Chapter II

STRUCTURE OF INTER-DISTRICT DIFFERENTIALS OF AGRICULTURAL WAGES

In the present chapter we have examined the changes in geographical wage differentials in agriculture among small regional units such as the districts within the State of Gujarat. Within the same state, due to greater linguistic and cultural homogeniety, one may expect greater mobility of labour as between the districts. Moreover in the course of planned development, the hold of depressing factors in particular regions will become loose and the working of economic forces more effective. Hence one would expect a tendency towards compression of the geographical wage structure.

The existence of significant and persistant geographical wage differentials have been noted and studied[1] by a few in developed country such as the United States of America. In India, the All India Agricultural Labour Enquiry Reports had

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[1] Wolfsman R.J. "An Econometric Investigation of Regional Differentials in American Agricultural Wages." Econometrica, April, 1958, p.225.
Black J.D. "Agricultural Wage Relationship: Geographic Differences." Review of Economics and Statistics, Vol.18, 1936, pp.63-83.
Schultz T.W. Agriculture in an Unstable Economy, McGraw Hill Book Company, Part IV, 1945, pp.85-112.
Weatherford W.D. Geographic Differentials of Agricultural Wages in the U.S.A., Cambridge, Harvard University Press, 1957.
Ducoff L.J. Wages of Agricultural Labour in the United States, U.S. Department of Agriculture, Technical Bulletin, 1945, p.895.

briefly mentioned the male-female[2] differentials but had neglected the detailed analysis and explanation of the geographical differentials in agricultural wages. This was surprising because the findings of the Second All India Agricultural Labour Enquiry Report have shown the existence of sizable[3] wage differentials among the states both in 1950-51 and in 1956-57. For instance the highest daily wage of a male casual agricultural labourer in 1956-57 was Rs.1.98 in Punjab as against the lowest of Re.0.76 in Madhya Pradesh. In other words the ratio of the highest to the lowest was 2.6. In 1950-51, the highest wage rate was Rs.1.90 in Assam and the lowest Rs.0.72 in Orissa. Or the highest lowest ratio was 2.7. The detailed study of the various aspects of these differentials in agriculture is almost completely lacking both in the academic and official literature on agricultural wages in India. Uptill now the issues such as socio-economic conditions of agricultural labour, methods of wage payments, minimum wages etc., have drawn greater attention while the examination of the changes in the structure of these geographical wage differentials in agriculture is absent. It is true that the study of agricultural wages is be-set by a host of problems such as paucity of time series data on wages, on changes in employment opportunities within agriculture, absence of checks to test the reliability of available data,

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[2] Report of All India Second Agricultural Labour Enquiry, Government of India, 1956-57, p.115.

[3] Ibid., p.117.

absence of the data on the number of days of employment available in agriculture etc. Due to these factors one is reasonably inclined to accept the enormity and complex nature of the problems involved. However the fact remains that the type of information on wages which is regularly published in the official[4] sources is enormous and very useful. Careful attempt at analysing them from different aspects would definitely serve, though in a limited way, a useful purpose of understanding the wider problems of agricultural labour in the country.

The purpose of the present chapter is to throw light on this hitherto neglected problem of geographic differentials in agricultural wages. In view of the peculiar limitations of the available data on agricultural wages the aim is to confine the study to the small regional units like districts within the state.

At the outset it may be noted that if we consider agriculture in its broader aspect i.e. plantations, fishery, forestry, animal husbandry and farming then, it would be hardly justified to describe it as a homogeneous activity. However, we are examining the wages paid to casual adult male labourers employed in crop raising activity and this can be treated as homogeneous

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[4] Agricultural Wages in India; Directorate of Economics and Statistics, Ministry of Food, Agriculture, Community Development and Co-operation, Government of India. The publication contains Month-wise wage rates prevailing in all the districts in all the States in India. Within each district wage rates are reported from different centres.

from the view point of labour employed. This homogeniety is understood in the sense that the levels of skill required are more or less the same. Moreover the occupational rigour and hazards are also the same. Such homogeniety is likely to prevail all the more when one considers the small regional units such as districts within a state.

Concept of Agricultural Wage and Limitations of the Data:

The daily agricultural wage used in the present study is the simple arithmetic average of wage rate of adult casual male labourer for (1) field work* and (2) other labour** in agriculture. The daily agricultural wage in a district is arrived at by taking a simple average of daily wage rates in each month during a year. In each district daily wage rates are reported for each month from different centres and hence the daily wage in a district in a month is the average of the wage rates reported from different centres in each district. These

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*This includes ploughing, sowing, reaping, harvesting, weeding, transplanting etc.

**This includes coolie labour employed for watering the fields, for load carrying, cleaning silt from water ways, embankment, well digging etc.

reporting centres are intended to be representative* of the agricultural conditions prevailing in that particular area in each district. In the districts of Gujarat there is a large coverage in respect of the number of reporting centres in each of the districts in the state.

The daily agricultural wage is in terms of Rupees per day, the normal working day being of 8 hours. If the wage or a part of the wage is paid in kind, then its money equivalent is calculated and included in the money wage by the same agency, which is responsible for collecting and consolidating information on wages. The money wage rate thus reflects price of labour and it does not include any payment which is not a part of wage. Items such as concessions and bonus are rare in agriculture.

Since the data on employment at each wage rate in different periods during a year are not available, the simple average wage is used. It might contain the discrepency as shown below:

In two periods - Period I and Period II, the wage rates and employment are as under:

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*The state Governments are at liberty to choose an appropriate agency for the collection of these statistics. They can collect through Patwaris, Presidents of Local Panchayat Boards, Primary School teachers etc. These data are scrutinised and consolidated at the district Head Quarters. For the details of the scheme of collection and selection of centres in each district. See: Agricultural wages in India 1965-66., Appendix II, pp.530-541., Directorate of Economics and Statistics, Ministry of Food, Agriculture, Community Development and Co-operation, Government of India.

	Period I	Period II
Daily wage (Rs.)	2	1
Employment (Days)	5	15

The average wage (AW) of both the periods combined will be,

$$AW = \frac{W_1 x\ MD_1 + W_2 x\ MD_2}{(MD_1 + MD_2)}$$

Where,

W_1, W_2 are wage rates, and

MD_1, MD_2 are the respective number of mandays worked.

