.
b. Output and input ratio.
c. Output per unit of labour applied.
d. Output in terms of grain equivalents per head of population.

In this study Bhatia's method has adopted to measure agricultural efficiency (Ei) following these steps:-

i. $IYa = \frac{Yc}{Yr} * 100$

Where, IYa is the yield index of crop a,
Yc is the acre- yield of crop a in the component unit.
Yr is the average acre- yield of crop a in the entire area.
ii. $Ei = \frac{Iya.Ca + IYb.Cb + IYc.Cc + \cdots + IYn.Cn}{Ca + Cb + Cc + \cdots + Cn}$

Where, Ei is the agricultural efficiency index.
IYa, IYb, IYc, IYn are yield indexes of various crops.
Ca, Cb, Cc, Cn represent the proportion of crop land to different crop.

Results:

Result has been discussed in two steps as follows:

1. Agricultural Efficiency (Ei) in 2004-05 dataset:

From Table no.1, it is observed that the average agricultural efficiency has been found about 100.53 and the highest value is recorded in Memari–II (116.10) and followed by Kalna-I (114.64), Bardhaman–II (113.23), Raina-I (111.05), Memari-I (109.93), Galsi-II(108.89), Bardhaman-I (107.92), Kalna-II (106.85), Galsi-I (103.96) and Mongolkote (102.18) etc C.D. blocks. Due to high level concentration of main crop (rice) with the help of DVC canal irrigation, application of modern agricultural technologies, alluvium fertile soil, fertilizer/pesticides/herbicides used road connectivity, electrification of mouzas, HYV seeds distribution and banking and bima facilities over all agricultural training and skill development.

Besides, rests of the C.D blocks are recorded less than average agricultural efficiency (Ei). The lowest agricultural efficiency (Ei) is found in Ketugram-I (87.30), that is followed by Katwa-II (88.78), Khandoghosh(90.15), Ketugram-II (90.43), Jamalpur (91.39), Purbasthali-II (92.30), Purbasthali-I (92.62), Aushgram-II (92.79), Katwa-I (94.71), Aushgram-I (96.32), Katwa-I (94.71), Monteswar (98.21), Bhatar (98.02). Due to lack of irrigation and weak application of agro-technologies and along with low infrastructural facilities, through agricultural efficiency (Ei) is not so good. (See Table no.1)

On the basis of agricultural efficiency Purba Bardhaman can be classified into five zones as below:

a. **Very low agricultural efficiency (Ei) zone (less than 92.50):** - In this category efficiency value is less than 92.51 which is found in only six blocks. These are Jamalpur, Khandoghosh, Ketugram-I & II, Katwa-II and Purbasthali-II etc C.D blocks.

b. **Low agricultural efficiency zone (92.51-97.50):**-It is observed only four C.D blocks which are Ausgram-I & II, Katwa-I, Purbasthali-I etc C.D blocks.

c. **Medium efficiency zone (97.51-102.50)**:- This scenario is found only three C.D blocks. These are Bhatar, Mongolkote and Monteswar.

d. **High level agricultural efficiency (Ei) zone (102.51-107.50)**:- Are seen in Galsi-I, Raina-II and Kalna-II etc C.D blocks.

e. **Very high agricultural efficiency zone (above 107.51)**:- It is observed only seven C.D blocks. These are Bardhaman-I&II, Galsi-II, Memari-I & II, Raina- I, Kalna-I. (See Table no.3 & Map no.2)

2. Agricultural efficiency (Ei) in 2014-15 dataset:

From Table no. 2; it is observed that the average agricultural efficiency (Ei) has been found about 99.94. The highest agricultural efficiency (Ei) value is recorded in Kalna-I (119.59) C.D block and followed by Ketugram-I (110.36), Galsi-II (107.59), Memari-II (106.76), Raina-II (106.16), Ausgram-I (104.29), Mongolkote (102.27), Aushgram II (101.25) and Katwa-II (100.25) etc C.D block.
Therefore, rest of the C.D blocks areas have recorded less than average agricultural efficiency (Ei). The lowest agricultural efficiency (Ei) is found in Galsi-I (85.37) and followed by Jamalpur (92.23), Katwa-I (94.71), Bardhaman-II (96.02), Raina-I (96.24), Purbasthali-II (96.37), Bhatar (96.22), Katwa-I (97.84), Ketugram-II (97.96), Memari-I (98.24), Monteswar (98.53),Khandoghosh (99.66). (See Table no.2)
On the basis of agricultural efficiency (Ei) in 2014-15 dataset, Purba Bardhaman district can be classified into five zones. These are as follows:

a. **Very low agricultural efficiency (Ei) zone (less than 92.50):** - This agricultural efficiency (Ei) value is found in Bardhaman-I, Galsi-I, Jamalpur etc C.D blocks.
b. **Low agricultural efficiency (Ei) zone (92.51-97.50)**:- It is observed in Bardhaman-II, Bhatar, Purbasthali-II and Raina-I etc C.D block.

