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## AGRICULTURAL PROGRESS OF MADRAS STATE BETWEEN 1949-50 AND 1959-60—A DISTRICT-WISE ANALYSIS

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The objects of this paper are to examine (a) the degree of variations in agricultural progress between different districts in Madras State and (b) to account for these variations.

The basic data for identifying the variations are got from the Season and Crop Reports of Madras State for the period 1949-50 and 1959-60. The Season and Crop Reports give district-wise figures regarding acreage, crops and farm harvest prices. Adopting these figures, gross value of production of all crops is derived for each of the districts. Wherever the production data are lacking as in the case of crops like condiments and spices, fruits and vegetables, fibres other than cotton, drugs and narcotics and fodder crops, the nominal values per acre given in the Season and Crop Reports in 'the statement showing the output and value for the State' as a whole are adopted. In cases where the price data are not available for any specific crop, the prices quoted for the State as a whole are adopted to get at the gross values. The year 1949-50 is chosen as the base period since many of the targets of agricultural production in the plans are in fact set with reference to 1949-50. The year 1959-60 is the latest year for which the Season and Crop Reports are readily available. "The condition of the crops was generally satisfactory in all districts of the State excepting parts of Chingleput, South Arcot, North Arcot, Salem, Coimbatore and Tiruchirapalli districts."<sup>1</sup> Hence, the year 1959-60 may be considered to be a normal year so far as Madras State is concerned. To get at the real increase in agricultural production, the production of 1949-50 is valued at 1959-60 prices and these values are compared with gross value of production of 1959-60 at 1959-60 prices. The 1959-60 prices are chosen in preference to 1949-50 prices since during that year the foodgrain prices were controlled while non-foodgrain prices reflected demand and supply conditions of free market.

Even at the outset, it is necessary to present some of the limitations of the study. The absolute production figures of 1949-50 were based on the village *Karnam's* estimates in respect of all crops. The 1959-60 figures in respect of some crops like rice, *chulam*, *cumbu*, *ragi* are based on crop cutting experiments conducted by the Department of Statistics. The study did not consider also changes due to increase in the reporting area. This may vitiate the results of such districts which were formerly predominantly under *Zamindari* and *Inamdari* tenure, for example, Ramanathapuram district in Madras State. In such districts the actual increase will be lower than what is indicated by the figures in the study.

The gross value of product of different districts at 1959-60 prices is given in Table I for the two years 1949-50 and 1959-60.

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1. Season and Crop Report of Madras State for the Agricultural year 1959-60—*Fasli* 1369.

TABLE I—CHANGES IN GROSS VALUE OF PRODUCT OF DIFFERENT DISTRICTS (AT 1959-60 PRICES)

No.	Districts	Gross value in crores of Rs.		Percentage change	Annual rate of increase
		1949-50	1959-60		
1.	Chingleput .. .. .	9.97	27.72	178.03	16.18
2.	South Arcot .. .. .	25.00	36.70	46.80	4.25
3.	North Arcot .. .. .	24.27	35.33	45.57	4.14
4.	Salem .. .. .	26.52	40.37	52.22	4.75
5.	Coimbatore .. .. .	32.63	56.89	74.35	6.76
6.	Tiruchirapalli .. .. .	31.57	42.43	34.40	3.13
7.	Tanjore .. .. .	38.88	56.76	45.99	4.18
8.	Madurai .. .. .	27.52	38.05	38.26	3.48
9.	Ramanathapuram .. .. .	14.01	27.84	98.72	8.98
10.	Tirunelveli .. .. .	22.09	35.73	61.75	5.61
11.	Nilgiris .. .. .	8.90	13.48	51.46	4.68
	State .. .. .	261.36	411.30	57.41	5.22

The following questions are sought to be answered :

- (1) What is the order of progress in different districts ?
- (2) Did the variations between the districts increase or decrease ?

Chingleput district shows rather an exceptional rate of increase. The other districts which show rates higher than the State average are Ramanathapuram, Coimbatore, and Tirunelveli. The lowest rates of progress are shown by Tiruchirapalli and Madurai districts. Considering the districts which show high rates of progress a large portion of area in Ramanathapuram district was formerly under Zamindari and *Inamdari* tenure and better reporting accounts in part for the high progress noticed. Chingleput had exceptionally low yields in 1949-50 and this accounted for the surprising results of Chingleput. The figures of Coimbatore and Tirunelveli are subject to less unreliability.

