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Crop Profile Of The West Bengal During 2000-2015 -A Ray Of Hope!

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Abstract

Agriculture along its allied sectors, is the largest livelihood provider in West Bengal, more so in the vast rural areas. Census 2011 data reveals that majority of total rural workers are cultivators or agricultural laborers. Therefore, our State's development depends significantly upon the development of agriculture. Agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. After a long period of stagnation, agricultural growth in West Bengal was initiated in the early 1980s. There has been a growing concern in recent years about the trend of agricultural output in most of the agricultural states in post-reform period since 1990. The conducive effect of implementation of New Agricultural policy enhanced the productivity in the 1980s which have been petered out in the phase of neo-liberal reforms in India. The improper use of chemical fertilizer and pesticides in technology-intensive production of rice and wheat largely account for environmental degradation and erosion of soil fertility. Under this backdrop, this article attempts to uphold the trend of major food grain and non-food grain crop production of rural West Bengal of its own as well as across the administrative division in order to understand the agricultural development in West Bengal, if any during 200-2001 to 2014-15. The study is descriptive in nature based on secondary data published in Statistical Abstract 2015. For that research purpose, Garret Ranking tool has been used.

Index terms : Cropping intensity, Crop pattern, yield rate, administrative division, Garret ranking Method.

Introduction

Agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. West Bengal, a State in the eastern part of India, is no exception to that. Lying between 21° 25' 24" and 27° 13' 15" north latitudes and 85° 48' 20" and 89° 53' 04" east longitudes, the State of West Bengal shares its borders with three different nations – Bangladesh, Bhutan and Nepal and four other Indian States, viz. Orissa, Jharkhand, Assam and Sikkim (Govt. of West Bengal, 2016). The climate of the State is tropical and humid except in the northern hilly region which is close to the Himalayans. The annual rainfall in the State varies considerably among the districts ranging between 1150 mm to 3800 mm approximately. The temperature in the mainland normally varies between 24°C to 40°C during summer and 7°C to 26°C during the winter. According to the 2011 census, the total population of the State is 9.13 crore, the fourth most populated State in India and ninth most populated State in the World. West Bengal accounts

for 7.54 percent of the country's total population, while it accounts for only 2.7 per cent of the country's total geographical area. Around 68% of the total populations live in rural areas. Of the total rural workers, 20.56 and 40.8 percents are cultivators and agricultural labourers, respectively.

West Bengal is basically an agrarian economy particularly in food grain production, donated significantly to overall economic growth of the state since the early 1980s. Agricultural growth has a significant impact on poverty reduction (Ravallion and Datt, 1996). After a long period of stagnation, agricultural growth in West Bengal was initiated in the early 1980s with the expansion of cultivation by using high yielding seeds (HYVs) and chemicals-based technology within the frame of more equitable distribution of land through agrarian reforms (State development Report, 2010). Implementation of Operation Barga as an initiative under tenancy reform after the late 1970s, have secured the right to register tenancies and also the legal entitlement to higher crop shares in favour of the tenants through legislation. There has been a growing concern in recent years about the trend of agricultural output in most of the agricultural states in post-reform period since 1990. The conducive effect of implementation of New Agricultural policy enhanced the productivity in the 1980s which have been petered out in the phase of neo-liberal reforms in India.

Adoption of HYVs technology with considering the soil and moisture conditions, inadequate rural infrastructure, weak network of agricultural marketing, sharply skewed land distribution and tenancy laws against the tenants in most part of the country are the major impediments to agricultural growth in India (GoI, 2001). The improper use of chemical fertilizer and pesticides in technology-intensive production of rice and wheat largely account for environmental degradation and erosion of soil fertility.

Under this backdrop, this article attempts to uphold the trend of major food grain and non-food grain crop production of rural West Bengal of its own as well as across the administrative division in order to understand the agricultural development in West Bengal, if any during 200-2001 to 2014-15. Various indicator of agricultural development like crop intensity, proportion of uses of arable land under certain major crops, yield rate, etc during this tenure of 15 years will be examined. The analysis has been conducted for the major crops covering rice, wheat and total pulses in food grains, and oilseeds, jute and potato in non-food grains.