So If we assign the proper weights to each wage, the weighted average wage will be as under:

$$AW = \frac{Rs.\ 2 \times 5 + Re.\ 1 \times 15}{20}$$

$$\therefore \quad 25/20 = Rs.1.25$$

However, the simple average wage will be $\frac{Rs.2+Re.1}{2}$ = Rs.1.50. Thus the discrepency between the two wage rates exists because in simple average we have assigned equal weight to both the wage rates. If the wage rate in Period I had been higher than Rs.2, or the employment lower than 5 days or both, this discrepency would have been still higher. In such a case the representative character of simple average can be seriously undermined. Due to these reasons it is essential to obtain an

idea about the fluctuations in the reported daily agricultural wage rates among the months or seasons in a year. In order to check upon this possibility we have calculated the magnitude of variation in monthly wage rates in the 16 districts in the state. These relate to the year 1966-67. The seasonal variation is measured as,

$$\frac{\text{Highest wage - Lowest wage}}{\text{Mean}} \times 100 ,$$

and is computed for the monthly wage rates in 16 districts given in appendix II-1. They are shown below:

Table II-1

Seasonal variation in agricultural wage rates in 16 districts in Gujarat:1966-67

District	Seasonal variation
1	2
1. Ahmedabad	31.88
2. Surat	15.29
3. Baroda	18.96
4. Kaira	14.28
5. Mehsana	15.13
6. Broach	16.66
7. Panchmahals	16.56
8. Sabarkantha	7.30
9. Banaskantha	10.50
10. Rajkot	9.56
11. Jamnagar	12.74
12. Bhavnagar	10.27
13. Junagadh	16.36
14. Surendranagar	15.51
15. Amreli	15.18
16. Kutch	7.74

Source: Appendix II-1.

It will be seen from the table that excepting in two or three districts, the magnitude of seasonal variation in monthly wage rates is low and similar i.e. between 10 to 15 per cent in the districts. Hence the seasonal variations do not unduly affect the representative character of simple average rate in the districts under examination.

The study covers 16 districts in the state. The district of Bulsar which was formed out of the old Surat district is treated as part of the Surat district while the Gandhinagar district is included in the district of Ahmedabad. The district of Dangs has very little gainful agricultural activity and hence it is excluded.

Due to the constraint of the availability of data in time series, the analysis of the changes in the structure of wage differentials in the districts is carried out for (i) 16 districts during the period 1956-57 to 1967-68 i.e. 12 years, and (ii) 11 districts for which the time series data were available for longer period 1950-51 to 1967-68 i.e. 18 years. Two sets are made only because the time series data on wages for the 16 districts were not available for the entire period 1950-51 to 1967-68.

Structure of Agricultural Wage Differentials in the Districts and the Measurement of Change:

In the present study, by the structure[5] of wage differentials is understood the relative wage rates for different districts and the changes in the structure of wage differentials refer to the movements of relative wage rates in different districts.

The changes in the structure of wage differentials are measured by the following techniques:

(1) To begin with we have examined the changes in the Rank structure of district wage rates by computing the coefficient of Rank correlation.

(2) We have then used coefficient of variation which is a measure of relative dispersion. Along with it, standard deviation which is a measure of absolute dispersion, is also shown.

(3) The changes in the structure are further examined with High-Low percentage and absolute differentials on the basis of the wage rates in upper quartile and lower quartile of the inter-district structure of agricultural wages.

Wage Rates in the Districts of Gujarat:

A preliminary look at the district wage rates (Table II-2) shows significant differences. For instance in 1952-53 the

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[5]See: Reynolds L.G. and Taft C.H. The Evolution of Wage Structure, New Haven, Yale University Press, 1956. pp.1-2 & 9-10.

Table II-2

Average Daily Agricultural Wage Rates of Adult Male Casual Labourers

in 16 districts in Gujarat State: 1950-51 to 1967-68

(Rupees per day)

District	Year																	
	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Jamnagar	-	-	2.23	-	-	1.37	2.25	2.31	2.41	2.49	2.76	2.95	3.02	[illegible]	3.12	3.42	3.61	3.81
2. Junagadh	-	-	1.47	-	-	1.63	1.73	2.10	2.17	2.37	2.64	2.45	2.72	2.71	3.37	3.17	3.36	3.70
3. Rajkot	-	-	2.12	-	-	1.89	2.26	2.31	2.35	2.38	2.45	2.61	2.49	2.63	2.86	3.27	3.24	3.54
4. Bhavnagar	-	-	1.16	-	-	1.74	1.79	1.55	2.17	2.20	2.26	2.28	1.95	2.06	2.15	2.31	2.53	2.72
5. Surendranagar	-	-	1.41	-	-	1.92	1.93	2.37	1.95	2.06	2.02	2.09	2.27	2.45	2.63	2.74	2.90	2.92
6. Amreli	1.86	1.39	1.42	1.39	1.30	1.21	1.44	1.51	1.97	2.01	2.42	2.45	2.39	2.45	2.67	2.56	2.70	2.98
7. Kutch	1.81	3.07	2.46	2.36	2.46	2.25	2.03	2.02	1.84	2.14	2.39	2.50	2.55	2.19	2.30	2.46	2.97	3.35
8. Ahmedabad	1.71	1.81	1.84	1.07	1.50	1.62	1.67	1.50	1.71	1.89	1.77	2.00	2.02	2.14	2.42	2.35	2.76	2.89
9. Mehsana	1.62	1.63	1.58	1.59	1.58	1.47	1.37	1.69	1.55	1.58	1.83	2.01	2.08	2.13	2.19	2.28	2.51	2.77
10. Banaskantha	1.59	1.41	1.62	1.75	1.56	1.53	1.53	1.58	1.63	1.75	1.68	1.73	1.75	1.91	1.92	2.00	2.19	2.62
11. Sabarkantha	2.39	1.68	1.37	1.27	1.27	1.24	1.37	1.31	1.39	1.44	1.71	1.84	1.88	2.01	2.04	2.07	2.12	2.34
12. Kaira	2.12	2.06	1.68	1.70	1.64	1.67	1.69	1.75	1.89	1.89	1.81	1.80	1.83	1.92	1.84	1.94	2.17	2.57
13. Baroda	1.36	1.26	1.31	1.24	1.24	1.27	1.24	1.29	1.24	1.21	1.24	1.51	1.50	1.56	1.58	1.71	1.74	2.11
14. Panchmahals	1.14	1.25	0.99	0.96	1.00	0.94	1.06	1.00	1.07	1.09	1.14	1.17	1.27	1.23	1.42	1.57	1.69	1.80
15. Broach	1.01	1.02	1.12	0.93	0.96	1.00	1.03	1.11	1.44	1.15	1.19	1.33	1.49	1.50	1.52	1.67	1.80	2.02
16. Surat	0.91	1.10	1.12	1.07	1.08	1.12	1.16	1.18	1.24	1.70	1.26	1.24	1.31	1.40	1.58	1.67	1.70	1.92
State	1.59	1.61	1.55	1.39	1.42	1.44	1.60	1.67	1.75	1.83	1.91	2.00	2.00	2.05	2.23	2.32	2.50	2.75

Source: i) Basic Agricultural Statistics of Gujarat State for the period 1949-50 to 1961-62.

ii) Agricultural wages in India, Ministry of Food and Agriculture, Community Development and Co-operation, Government of India.

iii) Gujarat Labour Gazttes.