c. **Medium agricultural efficiency (Ei) zone (97.51-102.51)**:-This scenario is seen in Ausgram-II, Memari-I, Khandoghosh, Mongolkote, Ketugram-II, Katwa-I&II, Purbasthali-I, Kalna-II and Monteswar etc C.D blocks.

d. **High level of agricultural efficiency (Ei) zone (102.51-107.50)**:- It is found in Ausgram-I, Memari-II and Raina-II C.D blocks in Purba Bardhaman district.

e. **Very high level of agricultural efficiency (Ei) zone (above 107.51)**:- It is observed in Galsi-I, Ketugram-I, Kalna-II etc C.D blocks. (See Table no.3 & Map no. 3)

Discussion:

From this analysis it can be said that overall agricultural efficiency have increased. Although, in very high agricultural efficiency (Ei) category number of C.D blocks have decreased in 2014-15 in respect of 2004-05 but the C.D blocks showing medium agricultural efficiency (Ei) has increased remarkably, i.e., from 03 to11 and agricultural efficiency (Ei) of very low category has improved i. e, from 06 to 03 in 2014-15.

i. ***C.D blocks with improved agricultural efficiency (Ei) are as follows:***
14 C.D blocks have been improved their agricultural efficiency (Ei) value namely, Ausgram-I (+7.79), Ketugram-I (+23.26), Katwa-II (11.47), Ausgram-II (8.46), Ketugram-II (7.53), Khandoghosh (9.51), Purbasthali-I (5.68), Kalna-I

(4.95), Purbasthali-II (4.07), Katwa-I (3.13), Raina-II (1.85), Jamalpur (0.84), Monteswar(0.11), Mongolkote (0.09). (See Fig no.1& Table no.4)

ii. C.D blocks with unchanged degree of agricultural efficiency (Ei) as follows*:* - In between 2004-05 and 2014-15 cropping year only five C.D blocks has intact position on the basis on degree of efficiency. Such as Galsi-II (very high), Kalna-I (very high), Raina-II (high), Monteswar (medium), Jamalpur (very low). (See Table no.4)

iii. C.D blocks having less agricultural efficiency (Ei) are as follows*:* - Nine C.D blocks have remained in these categories. Like Bardhaman -I (-19.51), Galsi-I (-18.59), Bardhaman-II (-16.61), Raina-I (-14.81), Memari–I (-11.74), Memari-II (-9.34), Kalna-II (-8.32), Bhatar (-1.85), Galsi-II (-1.3). (See Table no.4& Fig. no.2)

Undivided Bardhaman district was termed as the 'Rice bowl'/'Granary of Bengal'. Although, it has sometimes reduced total production due to some socio-economic and agro-climatic causes which have described previously. From the above discussion it can be concluded that there is a C.D blocks wise regional imbalances in agricultural efficiency. The high agricultural efficiency (Ei) indicates multi-crop agriculture, crop rotation as well as crop diversified area.

From, the forgoing discussion and comparative study of 23 blocks of Purba Bardhaman district, it is clear that nine (09) C.D blocks are lagging in terms of efficiency index in between 2004-05 and 2014-15 cropping year. Mainly four C.D blocks have recorded decreased agricultural efficiency (Ei) rate. There are Bardhaman-I, Bardhaman-II, Galsi-I and Raina-I due to very high urbanization rate and shifting focus of rural economy from direct agriculture to secondary and other economic sectors (mainly agro-based industries). (See Table no.3 &4)

Although, five C.D blocks showing intact position, their rate of change of agricultural efficiency (Ei) is negligible (1.88 to 0.11). These are Bhatar (1.85), Galsi-II (1.3), Jamalpur (0.84), Mongolkote (0.09), and Monteswar (0.11). All the C.D blocks except Jamalpur that always remains medium to high agricultural efficiency (Ei) category without any major changes. Due to their infrastructural development and DVC canal irrigation system helped to retain their previous position. (See Table no.3 & 4)