The discussion is focused mainly on the period covering 2000-01 to 2014-15. The information on area, production and yield for different crops has been compiled from Statistical Abstracts of West Bengal for different years published by the Bureau of Applied Economics and Statistics, Government of West Bengal.

We have classified the paper into different section. Section 1 discusses changes in cropping pattern in agriculture of the West Bengal and across its districts. Growth performance of agriculture is analysed in terms of production, yield and area for important crops as produced in West Bengal during 2001-15. This section is followed by section 2 that speaks about the objective of the study and section 3 that on methodology. Section 4 will describe the findings and section 5 concluded the section with recommendations.

Section 1: Crop profile of the district of West Bengal.

Cropping intensity: Cropping intensity denotes to the number of crops harvested from a given piece of land in a year. It is an important index of agricultural productivity. Higher cropping intensity means that a higher proportion of the net sown area is being cropped more than once during one agricultural year. This also implies higher productivity as well as efficient uses of per unit of arable land during one agricultural year. Several factors like rainfall, climate, temperature, soil type, uses of appropriate technology, and farmers' socioeconomic conditions are significant determinants of cropping patterns.

Cropped area changes through a change in net area sown and/or intensity of cropping. Changes in cropping intensity are brought about through multiple cropping supported by irrigation. The introduction of multiple cropping of non-traditional varieties of seeds with proper irrigation led to the increase in gross cropped area. During 2001-2015 cropping intensity has increased by more than 10.12 per cent in West Bengal. Cropping intensity in West Bengal increased substantially during the 2000s and thereafter, contributing to the increase in gross cropped area in the state. This rise in cropping intensity is mainly occurred in Hooghly district

followed by Birbhum and Murshidabad. In the following Table 1, 2, 3, 4, 5, 6 and 7 we will represent the trend of yield rate of different food and non-food crops across the district during 2001-2015.

Table1: Trend of average yield rate of cereals during 2001-2015

District	Proportion of the area under cereals in 200-01	Proportion of the area under cereals in 2014-15	% change in using area under cereals prod	Yield rate of cereals in 2000-01(In Kgs. per hectare)	Yield rate of cereals in 2014-15(In Kgs. per hectare)	% change in total cereals
West Bengal*	0.65	0.62	-4.19	2297	2909	26.64
Burdwan	0.75	0.75	0.65	2694	3248	20.56
Birbhum	0.75	0.75	-0.04	2532	3245	28.16
Bankura	0.81	0.73	-9.95	2504	2762	10.30
Purba Midnapore	0.37	0.79	115.27	2348	2666	13.54
Paschim Midnapore	0.41	0.73	75.59	2314	2764	19.45
Howrah	0.69	0.70	1.76	1381	2729	97.61
Hooghly	0.51	0.51	0.42	2526	3114	23.28
North 24-Parganas	0.56	0.49	-13.15	2347	3017	28.55
South 24-Parganas	0.80	0.72	-9.98	2034	2589	27.29
Nadia	0.40	0.41	1.00	2754	3239	17.61
Murshidabad	0.48	0.51	5.81	2553	3184	24.72
Uttar Dinajpur	0.64	0.64	-0.64	2225	3228	45.08
Dakshin Dinajpur	0.74	0.64	-13.79	2229	2904	30.28
Malda	0.60	0.59	-2.87	2374	3278	38.08
Jalpaiguri	0.52	0.47	-8.92	1507	2436	61.65
Darjeeling	0.33	0.31	-5.53	1826	2007	9.91
Cooch Behar	0.62	0.58	-7.16	1786	2791	56.27
Purulia	0.86	0.82	-4.69	1817	2145	18.05

Source: Statistical Abstract(2015)