Note: (a) All the three sources publish the data on wages collected and consolidated by the same agency.

(b) Wage rates are simple average rates and combine 'Field labour' and 'Ordinary labour'.

highest wage rate was Rs.2.46 per day in the district of Kutch as against Rs.0.99 in Panchmahals district. In other words the highest wage rate was 2.48 times the lowest. After 15 years in 1967-68 one finds the highest wage rate to be Rs.3.81, prevailing in Jamnagar district and the lowest Rs.1.80 in Panchmahals. Again, the highest wage was 2.12 times the lowest agricultural wage. It is remarkable that excepting the year 1955-56 and 1956-57, the wage rate in the district of Panchmahals has remained the lowest all along the period while the highest wage rate was in Jamnagar for majority of the years during the period. The pattern of behaviour of wage rates is brought into sharp focus by the graph- 1 . It shows two year averages of agricultural wage rates in 16 districts during 1956-57 to 1967-68. It will be seen from the graph that Jamnagar has the highest wage rate throughout while Panchmahals has the lowest. Moreover Panchmahals, Surat, Baroda and Broach constitute one group of low wage districts almost throughout the period. While Jamnagar, Rajkot, Junagadh constitute another group having very high agricultural wages. If we take the highest district wage as percentage of the lowest district wage, as shown in the Table II-3. One is struck by the size of differential and the lack of any significant narrowing.

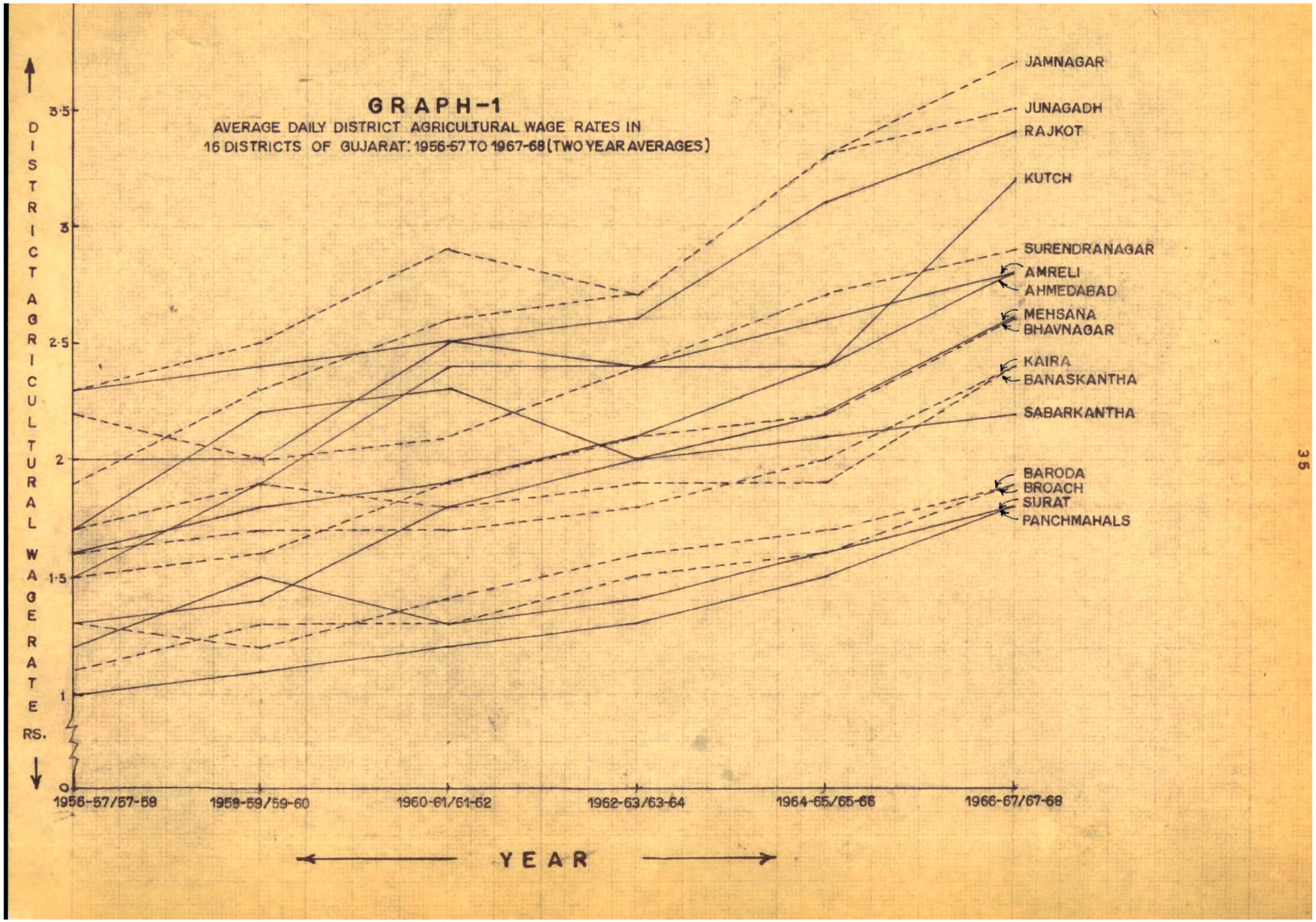
GRAPH-1
AVERAGE DAILY DISTRICT AGRICULTURAL WAGE RATES IN
16 DISTRICTS OF GUJARAT: 1956-57 TO 1967-68 (TWO YEAR AVERAGES)
DISTRICT AGRICULTURAL WAGE RATE RS.
3·5
3
2·5
2
1·5
1
0
1956-57/57-58
1958-59/59-60
1960-61/61-62
1962-63/63-64
1964-65/65-66
1966-67/67-68
YEAR
JAMNAGAR
JUNAGADH
RAJKOT
KUTCH
SURENDRANAGAR
AMRELI
AHMEDABAD
MEHSANA
BHAVNAGAR
KAIRA
BANASKANTHA
SABARKANTHA
BARODA
BROACH
SURAT
PANCHMAHALS

Table II-3

Highest Agricultural Wage as Percentage of the Lowest Wage in the 16 districts: 1952-53 to 1967-68

Year	Highest wage rate as percentage of the lowest	Absolute differential between the highest and the lowest wage (Rs.)
1	2	3
1952-53	248.48	1.47
1953-54	-	-
1954-55	-	-
1955-56	201.06	0.95
1956-57	219.41	1.23
1957-58	237.00	1.37
1958-59	225.33	1.34
1959-60	228.44	1.40
1960-61	242.10	1.62
1961-62	252.13	1.78
1962-63	237.79	1.75
1963-64	220.32	1.48
1964-65	237.32	1.95
1965-66	217.83	1.85
1966-67	213.60	1.92
1967-68	211.66	2.01

Source: Table II-2.