Besides, 14 C.D blocks have improved their position. Mainly six C.D blocks remarkable change (7.53to 23.06) have been observed. These are Ausgram-I (7.97), Ketugram-II (7.53), Ausgram-II (8.46), Khandoghosh (9.51), Katwa-II (11.47) and Ketugram-I (23.06). Comparatively Ketugram-I have improved at the highest rate of agricultural efficiency (Ei) while Bardhaman-I have shown the remarkable decrease in agricultural efficiency (Ei) in respect to other C.D blocks. (See Table no.3 & 4)

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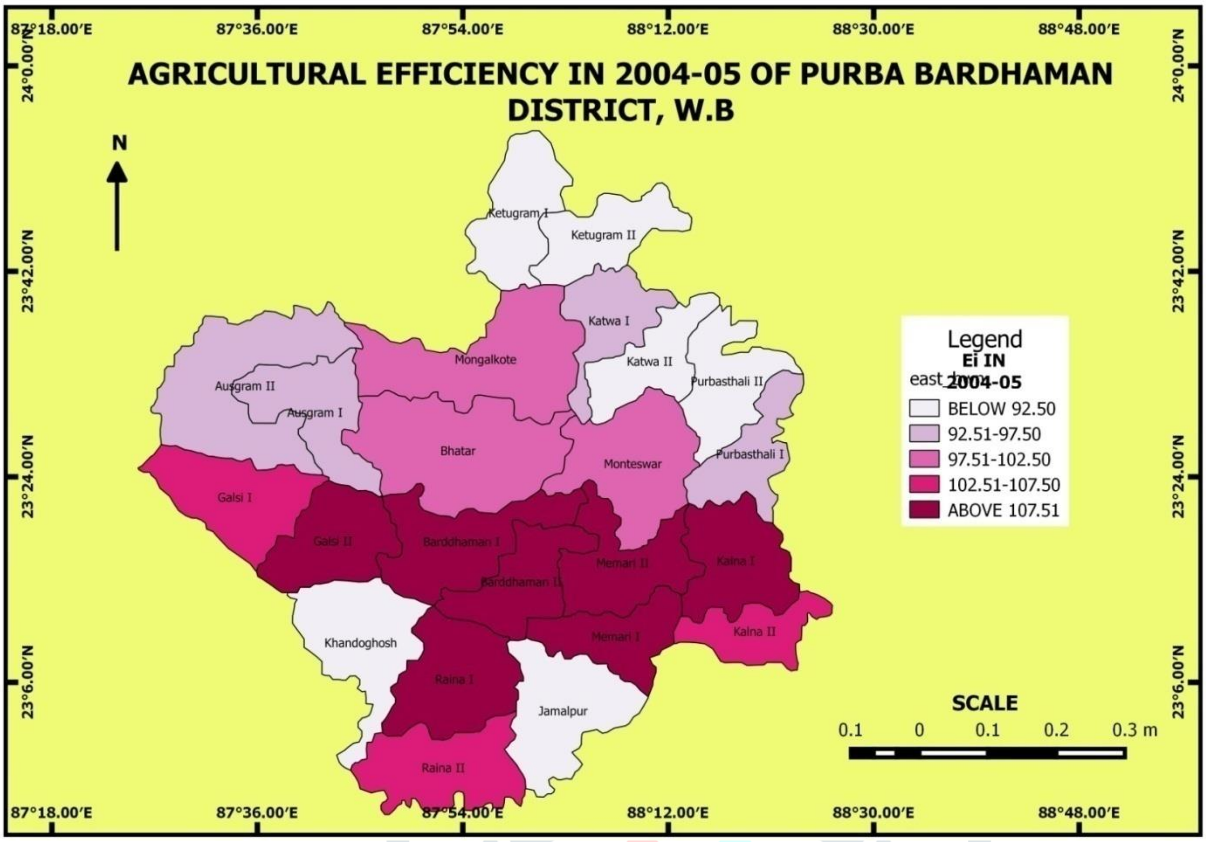
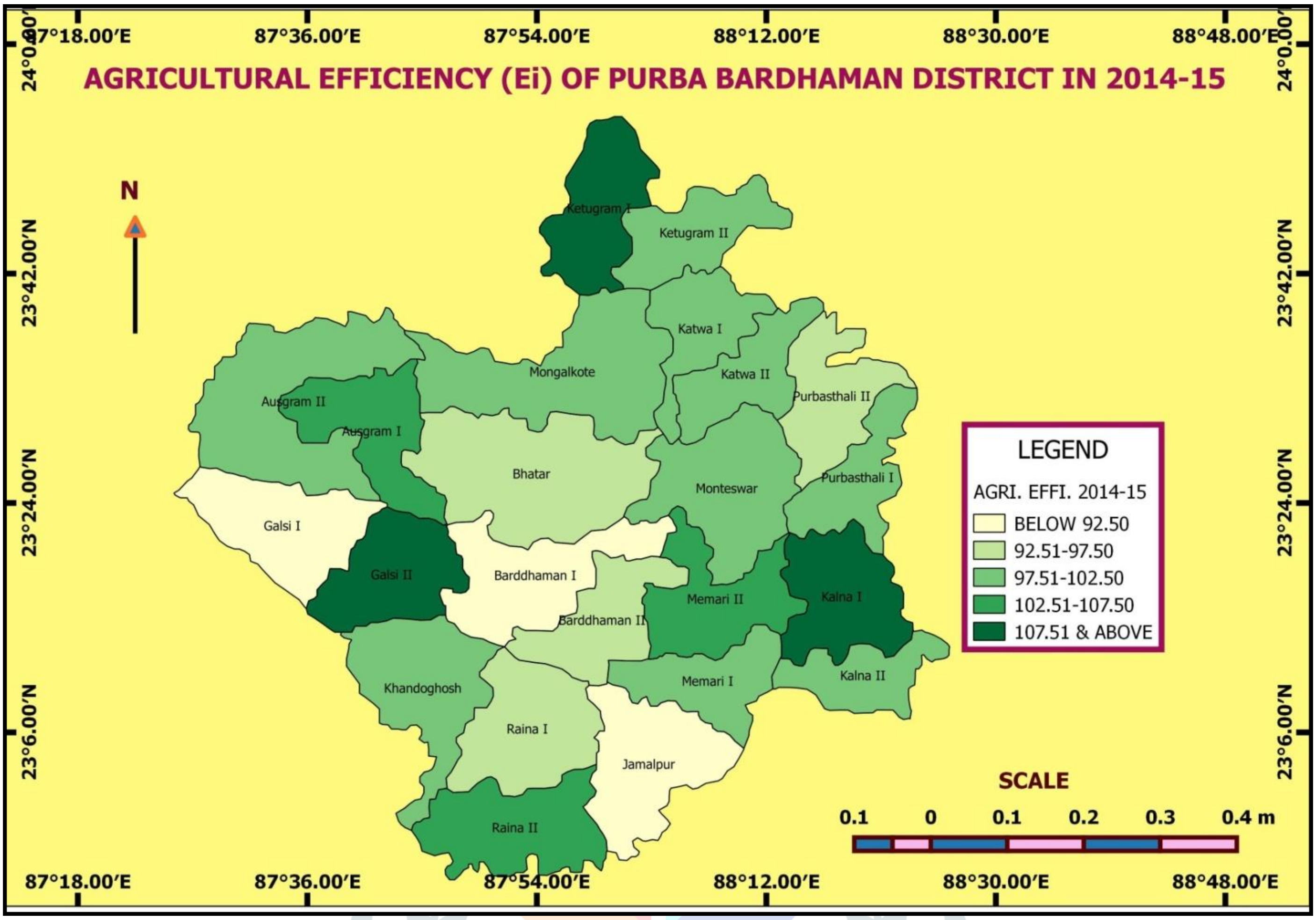