In the table 1, we have seen that major percentage of cropped area were using for cereals production. In West Bengal, cereals production accounted for 65 per cent of the gross cropped area in 2000-2001 but its share declined to 62 per cent in 2014-15. The higher share of cereals in total cultivated area in the state was largely accounted for by the large share of marginal farmers in operational holdings. The marginal farmers normally allocate major part of their holdings for the production of food crops to meet their own consumption needs. We have seen that both Purba and Paschim Medinipore, Bankura, Birbhum, Burdwan and Purulia were utilizing major share of gross cropped area in the production of cereals. However, though Purba and Paschim Medinipore allotted more cropped area for cereals production, Burdwan, Birbhum were using same proportion of land under cereals production as before. North and South 24 Parganas, Dakshin Dinajpur, Bankura, Darjeeling, Jalpaigudi and Cooch Behar were reducing the share. Surprisingly, district like Howrah, North and south Dinajpur, Jalpaigudi and Cooch Behar were showing an sharp increase in the yield rate of cereals which indicates efficient uses of land for production of cereals. All the northern district were contributing a large share in the production of cereals. However overall decrease in share of land in cereal production reflect improved economic condition of marginal farmers.

Rice is the most dominating food crop covering 57% per cent of the cropped area of the state in 2014-15. Its share was falling during 2000-2015. Here we also found the Purba and Paschim Medinipur which were allocating large share of gross cropped area in the production of rice were producing less significant in volume, declined over time as well compared to districts in North West Bengal which utilized less land but produced large volume during this period.

Table2: Trend of average yield rate of cereals during 2001-2015

	Proportion of the area under rice in 200-01	Proportion of the area under rice in 2014-15	Yield rate of rice in 2000-01(In Kgs. per hectare)	Yield rate of rice in 2014-15(In Kgs. per hectare)	Growth rate in rice
West Bengal*	0.60	0.57	2287	2882	26.02
Burdwan	0.74	0.75	2687	3251	20.99
Birbhum	0.69	0.69	2503	3280	31.04
Bankura	0.79	0.72	2511	2764	10.08
Purba Midnapore	0.37	0.79	2348	2866	22.06
Paschim Midnapore	0.40	0.72	2317	2770	19.55
Howrah	0.69	0.70	1979	2730	37.95
Hooghly	0.50	0.51	2527	3116	23.31
North 24-Parganas	0.53	0.47	2340	3018	28.97
South 24-Parganas	0.79	0.71	2036	2586	27.01
Nadia	0.32	0.34	2836	3215	13.36
Murshidabad	0.30	0.39	2446	3240	32.46
Uttar Dinajpur	0.57	0.44	2220	2746	23.69
Dakshin Dinajpur	0.70	0.59	2218	2874	29.58
Malda	0.48	0.45	2360	3465	46.82
Jalpaiguri	0.47	0.41	1473	2437	65.44
Darjeeling	0.18	0.17	1549	2105	35.89
Cooch Behar	0.57	0.52	1772	2596	46.50
Purulia	0.81	0.80	1812	2143	18.27

Source: Statistical Abstract(2015)