Further support is got for this judgement when triennial indices of production of all cereals are examined. Of the districts which recorded high rates of progress, in Chingleput and in Ramanathapuram, the triennium ending with 1959-60 recorded less production than the triennium ending with 1956-57. In Ramanathapuram the fall was substantial. Only in Coimbatore and Tirunelveli districts there was a rise in production of cereals between the two trienniums. The index of cereal production for the triennium 1957-58 to 1959-60 showed that Tiruchirapalli had the lowest rate of progress.

It is necessary to point out that the year 1949-50 was below the normal. "For the State as a whole the yield per acre for all the main crops was below normal."<sup>2</sup> The percentage of the yield per acre attained in that year in the case of foodgrains ranged around 75 and in the case of non-foodgrains around 85. If the percentage change indicated in our study is corrected for the below normal yields obtained in 1949-50, the 1959-60 gross value will not be 157.41 times of 1949-50 but will be only 125.93 times. In other words, the rate of progress will not be 57.41 per cent but, will be 25.93 per cent. For individual districts the percentage change after correction of abnormally low yields of 1949-50 are presented in Table II.

TABLE II

Districts	Correction factor	Index of production with 1949-50 as base	Index after correction with 1949-50 as base	Percentage change after correction
Chingleput .. .. .	50%	278.03	139.15	39.15
South Arcot .. .. .	70%	146.80	102.76	2.76
North Arcot .. .. .	70%	145.57	101.89	1.89
Salem .. .. .	80%	152.22	121.78	21.78
Coimbatore .. .. .	75%	174.35	130.76	30.76
Tiruchirapalli .. .. .	80%	134.40	107.52	7.52
Tanjore .. .. .	85%	145.99	124.09	24.09
Madurai .. .. .	80%	138.26	110.61	10.61
Ramanathapuram .. .. .	67%†	198.72	131.15	31.15
Tirunelveli .. .. .	70%	161.75	113.22	13.22
Nilgiris .. .. .	—	151.46	121.17	21.77
State** .. .. .	80%	157.41	125.93	25.93

† In the case of Ramanathapuram, paddy formed only around 30% and the variation between the yields of other crops and their corresponding normal yields were found to be different from that of paddy. Hence a weighted conversion is adopted.

\*\* Composite Madras State.

For correction purposes for districts where paddy is the single major crop and where the deviation between current and normal yields did not show much difference between paddy and other crops the proportion of current yields of paddy in the normal is adopted. But in two districts, South Arcot and Ramanathapuram, there was found to be a difference. In respect of these two districts, the weighted correction factor is adopted. Even after correction the three districts, Chingleput, Coimbatore, and Ramanathapuram continue to be at the top while Tiruchirapalli and Madurai are among the bottom districts. But, the results after correction

indicate that reliance should be placed on the absolute figures only for indicating the order and *not* the magnitude of progress.

We sought to know whether the variations in gross value of production in different districts had increased or decreased. For this purpose, the coefficient of variation, had been computed for two years. The results are as follows :

<i>Year</i>	<i>Coefficient of variation between districts</i>
1949-50 .. .. .	38.08
1959-60 .. .. .	31.80

This shows that the variations had decreased. But, when the districts are ranked by the order of their income for both the years, there is found to be a close correspondence between the two series of ranks.

Changes in productivity per acre are considered by examining the gross value of product per acre of net sown area for the two years, 1949-50 and 1959-60 at 1959-60 prices. The relevant figures are shown in Table III.

TABLE III—GROSS VALUE OF PRODUCT PER ACRE FOR DIFFERENT DISTRICTS AT 1959-60 PRICES

S. No.	Districts	1949-50	1959-60	Percentage change
1.	Chingleput .. .. .	144.31	331.85	129.96
2.	South Arcot .. .. .	181.18	277.09	52.94
3.	North Arcot .. .. .	207.81	286.63	37.93
4.	Salem .. .. .	168.04	201.44	19.88
5.	Coimbatore .. .. .	193.53	315.23	62.88
6.	Tiruchirapalli .. .. .	191.35	251.07	31.21
7.	Tanjore .. .. .	277.24	395.44	42.63
8.	Madurai .. .. .	235.40	273.58	16.22
9.	Ramanathapuram .. .. .	144.69	204.23	41.15
10.	Tirunelveli .. .. .	228.92	301.64	31.77
11.	Nilgiris .. .. .	890.54	1,147.00	28.80
	State .. .. .	205.71	285.97	39.02
12.	Kanyakumari .. .. .	—	522.66	—

Examining the figures of 1949-50, the districts could be categorised into three groups from the point of productivity.

The district of Nilgiris is a category by itself. Its income is largely drawn from plantations. Tea, Coffee and Potatoes account for a major source of gross value. It has the highest gross value per net sown acre. Chingleput, Ramanathapuram, South Arcot, Salem, Tiruchirapalli and Coimbatore derived less than the State average. North Arcot, Tanjore, Madurai and Tirunelveli derived more than the State average.