The table shows that the differential between the lowest and the highest wage rates remained more than 100 per cent all

along the period. Moreover upto 1961-62 this wage differential had widened and had narrowed from 1962-63 onwards. In 1952-53 the wage differential between the highest and the lowest was greater than in any other year (except 1961-62) during the period. Column 3 shows the absolute difference between the lowest and the highest wage rates. This has widened almost all along the period. It was less than a Rupee i.e. Rs.0.95 in 1955-56 but was Rs.2.01 in 1967-68. Thus it has increased by more than 100 per cent

These preliminary observations on the extent and trend of agricultural wage differential among the districts have brought two points into sharp focus:

(1) There has existed significant differences in the levels of wage rates among the districts.

(2) In the districts the agricultural wage differential over time had widened upto 1961-62 and had somewhat narrowed thereafter. Considering the entire period 1956-57 to 1967-68, one finds that the narrowing tendency of wage differential was only marginal.

These preliminary observations therefore call for a closer examination of the structure of Wage differentials in all aspects. The most pertinent question that arises in this respect is as to whether the positions of various districts in the geographic wage differential structure have remained the same overtime or not. If the ranking order of the districts (according to the levels of agricultural wage rates) has remained

stable then it is certain that the causes of these wage differentials are to be found in the stable features of the economies of different districts. It is from this point of view that the examination of rank structure of districts becomes important. Table II-4 gives the coefficient of rank correlation of district wage rates.

Table II-4

Coefficient of Rank Correlation of district agricultural Wage Rates in 16 districts and 11 districts respectively for 1955-56 to 1967-68 and 1950-51 to 1967-68

Year	Coefficient of Rank Correlation			
	Long period		Short period	
	16 Districts	11 Districts	16 Districts	11 Districts
1	2	3	4	5
1950-51	-	0.79	-	-
1951-52	-	0.93	-	1.00
1952-53	-	0.95	-	0.90
1953-54	-	0.79	-	0.73
1954-55	-	0.97	-	0.89
1955-56	0.89	0.92	-	0.89
1956-57	1.00	1.00	1.00	1.00
1957-58	0.88	0.93	0.88	0.93
1958-59	0.87	0.81	0.87	0.81
1959-60	0.93	0.88	0.93	0.88
1960-61	0.85	0.77	0.85	0.77
1961-62	0.86	0.71	1.00	1.00
1962-63	0.85	0.76	0.95	0.97
1963.64	0.78	0.75	0.90	0.98
1964-65	0.71	0.72	0.92	0.94
1965-66	0.82	0.74	0.91	0.97
1966-67	0.89	0.83	0.95	0.93
1967-68	0.85	0.86	0.96	0.96

Source: Table II-2.

In the above table we have taken the rank order of the districts in 1956-57 as base year rank order and hence it is treated as 1.00. The changes in the rank structure for 16 and 11 districts during the period 1950-51 to 1967-68 are examined with respect to this base year rank structure as shown in Col. 2 and Col.3 of the above table. For Col.5 and Col.6 in which we have indicated the short-run changes, the rank structures of 1951-52, 1956-57 and 1961-62 i.e. beginning years of each of the three five year plans are taken as base year rank order.

Table II-4 highlights the point that the rank structure of districts wage rates have remained highly stable in respect of all the 16 districts (Column 2) and also for 11 districts (Column 3) in the state. Over the entire period 1950-51 to 1967-68, one notices a slight tendency of departure of the rank structure as one moves from the period 1950-51 to 1955-56 1956-57 to 1960-61 and onwards. However the tendency was very weak and once again in the last two years i.e. 1966-67 and 1967-68, it had been checked. Statistically, coefficient of rank correlation 0.7 is significant at 1 per cent level of significance given 14 d.f. The table shows the coefficient of rank correlation for most of the years to exceed 0.8.

It is true that a complete reversal in the rank structure cannot be expected. However what is remarkable is the lack of any systematic significant tendency of departure particularly among the 16 districts in the state.

Over the shorter periods corresponding approximately to each of the three Five Year Plans in India, rank structures for 16 districts (Column 4) and for 11 districts (Column 5) have shown even greater stability.

Thus the use of rank correlation coefficient brings into sharp focus a remarkably stable structure of the district wage rates differentials in the state during 1950-51 to 1967-68. At this stage however it becomes necessary to understand the limitations of rank correlation coefficient as a technique of measuring structural change. This is essential to point out so that necessary caution is used in interpreting the results. Rank correlation no doubt is a useful tool to locate the position. However sometimes it can exaggerate or suppress the dimension of change in the structure. For example if differences are very small, slight changes may change the rank structure. From Table II-2 it can be seen that in 1956-57 the wage rates in Mehsana and Sabarkantha are the same i.e. Rs. 1.37. In Jamnagar and Rajkot the difference is of only one paise etc. In such cases a small change in wage rate in one district will alter the positions though it hardly means any shift in the real sense of the term. Thus the change is exaggerated. On the other hand if the absolute differences in the constituents of the structure i.e. district wage rates in our case, are very high, then even significant changes in

their differences will not be reflected by rank correlation. Take a pair of districts A and B with their relative positions of wage rates as,

A	B
1	0.4

Now if they happen to stand in the relative position of 1:0.9 now, their ranks will still be the same, though the change from 0.4 to 0.9 for district B is a change of more than 100 per cent. The convergence of their relative positions is not reflected by the rank structure until the change has been pushed far enough to a point where they cross each other's ranks. In the same way, the divergence in the relative position will not be reflected in the rank structure. These limitations of the rank structure can be brought into sharp focus by diagrams (Figures 1 and 2).