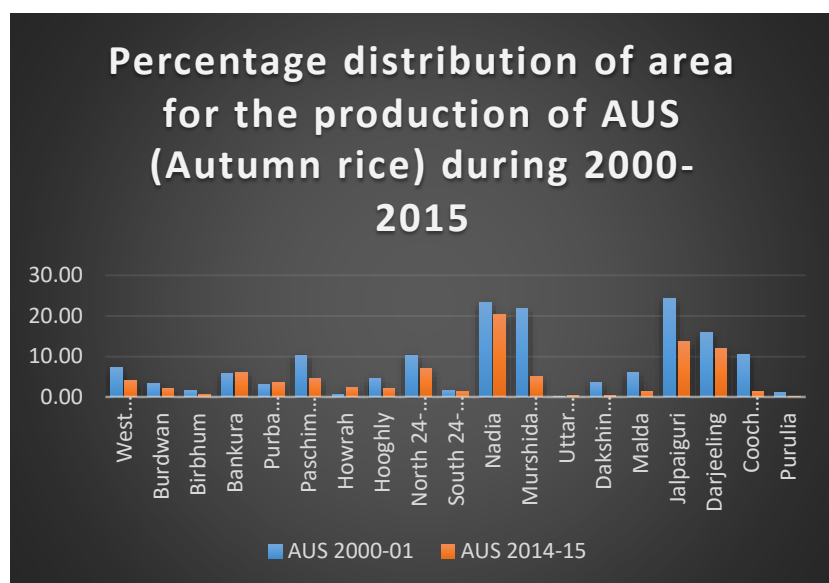


figure1

From the above figure it is clear that Majority of the district have reduced allocation of land in favour of AUS (Autumn rice) production.

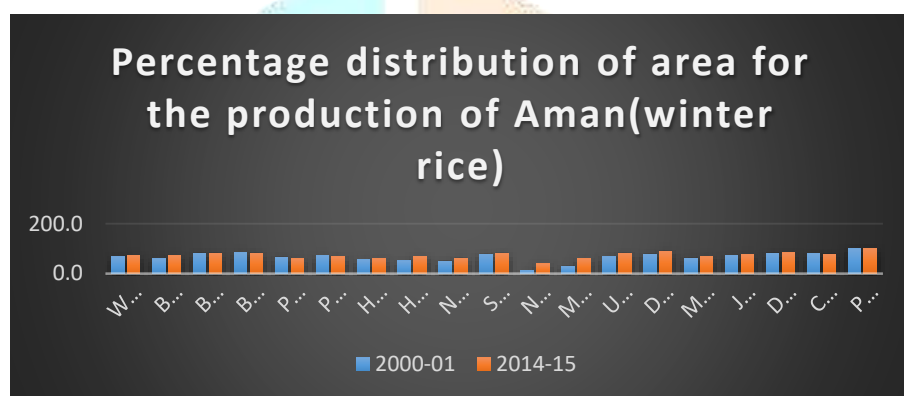


figure 2

In the above figure it is clear that except Bankura, east and West Medinipur, Cooch Bihar, remaining district increased the share of arable area in favour of production of Aman. Some district like Murshidabad, Uttar and Dakshin Dinajpur, Hooghly, Nadia increased a lot. District Purulia used almost entire arable land of rice in the production of Aman.

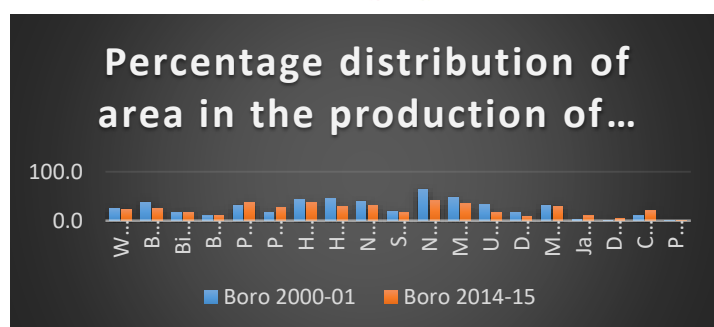


figure3

In the above figure we have seen except Bankura, Birbhum, East and West Medinipur, Jalpaigudi, Darjeeling and Coochbehar, other district had reduced the share of arable land in favour of Boro production. So, it is clear that total increase in area for rice production in East and West Medinipur had increases due to increase in share of arable land in production of Aman and Boro. Bankura, Birbhum, East and West Medinipore, Darjelling, Jalpaiguri have reduced their share of arable land of rice production against Aman, Aus and increased in favour of Boro. Whereas other districts redistributed a large share of its arable in favour of Aman and against Boro. So total decline in the arable land in northern district were due to their reduction in share

of Aman and Aus. But the growth in yield rate was high is a reflex of better utilization of inputs and good climatic condition. In a nutshell, fall in arable land under cereals production happened due to fall in arable land for production of Aus and Boro.