Examining the figures of 1959-60, Nilgiris continues to be a class apart from the other districts. Chingleput, Coimbatore, Tanjore, Tirunelveli and North Arcot recorded a productivity more than the State average and South Arcot, Tiruchirapalli, Madurai, Ramanathapuram and Salem recorded less than the State average. Kanyakumari, a newly formed district, which was formerly part of Travancore area, is also rather unique. Productivity of land in this district is only second to Nilgiris.

Examining the percentage change in gross value per acre, it should be noted that the absolute figures should not be taken too seriously and they indicate only the order of progress between different districts. Chingleput, Coimbatore, and South Arcot record higher rates of progress. Salem, Madurai and Tiruchirapalli are the districts which show low rates of progress. As will be seen, the latter part of the increase in productivity noted in South Arcot is due to a decrease in the net area sown.

An examination of the index of cereal productivity for the triennium 1957-58 to 1959-60 with the quinquennium 1949-55 to 1956-57 as the base had shown that productivity in Chingleput was declining as compared to the earlier triennium. In South Arcot also there was a decline. In Coimbatore alone, of the three districts, there was a rise. This indicates that the progress in Coimbatore alone had been stable.

Of the three districts in the bottom, Tiruchirapalli showed the lowest rates of progress when cereal productivity is examined by trienniums. Madurai also was found to be among the lowest. Productivity of cereals in these two districts was found to be declining in the triennium ending with 1959-60 as compared to the earlier triennium. But Salem did not present such a bad picture.

The degree of regional variations between the districts for the two years is considered. Coefficient of variations is computed. The result is as follows :

<i>Year</i>					<i>Coefficient of variation</i>
1949-50	..	..	..	..	78.47
1959-60	..	..	..	..	70.01

The figures show a high degree of variation in per acre value products between different districts. They also indicate that the variations in per acre products had declined between the two years.

Details relating to changes in gross output per head of agricultural population are given in Table IV.

TABLE IV—GROSS VALUE OF PRODUCT PER CAPITA ENGAGED IN AGRICULTURE  
AT 1959-60 PRICES

S. No.	Districts	1949-50 (Rs.)	1959-60 (Rs.)	Percentage change
1.	Chingleput .. .. .	80.16	188.10	134.6
2.	South Arcot .. .. .	110.14	147.21	33.7
3.	North Arcot .. .. .	122.19	161.55	32.3
4.	Salem .. .. .	110.85	149.67	35.0
5.	Coimbatore .. .. .	185.24	298.88	61.3
6.	Tiruchirapalli .. .. .	149.99	186.00	24.0
7.	Tanjore .. .. .	186.46	250.16	34.1
8.	Madurai .. .. .	150.86	187.77	24.4
9.	Ramanathapuram .. .. .	105.79	180.49	70.6
10.	Tirunelveli .. .. .	165.53	240.13	45.0
11.	Nilgiris .. .. .	864.60	995.13	15.0
	State .. .. .	141.60	205.29	45.0

The per capita output values of 1949-50 may be examined. Nilgiris stands unique. If Nilgiris is not considered, per capita output values ranged between 80.16 in Chingleput district to 186.46 in Tanjore district.

In terms of per capita product, Nilgiris, Tanjore and Coimbatore were in the top and Salem, South Arcot, Ramanathapuram and Chingleput were in the bottom. The top three districts continued to hold their position. Chingleput moved into the intermediate group and the other three continued to be in the bottom. It may be noted that the districts which have low per capita product have low per acre product also.

We sought to know the variables associated with differential rates of progress. For this purpose changes in some crucial variables associated with output are examined. The results are presented in Tables V and VI.

Functional relationship between changes in gross value of output and associated variables has not been attempted in this paper since the magnitude of progress indicated is misleading because of the abnormally low yields particularly in Chingleput and Ramanathapuram districts. Rank correlation coefficients were computed for each of the variables in order to assess the degree of association of these variables with the changes in gross values of the districts. The independent variables chosen are : (1) percentage change in net area sown ; (2) percentage



TABLE V—CHANGES IN GROSS VALUE OF PRODUCT OF THE DISTRICTS AND SOME ASSOCIATED VARIABLES BETWEEN 1949-50 AND 1959-60 (PERCENTAGES)