Figure 1

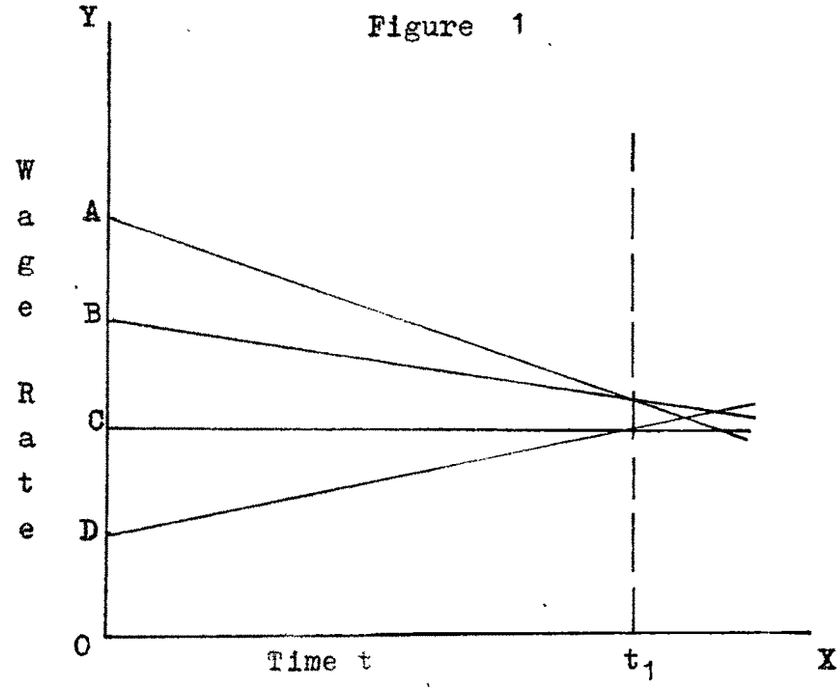

Figure 2

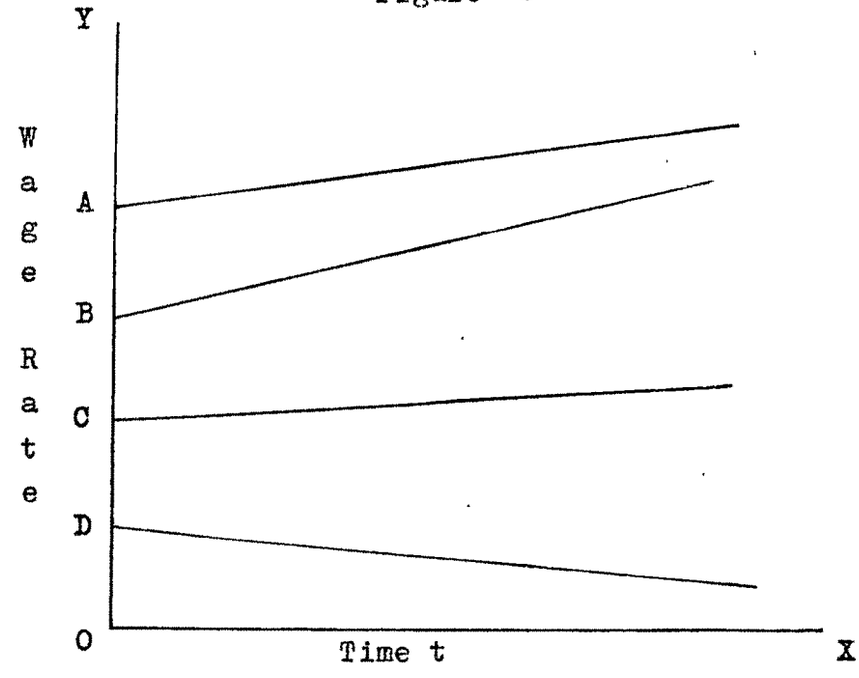

Figure 1 shows that the convergence in the wage rate structure is not reflected by the ranks. Ranks of districts A to D remain the same upto time t_1. Only beyond t_1 the ranks change.

Similarly in Figure 2 the divergence in the relative position is not reflected in the ranks. In view of the limitations of the tool of rank correlation as described above, the changes in the wage structure have to be examined in a more rigorous manner.

Before we analyse the measures of relative and absolute dispersion in the wage structure, an attempt is made below to relate the level of wage rates with the percentage of changes in them overtime. The process[6] of widening or narrowing of wage differentials is brought about respectively by the higher and lower percentage increase in high and low wage districts. In other words, the relative wage differential would widen if the high wage districts have experienced higher percentage increases than the low wage districts. On the other hand narrowing occurs due to the fact that the districts which have low initial wage rates experience greater percentage increases

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[6]For discussion on the processes of change in wage structure, See: Papola T.S. and Bharadwaj V.P. "Dynamics of Industrial Wage Structure: An Inter-country Analysis." The Economic Journal, March 1970.

in wage rates overtime. For this purpose we have taken the period 1956-57 to 1967-68 for 16 districts and 1950-51 to 1967-68 for 11 districts. 1956 happens to be the first year of the Second Five Year Plan in India. The coefficient of correlation was calculated between the levels of wage rates of 1956-57 and percentage increases in them by 1967-68 for 16 districts and levels of wage rates of 1950-51 and percentage changes in them by 1967-68 for 11 districts. They are shown in Table II-5.

Table II-5

Coefficient of Correlation between the District Agricultural Wage Rates and Percentage increases in them: 16 & 11 Districts

Period	Number of districts	Coefficient of correlation
1	2	3
1956-57 to 1967-68	16	- 0.3673*
1950-51 to 1967-68	11	- 0.7440**

Source: Calculated from table II-2.

*It is not significant at 5 per cent or 10 per cent level with 14 d.f. (t = 1.4780).

**It is significant at 1 per cent level of significance with 9 d.f. (t = 3.3408).

The negative correlation between the wage levels of 1956-57 and increases by 1967-68 point to the narrowing of the structure of wage differentials. However the value of correlation coefficient is not significant in case of 16 districts. Whereas negative correlation between the wage levels of 1950-51 and percentage rise in them by 1967-68 in 11 districts is significant at 1 per cent level of significance. Thus the structure shows narrowing both in respect of 16 and 11 districts. However the narrowing is significant in respect of 11 districts.

Relative and Absolute Dispersion of the Wage Structure;

The relative dispersion in the structure of agricultural wages is measured by coefficient of variation which is

$$\text{c.v.} = \frac{\sigma}{\bar{x}} \times 100$$

where,

σ is standard deviation.

$\bar{x}$ is mean of the series.

The absolute dispersion of the structure is measured by standard deviation:

$$\text{S.D.} = \sqrt{\frac{\sum x_i^2 - \frac{(\sum x_i)^2}{N}}{N-1}}$$

where,

N is the number of observations (districts).

Table II-6 shows coefficients of variation, standard deviation and mean wage rates for 16 and 11 districts.

Table II-6

Coefficients of Variation, Standard Deviation and Mean Wage Rates for 16 and 11 Districts: 1950-51 to 1967-68

Year	Coefficients of variation		Standard deviation		Mean	
	16 Districts	11 Districts	16 Districts	11 Districts	16 Districts	11 Districts
1	2	3	4	5	6	7
1950-51	-	29.43	-	0.471	-	1.60
1951-52	-	35.83	-	0.577	-	1.61
1952-53	-	27.46	-	0.412	-	1.50
1953-54	-	30.93	-	0.430	-	1.39
1954-55	-	29.43	-	0.418	-	1.42
1955-56	-	31.70	-	0.447	-	1.41
1956-57	22.50	21.19	0.360	0.301	1.60	1.42
1957-58	24.67	21.09	0.412	0.308	1.67	1.46
1958-59	22.85	19.09	0.400	0.294	1.75	1.54
1959-60	25.24	23.70	0.462	0.384	1.83	1.62
1960-61	28.27	26.60	0.540	0.447	1.91	1.68
1961-62	25.85	25.16	0.517	0.448	2.00	1.78
1962-63	24.80	19.21	0.506	0.342	2.00	1.78
1963-64	20.63	20.59	0.423	0.383	2.05	1.86
1964-65	25.69	21.07	0.573	0.411	2.23	1.95
1965-66	26.25	17.14	0.609	0.348	2.32	2.03
1966-67	24.44	20.95	0.611	0.463	2.50	2.21
1967-68	22.54	19.27	0.620	0.476	2.75	2.47

Source: Calculated from Table II-2.