The share of cropped area under wheat had been declining in all the districts except Birbhum, South 24 Parganas and in Dakshin Dinajpur. Among these three, growth in the yield rate was seen in the district of South 24 Parganas and in Dakshin Dinajpur while Birbhum had recorded decline in the yield rate. On the other hand, Nadia and Jalpaiguri which were reducing area for the production of wheat had recorded rise in yield rate.

In a nutshell, we may conclude that in the district of Birbhum, East and West Midnapore, Howrah, South 24 pargana, South Dinajpur, Jalpaigudi, Coch Behar, Maldah, Nadia, production of cereals occupied a major place.

Table3: Trend of average yield rate of wheat during 2001-2015

	Proportion of the area under Wheat in 200-01	Proportion of the area under wheat in 2014-15	Yield rate of Wheat in 2000-01(In Kgs. per hectare)	Yield rate of Wheat in 2014-15(In Kgs. per hectare)	Growth in yield rate of Wheat
West Bengal*	4.67	3.45	2485	2760	12.96
Burdwan	0.80	0.35	2422	2193	18.66
Birbhum	5.86	6.03	2891	2672	-1.11
Bankura	1.76	0.71	2397	2270	11.10
Purba Midnapore	0.05	0.09	2602	2570	5.92
Paschim Midnapore	0.90	0.57	2279	2393	-6.76
Howrah	0.60	0.06	2129	2040	22.31
Hooghly	0.40	0.04	2356	2656	3.10
North 24-Parganas	2.65	1.68	2497	2679	18.22
South 24-Parganas	0.59	0.70	1746	2557	68.44
Nadia	8.37	6.06	2458	2536	38.57
Murshidabad	17.95	11.07	2756	2971	3.92
Uttar Dinajpur	7.48	7.76	2300	2731	1.17
Dakshin Dinajpur	3.44	4.25	2461	3019	28.28
Malda	10.75	9.79	2511	3027	12.98
Jalpaiguri	4.74	3.02	1769	2301	26.85
Darjeeling	1.72	1.06	1920	1730	-24.74
Cooch Behar	4.94	2.14	1981	2034	17.47
Purulia	0.92	0.46	2495	2559	-9.50

Source: Statistical Abstract(2015)

There was a perceptible decline in the share of area under pulses except Purba Medinipore, Howrah, South 24 Parganas, Nadia. In these districts area of cereals production was replaced by the production of Pulses. However, among them Nadia and Purba Medinipur recorded significant rise in yield rate where as in remaining two, the allotment of land in favour of Pulse production was not fruitful. Nevertheless, Birbhum , Bankura, Hooghly, Uttar Dinajpur and Darjeeling showed a better yield rate in spite of reducing land in favour of production of pulses.

Table4: Trend of average yield rate of Pulse during 2001-2015

	Proportion of the area under Pulse in 200-01	Proportion of the area under Pulse in 2014-15	Yield rate of Pulse in 2000-01(In Kgs. per hectare)	Yield rate of Pulse in 2014-15(In Kgs. per hectare)	Growth in yield rate of Pulse
West Bengal	3.01	2.57	800	929	16.13
Burdwan	0.68	0.41	1110	875	-21.17
Birbhum	4.40	2.92	832	1309	57.33
Bankura	0.26	0.08	705	994	40.99
Purba Midnapore	0.65	1.70	1219	1624	33.22
Paschim Midnapore	0.80	0.53	761	923	21.29
Howrah	0.24	1.14	952	970	1.89
Hooghly	0.38	0.11	662	856	29.31
North 24-parganas	2.51	2.73	806	909	12.78
South 24-parganas	1.61	5.55	791	777	-1.77
Nadia	7.90	8.37	774	920	18.86
Murshidabad	7.85	5.67	951	1021	7.36
Uttar Dinajpur	1.82	0.89	506	797	57.51
Dakshin Dinajpur	1.37	0.32	598	673	12.54
Malda	7.86	4.98	820	884	7.80
Jalpaiguri	1.18	0.85	672	803	19.49
Darjeeling	1.02	0.76	646	821	27.09
Cooch Behar	2.07	1.14	663	671	1.21
Purulia	5.75	3.93	388	364	-6.19

Source: Statistical Abstract(2015)

Proportion of land under oilseed has increased as well as yield whereas uses of land under jute has declined though its production has increased. There may be a shifting of the land from production of Aus tice to Jute production.