Map.no 2 Choropleth map showing Agricultural Efficiency in 2004-05



Map no 3 choropleth map showing agricultural efficiency in between 2014-15

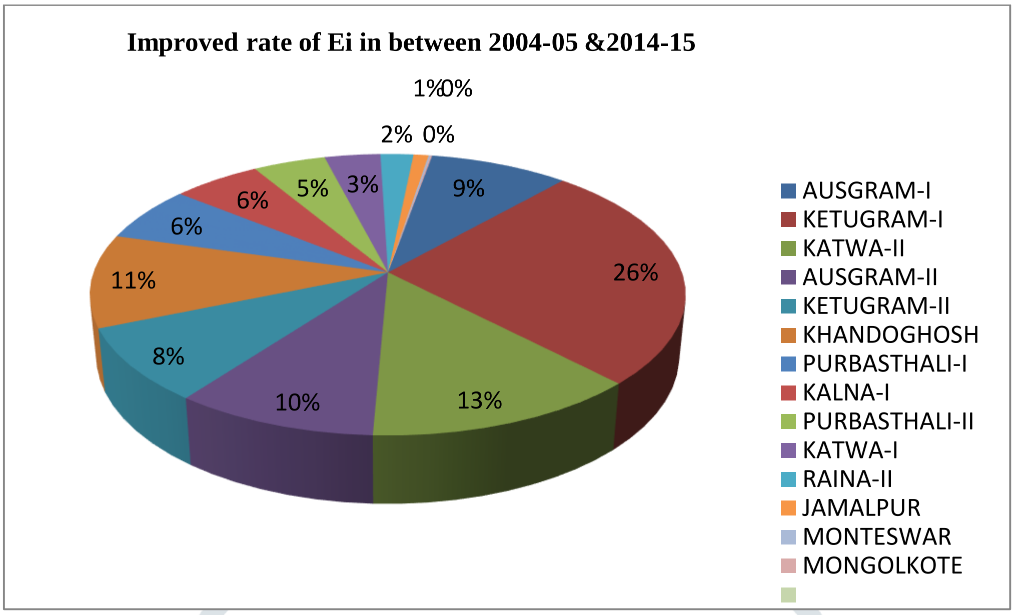


Fig. no 1 Pie chart improved rate of Ei in between 2004-05 & 2014-15

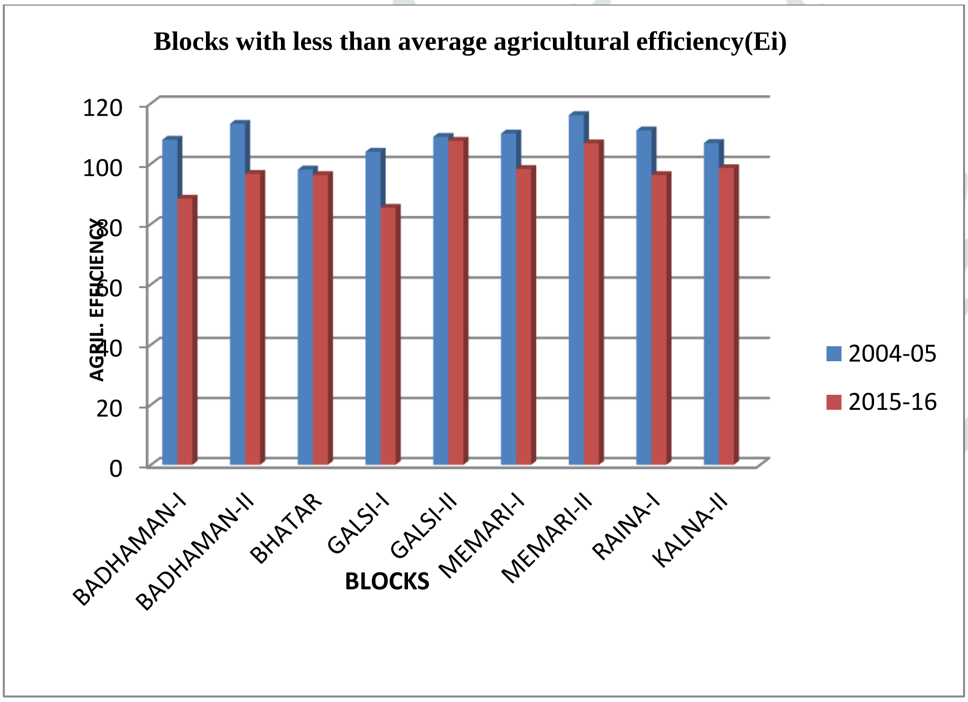


Fig. no 2 Bar diagram showing less than average Ei

Table no.1 Agricultural efficiency (Ei) in 2004-05 of Purba Bardhaman district

Sl no	Name of block	Paddy			Wheat			Jute			Pulses			Mustard			Potato			Til			Total area	Ei
		Area	yield	Iya	area	yield	Iyb	area	yield	Iyc	area	yield	Iyd	area	yield	Iye	area	yield	Iyf	area	yield	Iyg		
1	Bardhaman-I	28475	3199	107.4	200	3000	136.4	Nil	Nil	Nil	Nil	Nil	Nil	570	930	126.42	60	25620	106.9	30	688	100.62	29335	107.92
2	Bardhaman-II	22090	3356	112.6	5	2111	95.99	Nil	Nil	Nil	Nil	Nil	Nil	1350	930	126.42	1340	26366	110	5	463	67.85	24790	113.23
3	Ausgram-I	18000	2800	93.97	230	2572	117	5	1790	97.99	200	700	86.52	1330	940	127.78	300	22139	92.35	130	602	88.21	20195	96.32
4	Ausgram-II	20605	2770	92.96	520	1973	89.72	5	1540	84.31	5	302	37.33	1040	690	93.79	510	22095	92.86	130	486	72.22	22815	92.79
5	Bhatar	57410	2957	99.24	50	2141	97.35	Nil	Nil	Nil	10	339	41.9	2980	590	80.2	340	22066	92.05	150	166	24.32	60940	98.07
6	Galsi-I	27995	3082	103.4	100	1856	84.4	Nil	Nil	Nil	10	794	98.14	1980	825	112.15	160	25376	106.7	5	824	120.74	30250	103.96
7	Galsi-II	31420	3248	109	5	2669	121.4	Nil	Nil	Nil	5	869	107.4	1440	809	109.97	190	19505	81.36	240	745	109.17	33300	108.89
8	Memari-I	17180	3072	103.1	20	2628	119.5	Nil	Nil	Nil	5	1396	172.6	680	1102	149.8	5990	29823	124.4	350	836	122.5	24225	109.98
9	Memari-II	22770	3341	112.1	5	2790	126.9	Nil	Nil	Nil	Nil	Nil	Nil	880	1166	158.5	4880	30112	125.6	270	964	141.26	28805	116.1
10	Jamalpur	24990	2749	92.26	20	2074	94.31	38	1950	106.8	Nil	Nil	Nil	6520	655	89.04	5930	20094	83.82	2870	714	104.63	40368	91.39