Table II-6 shows that during 1956-57 to 1967-68 the relative dispersion for 16 districts was slightly more than that for 11 districts. The difference is to be expected as the districts of Saurashtra region except Amreli have not been included in the set of 11 districts. Nine out of these 11 districts are from the Gujarat region in the state. It will be also noted that the relative dispersion of wages among the 16 districts and also among the 11 districts has shown on the whole stability during the period 1956-57 to 1967-68. On detailed examination one will find a tendency to expand between 1956-57 to 1960-61 and the wage differentials show a tendency to narrow down during 1960-61 to 1967-68. However this tendency (considering time series) of wage differentials either to expand or narrow down is very weak in respect of 16 districts and a little more perceptible in 11 districts.

However considering the longer period of 1950-51 to 1967-68 i.e. 18 years we find a peculiar pattern of the inter-district differentials in case of 11 districts. (Column 3). Between 1950-51 to 1955-56 the coefficient of variation is significantly higher than in the remaining years of the period (Column 3). Thus approximately during the period of the first Five Year Plan the inter-district differentials of agricultural wages were much higher than in the rest of the period. On the other hand, the absolute dispersion (Columns 4 and 5) has increased steadily more or less throughout the period in respect of both 16 and 11 districts. It can be noted that the

absolute dispersion for 16 districts wage structure was .360 or 36 paise and .301 or 30 paise for 11 districts in 1956-57. Thus the overall absolute differentials have been low in 1956-57 and the difference in the two sets was of 6 paise. On the other hand by 1967-68, we find that the absolute dispersion in case of 16 districts had increased to .620 i.e. by 26 paise or 72.2 per cent. Whereas in case of 11 districts, it showed an increase of 18 paise or by 36 per cent. Thus in 1967-68 the absolute dispersion of the 16 district wage structure was higher by 14 paise than the absolute dispersion of the 11 districts wage structure. The significant point which emerges from the trends of relative and absolute wage differentials for 16 and 11 districts is that while the absolute wage differentials have widened steadily, there is only a slight narrowing of the relative dispersion of the wage structure. If we relate these trends to the "Law of Wage Differentials"[7] we find that our results do not fit into it completely. It will be noted that over the period considered in the present analysis the district agricultural wage rates as shown by district mean wage (Column 6) have risen continuously. However this has happened without there being any continuous contraction of relative wage differentials. If the high wage districts experience lower percentage rise in wage over time

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[7] Ross A.M. Trade Union Wage Policy. (Berkeley and Los Angeles, California University Press, 1948), pp.113-133.

is significant $\bar{x}$ (mean) would rise faster than standard deviation and hence c.v. will be lower i.e. the relative dispersion would narrow down. In our case what has happened is, for instance, the negative correlation between the initial district wage rates (1956-57) and percentage changes by 1967-68 (for 16 districts Table II-5) is not high or significant. And hence the years the standard deviation has increased faster than $\bar{x}$ or mean. As a result we find that absolute dispersion has widened without contraction in the relative dispersion of the structure. Hence from the pattern of behaviour which we notice in case of the districts, we cannot go to the extent of saying that there is no relationship between the wage levels and wage structure. But the explanation is to be found in the relationship between the magnitude of changes in the wage level and the mutual relation between the changes in absolute and relative dispersion. A large increase in wage levels can lead to increase in absolute and a decline in relative dispersion. But if the increases in wage levels are small then it will be accompanied by an increase in absolute and a smaller increase in relative dispersion.[8] This reasoning can be tested by taking an example. In case of 16 districts the mean wage has risen by 7 paise

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[8]In order to explain the patterns of changes in wage structure in different countries, Papola and Bharadwaj have developed this hypothesis. See: Papola T.S. and Bharadwaj V.P. Op.Cit., p.79.

(4.37%) between 1956-57 and 1957-58 and the absolute dispersion has gone up by 5.2 paise or by 14.14 per cent. The result is c.v. has increased from 22.50 in 1956-57 to 24.67 in 1957-58. Again between 1957-58 and 1958-59, the mean wage has increased by 8 paise or by 4.79 per cent but standard deviation has fallen from .412 to .400. The result is a substantial fall in coefficient of variation in 1958-59.

Thus, these two measures i.e. coefficient of variation and standard deviation show the over all or aggregative dispersion of the inter-district wage structure in agriculture. They highlight overall level both in absolute and percentage terms and also the nature of the change which has taken place in the wage structure of district agricultural wage rates. However these aggregative measures hide significant wage differentials among particular districts or groups of districts. It is important to examine this aspect of the wage structure. Because on the one hand we have districts like Panchmahals, Broach, Surat, Baroda etc., in which the agricultural wage rates are low and do not differ much from each other. However on the other hand in the districts of the Western region (Saurashtra region) in the state, such as Jamnagar, Junagadh, Rajkot etc., the agricultural wage rates are significantly higher. Again, these high wage districts constitute a group. Within this group at the top, the wage variations are small. The changes which take place among such groups of districts - the groups constituting the top and the