Table5 : Trend of average yield rate of oilseeds during 2001-2015

	Proportion of the area under oilseeds in 200-01	Proportion of the area under oilseeds in 2014-15	Yield rate of oilseeds in 2000-01(In Kgs. per hectare)	Yield rate of oilseeds in 2014-15(In Kgs. per hectare)	Growth in yield rate of oilseeds
West Bengal	6.57	7.85	953	1128	18.36
Burdwan	7.13	5.38	1038	1009	-2.79
Birbhum	8.15	7.20	1125	826	-26.58
Bankura	5.51	6.85	771	857	11.15
Purba Midnapore	1.73	3.65	1212	2773	128.80
Paschim Midnapore	3.31	10.26	1107	904	-18.34
Howrah	3.21	5.87	803	1719	114.07
Hooghly	8.48	12.65	939	1215	29.39

North 24-parganas	9.44	12.46	944	1345	42.48
South 24-parganas	1.06	2.54	704	1221	73.44
Nadia	15.09	15.49	918	1250	36.17
Murshidabad	9.42	11.62	1014	1132	11.64
Uttar Dinajpur	9.06	10.04	714	915	28.15
Dakshin Dinajpur	7.55	8.34	931	1034	11.06
Malda	7.77	7.93	1067	1182	10.78
Jalpaiguri	2.21	2.86	615	1028	67.15
Darjeeling	0.21	0.35	491	424	-13.65
Cooch Behar	2.48	2.92	609	558	-8.37
Purulia	0.86	1.17	545	756	38.72

Source: Statistical Abstract(2015)

Table6: Trend of average yield rate of Jute during 2001-2015

	Proportion of the area under Jute in 200-01	Proportion of the area under Jute in 2014-15	Yield rate of Jute in 2000-01(In Kgs. per hectare)	Yield rate of Jute in 2014-15(In Kgs. per hectare)	Growth in yield rate of Jute
West Bengal	6.72	5.85	12.12	15.53	28.14
Burdwan	1.33	1.38	18.12	20.6	13.69
Birbhum	0.02	0.05	18.8	20.75	10.37
Bankura	0.08	0.06	18.8	20.75	10.37
Purba Midnapore	0.33	0.11	19.1	12.75	-33.25
Paschim Midnapore	0.20	0.33	17.25	16.31	-5.45
Howrah	4.11	1.32	14.96	17.6	17.65
Hooghly	7.54	4.22	17.79	22.76	27.94
North 24-parganas	10.86	10.49	13.92	17.42	25.14
South 24-parganas	0.33	0.09	10.35	20.87	101.64
Nadia	18.06	16.28	13.07	15.54	18.90
Murshidabad	18.68	16.34	13.49	14.38	6.60
Uttar Dinajpur	11.78	10.14	7.75	16.44	112.13
Dakshin Dinajpur	5.05	6.46	9.68	14.06	45.25
Malda	5.22	4.89	10.34	17.23	66.63
Jalpaiguri	7.90	6.35	9.06	13.44	48.34
Darjeeling	1.18	1.72	8.13	13.95	71.59
Cooch Behar	16.54	13.64	9.31	13.79	48.12
Purulia	-	-	-	-	-

Source: Statistical Abstract(2015)