11	Raina-I	23990	3184	106.9	30	2747	124.9	5	2090	114.4	5	1361	168.2	1550	1029	139.88	870	26061	108.7	1790	977	143.16	28240	111.05
12	Raina-II	24385	3006	100.9	50	2550	116	5	2000	109.5	5	1067	131.9	690	1193	162.17	4500	25033	104.4	710	1119	163.97	30345	104.31
13	Khandoghosh	28159	2688	90.21	50	2130	96.85	70	2180	119.3	5	1084	134	2130	696	94.61	1090	18548	77.37	80	620	90.85	31584	90.15
14	Mongolkote	39630	3031	101.7	60	1642	74.66	5	1980	108.4	5	529	65.38	2110	490	66.61	5730	28488	118.8	130	683	100.08	47670	102.18
15	Ketugram-I	19790	2742	92.02	110	2449	111.4	5	1600	87.59	130	597	73.79	2050	308	41.87	60	19080	79.59	30	458	67.11	22175	87.3
16	Ketugram-II	19260	2884	96.79	530	1671	75.98	180	1700	93.07	160	467	57.72	2470	332	45.13	80	22003	91.78	150	699	102.43	22830	90.43
17	KatwaI	19780	2858	99.91	10	1683	76.53	70	1300	71.17	15	397	49.07	1510	304	41.32	150	23909	99.73	360	257	37.66	21895	94.71
18	Katwa-II	17995	2763	92.72	10	1712	77.85	1200	1480	81.02	15	427	52.78	1210	300	40.78	120	20856	87	80	376	55.1	20630	88.78
19	Purbasthali-I	14480	2820	94.64	480	2294	104.3	1690	1690	92.52	55	918	113.5	1550	524	71.23	330	20039	83.59	5	949	139.06	18590	92.63
20	Purbasthali-II	13230	2643	88.7	700	2047	93.08	6390	1700	93.07	910	1208	149.3	6960	674	91.62	610	20481	85.43	200	607	88.95	29000	92.3
21	Kalna-I	18660	3339	112.1	200	2105	95.72	1510	2280	124.8	5	1394	172.3	1650	715	97.19	4800	30714	128.1	20	916	134.23	26845	114.64
22	Kalna-II	21800	3083	103.5	5	2084	94.76	970	2120	116.1	Nil	Nil	Nil	250	927	126.01	2910	30556	127.5	5	1023	149.91	25940	106.85
23	Monteswar	45640	2920	98	270	1653	75.16	Nil	Nil	Nil	5	714	88.25	2370	791	107.52	1130	22408	93.47	20	524	76.78	49436	98.21

Sources:- i. Burdwan district statistical hand book-2005 **Compiled by authors**

Ii. Deputy Director of Agriculture, Purba Bardhaman..