S. No.	District	Change in gross value	Change in net area sown	Change in gross cropped area	Change in irrigated area	Change in area under crops other than food-grains and fodder excepting paddy	Change in agricultural population
1.	Chingleput .. ..	178.03	20.84	35.04	20.52	49.18	18.44
2.	Ramnad .. ..	98.72	42.08	50.36	69.13	56.66	16.47
3.	Coimbatore .. ..	74.35	7.06	8.14	38.84	29.29	8.02
4.	Tirunelveli .. ..	61.75	22.42	23.30	16.17	23.42	11.52
5.	Salem .. ..	52.22	26.93	25.23	32.81	23.62	12.72
6.	Nilgiris .. ..	51.46	18.00	15.09	—	16.84	31.19
7.	South Arcot .. ..	46.80	-3.99	2.35	21.86	5.43	9.80
8.	Tanjore .. ..	45.99	2.35	11.22	0.33	6.80	8.77
9.	North Arcot .. ..	45.57	5.48	6.81	18.38	13.94	10.02
10.	Madurai .. ..	38.26	18.99	15.27	-9.14	26.35	11.05
11.	Tiruchirapalli .. ..	34.40	5.43	7.32	2.30	7.35	8.35
	State .. ..	57.41	13.21	17.76	14.88	20.56	14.14

TABLE VI—CHANGES IN PER ACRE VALUES AND CHANGES IN SOME ASSOCIATED VARIABLES (IN PERCENTAGES) BETWEEN 1949-50 AND 1959-60

S. No.	District	Per acre output values	Change in irrigation per acre of net sown area	Change in density per acre	Change in intensity of cropping	Change in area under-crops other than food-grains and fodder excepting paddy
1.	Chingleput .. ..	129.96	-0.33	-2.22	12.40	10.47
2.	South Arcot .. ..	52.94	27.07	14.63	7.02	3.00
3.	North Arcot .. ..	37.93	12.38	4.12	1.68	6.66
4.	Salem .. ..	19.88	4.94	-11.18	-0.87	-1.29
5.	Coimbatore .. ..	62.88	13.18	0.96	0.81	19.57
6.	Tiruchirapalli .. ..	31.21	-2.95	3.05	1.79	0.02
7.	Tanjore .. ..	42.63	-2.10	6.04	9.24	-3.96
8.	Madurai .. ..	16.22	-23.64	-6.41	-3.42	9.62
9.	Ramnad .. ..	41.15	19.16	-18.12	5.88	4.20
10.	Tirunelveli .. ..	31.77	-5.11	-8.70	0.85	0.09
11.	Nilgiris .. ..	28.80	—	10.58	-2.80	1.52
	State .. ..	39.02	6.34	-1.38	1.19	2.37

change in irrigated area ; (3) percentage change in gross cropped area ; and (4) percentage change in area under crops other than foodgrains and fodder, excepting paddy. The rank correlation coefficients are 0.61, 0.62, 0.65 and 0.69 respectively. The corresponding coefficients excluding Nilgiris are 0.58, 0.71, 0.64 and 0.66. All these excepting that for percentage change in net area sown excluding Nilgiris are found to be significant at 5 per cent level. This indicates that extension in cultivated area and extension in irrigation help to account for higher rates of progress in certain districts.

But what is more important is the need for an explanation of the differences in productivity per acre for this accounts for most of the difference in rates of progress. Hence, the per acre output values are examined in relation to the following :—(i) percentage change in irrigated area; (ii) percentage change in density per acre; (iii) percentage change in intensity of cropping ; and (iv) percentage change in area under crops other than foodgrains and fodder excepting paddy.

The rank correlation coefficients for the above variables are 0.56, 0.24, 0.76 and 0.39 respectively. All these excepting that for percentage change in intensity of cropping were found to be not significant. In order to find out whether this is due to exceptionally low yields in 1949-50 particularly in some districts, the correction factor was applied to the progress and the rank correlation coefficients were worked out with the new rankings, and even these were found to be not significant. We could not examine the relationship between differential rates of increase in productivity and use of (a) fertilizers ; (b) improved seeds ; (c) improved practices and (d) use of electricity, etc. ; since district-wise data on these are not readily available to us. However, the weak correlation between some of the crucial variables that we chose and the changes in production is rather surprising and leads to the suspicion whether much of the noticed differences in the progress of productivity is not due to chance.

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## REGIONAL VARIATIONS IN AGRICULTURAL PRODUCTIVITY IN ANDHRA PRADESH

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The objects of this paper are (1) to measure the degree of variation in (a) output per acre, (b) output per head in agriculture, and (2) to account for this variation between different districts of Andhra Pradesh.

The basic data for this purpose are got from the Season and Crop Reports published by the Bureau of Economics and Statistics, Andhra Pradesh, 1959-60.