Table7: Trend of average yield rate of Potato during 2001-2015

	Proportion of the area under total Potato in 200-01	Proportion of the area under Potato in 2014-15	Yield rate of Potato in 2000-01(In Kgs. per hectare)	Yield rate of Potato in 2014-15(In Kgs. per hectare)	Growth in yield rate of Potato
West Bengal	3.29	4.25	25606	33737	31.75
Burdwan	5.34	7.70	26454	31968	20.84
Birbhum	2.79	2.92	20826	30493	46.42
Bankura	4.31	6.22	26622	37282	40.04
Purba Midnapore	1.43	0.52	21424	26221	22.39
Paschim Midnapore	2.77	6.29	28987	37996	31.08
Howrah	5.56	5.15	26919	33917	26.00
Hooghly	20.33	18.54	28997	34802	20.02
North 24-parganas	1.65	2.03	22364	33093	47.97
South 24-parganas	0.71	0.29	20521	24445	19.12
Nadia	0.49	0.75	26999	40777	51.03
Murshidabad	1.18	1.25	24094	33349	38.41
Uttar Dinajpur	1.34	1.67	19789	26647	34.66
Dakshin Dinajpur	1.57	1.59	18303	24989	36.53
Malda	0.52	1.21	17642	36905	109.19
Jalpaiguri	2.55	6.85	21638	31523	45.68
Darjeeling	3.81	3.65	13759	16926	23.02
Cooch Behar	2.40	6.86	23031	33107	43.75
Purulia	0.28	0.14	14732	20954	42.23

Source: Statistical Abstract(2015)

Section 2: Objective

On the basis of above analysis of production of some major food-grains and non-food grain crops of the district of West Bengal during 2001-2015, we want to rank the agricultural product performance of those major crops across the administrative division of West Bengal based on Garret rank method during that same period.

Section3: Methodology

The study is descriptive in nature based on secondary data published in Statistical Abstract 2015. The rank of the districts depends on the yield rate of the corresponding crop. However, descriptive crop profiles of the districts on the basis of the value of the yield rate of the six crops are somehow clumsy. Therefore, to determine the rank of the districts on the basis of crop profile is essential. For that research purpose, Garret Ranking tool has been used. For the sake of calculation, we have cluster the district according to their administrative division. In West Bengal, districts are classified under following five division named are Jalpaiguri division, Burdwan division, Maldah division, Medinipore division and Presidency division. As our year of analysis span from 2000-2001 to 2014-2015, therefore we have categorized the 18 districts as per as 2014-15 status. Though in recent years periphery of districts are reshaped, we have not considered the latest structure due to non-availability of the current data on production in the West Bengal. So, this is our

inadvertently limitation of the study. Following table shows the distribution of the district across the five administrative division.

Table 8: Division wise distribution of the districts in West Bengal

Name of the division	Jalpaiguri division	Burdwan division	Maldah Division	Medinipur division	Presidency division
Name of the districts	Jalpaiguri, Darjeeling, Coochbehar	Burdwan, Birbhum, Hooghly	Maldah, Uttar Dinajpur, Dakshin Dinajpur, Murshidabad	Bankura, Purulia, East Medinipore, West Medinipore	Howrah Nadia North 24 Parganas, South 24 parganas

Garrett Ranking Method .The garret ranking is calculated by using appropriate garret ranking formula. Then based on the garret ranks, the garret value is ascertained in the garret table values and scores in Table - are multiplied to record scores in Table – .Finally by adding each rows the total garret score is obtained.