Table no. 2 Agricultural efficiency (Ei) in 2014-15 of Purba Bardhaman district

Sl no	Name of block	Paddy			Wheat			Jute			Pulses			Mustard			Til			Potato			Total area	Ei
		Area	Yield	Iya	Area	Yield	Iyb	Area	Yield	Iyc	Area	Yield	Iyd	Area	Yield	Iye	Area	Yield	Iyf	Area	Yield	Iyg		
1	Bardhaman-I	12374	2853	86.14	2	2567	91.78	Nil	Nil	Nil	47	1172	116.62	798	1175	118.21	140	1028	133	3665	30476	87.53	17026	88.41
2	Bardhaman-II	23132	3215	97.07	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	193	1262	126.96	290	558	72	1060	30641	88.01	24675	96.62
3	Ausgram-I	18202	3482	105.1	187	2796	99.96	Nil	Nil	Nil	545	1172	116.62	1092	1046	105.23	518	174	22.6	801	45208	129.8	21345	104.29
4	Ausgram-II	19646	3394	102.5	170	2107	75.33	Nil	Nil	Nil	29	1120	111.44	292	1165	117.2	439	323	41.7	1329	35606	102.3	21905	101.25
5	Bhatar	41889	3174	95.83	13	2207	78.91	Nil	Nil	Nil	3	1215	120.9	1096	1157	116.4	221	595	76.7	1028	33024	94.85	44250	96.22
6	Galsi-I	26894	2800	84.54	156	2286	81.73	Nil	Nil	Nil	Nil	Nil	Nil	1182	1024	103.02	1	860	111	640	30842	88.58	28873	85.37
7	Galsi-II	23088	3570	107.8	127	3276	117.1	Nil	Nil	Nil	2	1084	107.86	753	867	87.22	355	969	125	4822	37706	108.3	29147	107.59
8	Memari-I	17186	3332	100.6	199	2883	103.1	Nil	Nil	Nil	1	875	87.06	557	1061	106.74	1207	581	74.9	6263	33195	95.34	25413	98.24
9	Memari-II	22260	3659	110.5	Nil	Nil	Nil	Nil	Nil	Nil	3	1070	106.47	595	776	78.07	640	409	52.8	4905	34952	100.4	28403	106.76
10	Jamalpur	21024	3340	100.9	Nil	Nil	Nil	2	31	138.2	1	1067	106.17	804	649	65.29	5353	1068	138	14997	22751	65.34	42181	92.23
11	Raina-I	22286	3149	95.08	212	2893	103.4	Nil	Nil	Nil	16	1257	125.07	300	1092	109.86	448	1008	137	3371	33985	97.61	26633	96.24
12	Raina-II	26304	3201	96.65	1	2892	103.4	Nil	Nil	Nil	21	1070	106.47	324	985	99.09	672	1000	129	2366	34158	98.11	29688	106.16
13	Khandoghosh	28733	3317	100.2	290	2892	103.4	Nil	Nil	Nil	30	1224	121.79	2969	974	97.99	823	872	112	2072	31104	89.33	34917	99.66
14	Mongolkote	41061	3426	103.4	33	1656	59.21	11	20	89.13	18	821	80.8	869	1045	105.13	837	522	67.3	1416	35814	102.9	44245	102.27
15	Ketugram-I	20744	3665	110.7	17	2723	97.35	Nil	Nil	Nil	6	959	95.42	828	1021	102.72	300	907	117	106	33561	96.39	22001	110.36
16	Ketugram-II	15820	3272	98.79	88	3111	111.2	596	17	60.78	220	950	94.53	2106	1063	106.94	324	495	63.9	279	35110	100.8	19433	97.96
17	Katwa-I	20421	3227	97.43	Nil	Nil	Nil	Nil	Nil	Nil	27	216	121	945	1026	103.22	342	404	52.1	1024	40271	115.7	22759	97.84
18	Katwa-II	15813	3366	101.6	21	2723	97.35	763	22	98.04	66	623	61.99	1118	923	92.86	265	505	65.1	Nil	Nil	Nil	18046	100.25
19	Purbasthali-I	17757	3200	96.62	770	3297	117.9	1897	24	107	22	920	91.54	2263	923	92.86	195	1168	151	368	34744	99.79	23272	98.3
20	Purbasthali-II	10369	3326	100.4	80	3363	120.2	5549	19	84.67	1270	769	76.52	1479	1025	103.12	833	1061	137	761	34744	99.74	20341	96.37
21	Kalna-I	18636	3700	111.7	2	3339	119.4	842	21	93.58	2	820	81.59	65	711	71.53	2187	1392	180	4313	44928	129	26047	119.59
22	Kalna-II	17486	3279	99	Nil	Nil	Nil	982	27	120.3	Nil	Nil	Nil	74	908	91.35	413	1178	152	3139	28629	82.23	22094	98.53
23	Monteswar	45958	3227	97.43	35	3339	119.4	134	21	93.58	23	700	69.65	1293	975	98.09	248	755	97.4	1065	44532	127.9	48756	98.1

Sources:- i. Burdwan district statistical hand book in 2015 **Compiled by authors**

ii. Deputy Director of Agriculture, Purba Bardhaman.