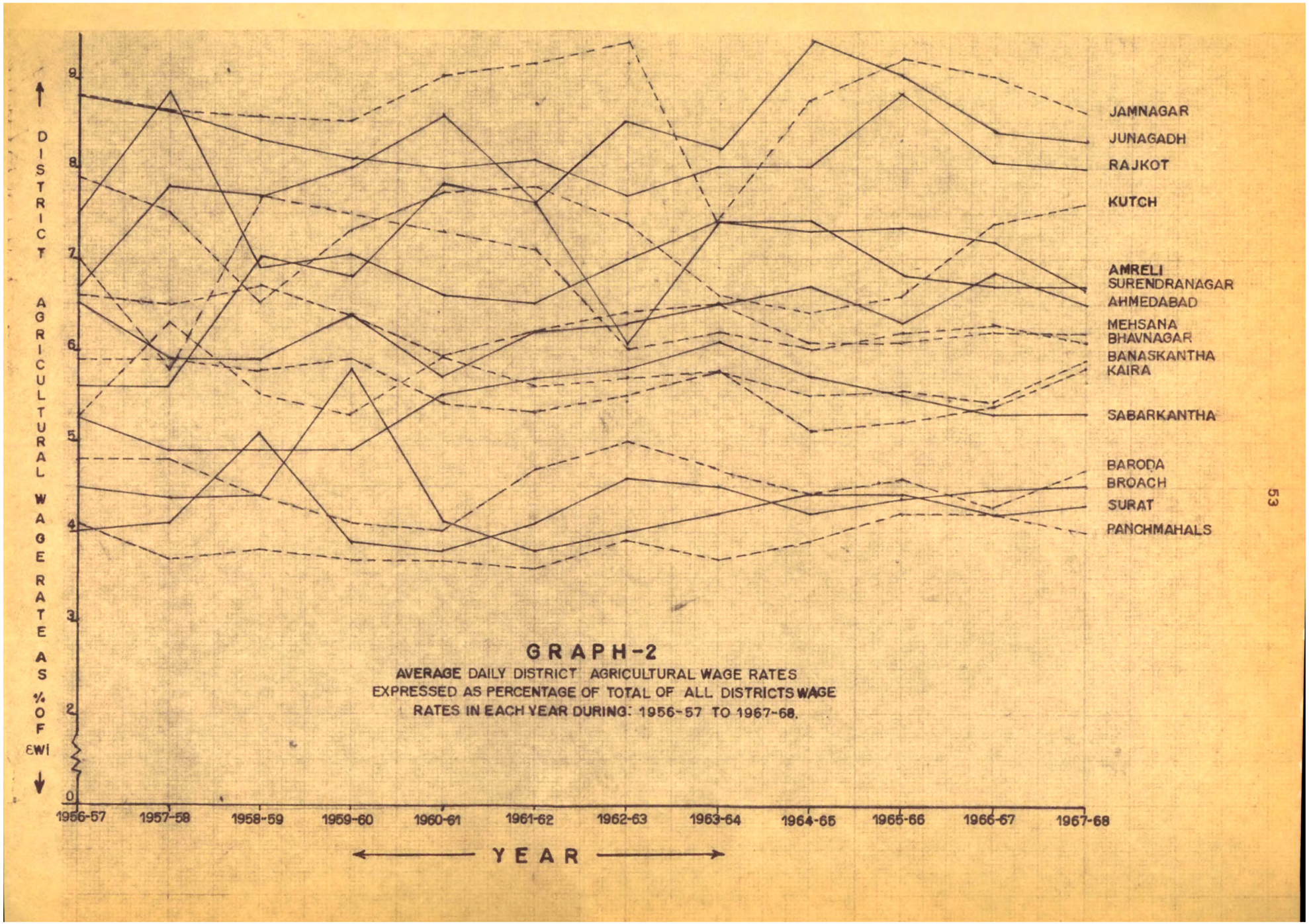
bottom of the wage structure - are not highlighted by the aggregative measures such as coefficient of variation and standard deviation. It is with this view that we have attempted the analysis of such high-low differentials. These are analysed as under:

We have defined high wage districts as those which fall in the upper quartile of the inter-district wage structure of a year and the low wage districts as those which belong to the bottom quartile of the wage structure. Keeping the ranking order of districts of 1956-57 as the basic rank order it can be seen (Table II-2) that, of the 16 districts, the 4 districts i.e. Rajkot, Jamnagar, Kutch, Surendranagar constitute the upper quartile of the wage structure in 1956-57. Of these, three districts Rajkot, Jamnagar and Kutch are found still in the upper quartile in 1967-68. The district of Surendranagar which had the second rank in 1956-57 is replaced by Junagadh in 1967-68. However it may be noted that the upper quartile of the wage structure has not remained very stable. This is indicated by the fact that the districts of Kutch and Surendranagar which occupied third and fourth ranks respectively in 1956-57, have frequently fallen out of the top group. For example Kutch has fallen out seven times and Surendranagar eight times in twelve years. Jamnagar has also fallen out twice in 1955-56 and 1963-64. Moreover within the upper group, ranks have inter-changed frequently.

In case of 11 districts the first three highest wage rates districts of 1956-57 i.e. Kutch, Ahmedabad and Kaira, are taken to constitute the upper group or top of the wage structure. In 18 years from 1950-51 to 1967-68 Ahmedabad has fallen out 11 times and Kaira four times from the upper group.

On the other hand, for 16 districts according to the ranking order of 1956-57, Broach, Panchmahals, Surat and Baroda constituted the bottom of the wage structure. None of these districts has fallen out of the bottom group practically in any year during 12 years between 1956-57 to 1967-68. Within this lowest group some changes in the ranks which have taken place are in the downward direction only.

In case of 11 districts the bottom of the wage structure is constituted by three of the same districts which constituted the lowest quartile for 16 districts. In case of 11 districts we have taken three districts at the lowest end. They are Panchmahals, Broach and Surat and as noted above none of these districts has been able to come out of the lowest group even in 18 years i.e. 1950-51 to 1967-68. It is thus depressing to note that the bottom of the inter-district agricultural wage structure in Gujarat has remained extremely stable. It is more stable than the upper quartile of the wage structure. The slight compressing tendency is from above and not because the wage rates in the bottom districts get elevated. The relative positions of district wage rates in the inter-district structure are highlighted by Graph .



GRAPH-2

AVERAGE DAILY DISTRICT AGRICULTURAL WAGE RATES EXPRESSED AS PERCENTAGE OF TOTAL OF ALL DISTRICTS WAGE RATES IN EACH YEAR DURING 1956-57 TO 1967-68.

The graph depicts each wage rate expressed as percentage of total of all 16 district wage rates in each year during the period 1956-57 to 1967-68. In other words each wage rate is shown as an element (in relative terms) in the structure. Since every wage rate is expressed as percentage, the scale effect or effect of absolute size is eliminated. A table showing these district wage rates as percentages of $\leq W_i$ (total of all wage rates in a year) is given in Appendix II-2.

The above graph highlights the nature of the inter-district structure of agricultural wage rates. It is interesting to note that the bottom of the wage structure which is comprised by the districts of Panchmahals, Broach, Surat and Baroda is highly stable throughout the period. In fact over the period, within the bottom group the positions have come nearer to each other because of a somewhat downward trend within the group. On the other hand the top group consisted of Rajkot, Jamnagar, Kutch and Surendranagar in 1956-57. It will be noted that the relative positions of wage rates in Kutch and Surendranagar have fallen below the top group frequently. Junagadh district has entered the top wage paying group and remained there.

Magnitude of High-Low Wage differentials:

For the measurement of the magnitude and changes of the high-low wage differential, we have used the following technique.[9]

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[9]This technique is used by Cullen D.C. to measure the high-low wage differentials in the inter-industry wage structure. See: Cullen D.C. "The Inter-Industry Wage Structure: 1899-1950". American Economic Review, June 1956.

For each year during the period 1956-57 to 1967-68, median wage is taken from the upper quartile and from the lower quartile. The median agricultural wage of the upper quartile is expressed as percentage of the median wage of the lower quartile. Similarly the absolute differential between the two median wage rates in each year, are calculated. These high-low percentage and absolute differentials are calculated separately for 16 districts and 11 districts.