Percent Position = $100(R_{ij} - 0.5)/N_j$, Here, R_{ij} = Rank given for i th item by j th sample respondents

N_j = Total rank given by the j th sample respondents

Section 4. Major findings and Discussion

Table 9– Division -wise average yield rate

Division	Average yield growth rate of rice	Average yield growth rate of Wheat	Average yield growth rate of Pulses	Average yield growth rate of Oilseeds	Average yield growth rate of Jute	Average yield growth rate of Potato
Jalpaiguri	49.28	6.53	15.93	15.04	56.02	37.48
Burdwan	25.11	6.88	21.82	.007	17.33	20.09
Maldah	33.14	11.59	21.30	15.41	57.65	54.7
Medinipore	17.49	0.19	22.33	40.08	-7.08	33.94
Presidency	26.82	36.89	7.94	66.54	40.83	36.03

Table 10: Rank of the division on the basis of average yield rate

Division	Rice	Wheat	Pulse	Oilseeds	Jute	Potato
Jalpaiguri	1	4	4	4	2	2
Burdwan	4	3	2	5	4	5
Maldah	2	2	3	3	1	1
Medinipur	5	5	1	2	5	4
Presidency	3	1	5	1	3	3

Table 11 – Percent Position of Garret Value

S.No	$100(R_{ij} - 0.5)/N_j$	Calculated Value	Garret Value
1	$100(1-0.5)/6$	8.33	77
2	$100(2-0.5)/6$	25	63
3	$100(3-0.5)/6$	41.67	54
4	$100(4-0.5)/6$	58.33	46
5	$100(5-0.5)/6$	75	37

Table12. Garrett score and rank of yield rate

Division	Rice	Wheat	Pulse	Oilseeds	Jute	Potato	Rank
Jalpaiguri	77	46	46	46	63	63	II
Burdwan	46	54	63	37	46	37	V
Maldah	63.00	63	54	54	77	77	I
Medinipore	37	37	77	63	37	46	IV
Presidency	54.00	77	37	77	54	54	III

The average scores are ranked according to their values. The first rank is given to Maldah division, second rank is assigned to Jalpaiguri division, third rank is given to Presidency division, Fourth rank goes to Medinipore division and Fifth -last rank is given to Burdwan division. During the period of 2001-2015 Maldah division performed much better than the other division in producing food and non-food production. The reason behind growth in yield rate in Maldah division was the crop diversity. In Maldah division we noticed a significant contribution of both food and non-food grain production where as in Jalpaiguri division in spite of recording highest growth rate in rice production, it placed second. Maldah division also successfully transformed arable land from food-grain to non-food grain production which is a reflection of improved the condition of marginal farmers. In Presidency division the non-food grain production contributed more than food grain production. The reason behind poor position of Burdwan district was due to negative growth rate in wheat, pulse and oilseeds. Same reason was applicable for Medinipore division.

Section 5: Conclusion & Suggestions

Agricultural diversification is one of the essential components of economic growth. The needs for diversification of crops include reducing farmer vulnerability to market fluctuations, climate change, and pest attacks. West Bengal displays considerable heterogeneity in agro-climatic conditions. Diversity in agro-climatic environment and resource endowment have resulted in interregional differences in cropping pattern and in productivity growth of major crops within the state. The extent of crop diversification facilitating growth rates of output and land productivity within the ambience of tenancy reforms and the expansion of new technology has been explored in the state level and at the district level also. Crop diversity enhances farmers' income. The data on daily wage rate also showed that daily Average Wage Rate for agricultural field farmer in the districts belongs to Maldah and Jalpaiguri had increased near about 5 times during 2001-2015. But for other districts it near about 3 -4 times higher in 2015 as compared to that in 2001. The recent decline in institutional credit, particularly bank credit, to agriculture has been highly significant in the context of financial sector reforms. So policy makers and facilitators group must choose the sustainable growth-led measures those include the accurate use of pesticides and insecticides, seed treatment, weed control, rodent control measures, etc and also opt mixed farming, relay farming, etc. These measures are effective when all the farmers in an area take these up collectively. Therefore, these measures should be promoted on an institutional basis. Economics review 2020-21 has revealed that in 2018-19 except wheat and oilseeds, the production and yield rate of total rice, pulses, Jute and potato have increased. Therefore, substantial improvement in yield can be attained through soil improvement measures, such as land leveling, sloping, contour bunding, terracing, removal of salinity and alkalinity, etc., and motivate the farmer to opt crop diversity which will enhance the development of the regions.

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