Table no .3 Degree of agricultural efficiency (Ei) of Purba Bardhaman district in between 2004-05 and 2014-15

Degree of efficiency	Index value of Ei	No of blocks in 2004-05		No of blocks in 2014-15	
		Sl. no of the block	Total block	Sl. no of the block	Total block
Very low	92.50 & below	10, 13, 15, 16, 18, 20	6	1, 6, 10	3
Low	92.51-97.50	3, 4, 17, 19	4	2, 5, 11, 20	4
Medium	97.51-102.50	5, 14, 23	3	4, 8, 13, 14, 16, 17, 18, 19, 22, 23	10
High	102.51-107.50	6, 12, 22	3	3, 9, 12	3
Very high	107.50 & above	1, 2, 7, 8, 9, 11, 21	7	7, 15 21	3

Compiled by authors

Table no.4 **Comparative analysis of agricultural efficiency in between 2004-05 &2014-15**

Sl no	Name of the block	Changing nature of Ei in between 2004-05&2014-15	Amount of Ei changed	Degree of Ei		Tentative causes of that change
				2004-05	2014-15	
1	Bardhaman-I	Lagging	-19.51	V.H	V.L	Adverse effect of urbanization, acquisition of land in non-agricultural purpose
2	Bardhaman-II	Lagging	-16.61	V.H	L	Adverse effect of urbanization and acquisition of land in non-agricultural purpose
3	Ausgram-I	Improved	7.97	L	H	Improvement of agricultural infrastructure, irrigation & technologies
4	Ausgram-II	Improved	8.46	L	M	Improvement of agricultural infrastructure, irrigation & technologies
5	Bhatar	Lagging	-1.85	M	L	High productive crop converting into low/medium crops & infrastructural deficiency
6	Galsi-I	Lagging	-18.59	H	V.L	High productive crop converting into low/medium crops, & infrastructural deficiency
7	Galsi-II	Lagging	-1.3	V.H	V.H	High productive crop converting into low/medium crops & infrastructural deficiency
8	Memari-I	Lagging	-11.74	V.H	M	High productive crop converting into low/medium crops, deficiency of infrastructural
9	Memari-II	Lagging	-9.34	V.H	H	High productive crop converting into low/medium crops, infrastructural deficiency
10	Jamalpur	Improved	0.84	V.L	V.L	Improvement of agricultural infrastructure & technologies
11	Raina-I	Lagging	-14.81	V.H	L	Acquisition of land in non-agricultural purpose & infrastructural deficiency.
12	Raina-II	Improved	1.85	H	H	Improvement of agricultural infrastructure & technologies
13	Khandoghosh	Improved	9.51	V.L	M	Improvement of agricultural infrastructure, irrigation & technologies
14	Mongolkote	Improved	0.09	M	M	Improvement of agricultural infrastructure, irrigation & technologies
15	Ketugram-I	Improved	23.06	V.L	V.H	Improvement of agricultural infrastructure, irrigation & technologies
16	Ketugram-II	Improved	7.53	V.L	M	Improvement of agricultural infrastructure, irrigation & technologies
17	Katwa-I	Improved	3.13	L	M	Improvement of agricultural infrastructure, irrigation & technologies
18	Katwa-II	Improved	11.47	V.L	M	Improvement of agricultural infrastructure, irrigation & technologies
19	Purbasthali-I	Improved	5.68	L	M	Improvement of agricultural infrastructure, irrigation & technologies
20	Purbasthali-II	Improved	4.07	V.L	M	Improvement of agricultural infrastructure, irrigation & technologies
21	Kalna-I	Improved	4.95	V.H	V.H	Improvement of agricultural infrastructure, irrigation & technologies
22	Kalna-II	Lagging	-8.32	H	M	High productive crop converting into low/medium crops & infrastructural deficiency
23	Monteswar	Improved	0.11	M	M	Improvement of agricultural infrastructure & technologies

V.H= Very High, H=High, M=Medium, L=Low, V .L=Very Low **Compiled by authors**