Further the high-low relative and absolute wage differentials are computed for particular districts during the period. This is done by taking the wage rate of median districts in the upper quartile and the wage rate of median districts in the lower quartile in one particular year i.e. 1956-57. For example in 1956-57, the median districts of the upper quartile (considering 16 districts) were Jamnagar (Rank II) and Kutch (Rank III) and the median districts in the lower quartile were Surat (Rank XIV) and Panchmahals (Rank XV). The wage differentials are then calculated between these same two pairs of districts throughout the period. Their ranks may not be the same in other years. In case of 11 districts we took Kaira district which had Rank II in 1956-57 and the district of Panchmahals which had Rank X in the set of 11 districts. For each year during the period, we have calculated the relative differential (upper quartile median wage expressed as percentage of the lower quartile median wage) and the absolute differences for the same districts. All these different types of high-low differentials are shown in Table II-7.

Table II-7

High-Low Percentage and Absolute Wage Differentials in 16 and 11 Districts: 1950-51 to 1967-68

Year	Upper quartile median wage as percentage of the lower quartile median wage		Absolute differential between the upper quartile median wage and the lower quartile median wage		Upper quartile and the lower quartile median wage districts of 1956-57			
					Upper quartile median wage as percentage of the lower quartile median wage		Absolute differential between the upper quartile median wage and the lower quartile median wage	
	16 district	11 district	16 district	11 district	16 district	11 district	16 district	11 district
1	2	3	4	5	6	7	8	9
1950-51	-	209.90	-	1.11	-	185.96	-	0.98
1951-52	-	187.27	-	0.96	-	164.80	-	0.81
1952-53	-	164.28	-	0.72	-	169.69	-	0.69
1953-54	-	182.29	-	0.79	-	177.08	-	0.74
1954-55	-	164.00	-	0.64	-	164.00	-	0.64
1955-56	-	149.10	-	0.55	-	177.65	-	0.63
1956-57	192.79	159.43	1.03	0.63	192.79	159.43	1.03	0.63
1957-58	192.50	157.65	1.11	0.64	199.08	175.00	1.08	0.75
1958-59	168.65	152.41	0.92	0.55	183.62	176.63	0.97	0.82
1959-60	201.69	174.78	1.20	0.86	165.71	173.39	0.92	0.80
1960-61	209.01	200.84	1.33	1.20	215.00	158.77	1.38	0.67
1961-62	196.12	197.58	1.24	1.21	225.61	153.84	1.52	0.63
1962-63	185.71	182.44	1.20	1.08	216.27	144.09	1.50	0.56
1963-64	175.17	156.42	1.09	0.79	175.75	156.09	1.00	0.69
1964-65	192.90	153.16	1.44	0.84	180.66	129.57	1.21	0.42
1965-66	192.81	147.30	1.55	0.79	181.48	123.56	1.32	0.37
1966-67	191.86	162.35	1.58	1.06	193.52	128.40	1.59	0.48
1967-68	183.75	155.20	1.65	1.06	192.47	142.77	1.72	0.77

Source: Computed from Table II-2.

It will be noted from the table that the high-low percentage differentials among the 16 districts (Col.2) have been substantial i.e. the upper quartile median wage being 192.72 per cent of the median wage of the lower quartile in 1956-57. In 1960-61 the differential has widened the high being 209.01 per cent of the low. Since 1960-61 the percentage high-low differentials have shown narrowing though the tendency (to narrow) is weak. However the high-low absolute differentials (Col.4) have widened more or less all over the period. It was Rs.1.03 in 1956-57 and increased to Rs.1.65 in 1967-68. The trend of high-low wage differentials in the set of 11 districts is more clear. The percentage high-low differentials (these are between the two districts which have ranks II and X respectively all along the period) have narrowed down between 1956-57 to 1967-68. The high as the percentage of the low was 200.84 in 1960-61 and it declined to 155.20 in 1967-68 (Col.3). If we consider the long period 1950-51 to 1967-68, the same trend exists on the whole. Only during 1959-60 to 1962-63 there is expansion. The absolute high-low wage differentials in the set of 11 districts (Col.5) have declined between 1950-51 and 1955-56. They have risen between 1955-56 and 1961-62. Once again they have fallen between 1962-63 and 1965-66. In the last two years they are higher than in many years during the period. Thus while the percentage high-low differentials (in the set of 11 districts) has a general tendency to decline, the absolute differentials have not shown any consistent trend.

The high-low percentage wage differentials between the upper quartile and the lower quartile median districts of 1956-57 (16 districts, Col.6) have revealed the same tendency as revealed by the high-low wage differentials of Column 2 i.e. widening upto 1960-61 or 1961-62 and narrowing thereafter. The absolute differentials however have on the whole widened from Rs.1.03 in 1956-57 to Rs.1.72 in 1967-68 (Col.8).

The high-low percentage wage differentials between the same districts (Col.7, 11 districts) i.e. Kaira and Panchmahals which had ranks II and X respectively in 1956-57, have shown decline which can be observed more clearly. The absolute differentials between these two districts have also fallen, considering the period as a whole (Col.9). The districts of Kaira and Panchmahals (which had ranks II and X in 1956-57 in the set of 11 districts) belong to the Gujarat region of the state. These two are the adjoining districts.

Conclusion:

(1) The rank structure of the districts according to their agricultural wage rates during 1956-57 to 1967-68 has remained almost unchanged for 16 districts and 11 districts in the state.

(2) In shorter periods corresponding approximately to each of the first three Five Year Plans in India the rank stability of district wage rates is even greater.

(3) For 11 districts the rank structure of agricultural wages is slightly more stable during 1950-51 to 1967-68 than during 1956-57 to 1967-68. However considering the random variations of rank correlation coefficients on either side, (which can be seen for some of the years from Table II-4) it can be concluded that the underlying pattern of rank structure has remained unchanged over the period.

(4) The relative dispersion as shown by coefficient of variation has widened during 1956-57 to 1960-61 and shows narrowing during 1960-61 to 1967-68. While the absolute dispersion as measured by the Standard deviation has expanded,both for 16 and 11 districts wage structures. The absolute dispersion of 16 districts wage structure has expanded faster than for 11 districts wage structure. However the overall dispersion either in absolute or relative terms and for 16 or for 11 districts is not high. Thus these measures do indicate overall behaviour pattern of the inter-district wage differentials in agriculture but they conceal some significantly high wage differentials among the districts.

(5) The high-low percentage and absolute wage differentials in 16 districts have behaved according to the pattern followed by the overall measures of dispersion i.e. high-low percentage differentials have widened upto 1960-61 and narrowed down thereafter. While the absolute differentials have widened. Moreover both absolute and percentage differentials are quite high. In 11 districts the percentage high-low differentials have shown decline while absolute differentials have not shown any consistent trend.

(6) For 16 districts the levels and changes in the high-low percentage and absolute differentials among the same districts confirm the earlier conclusion i.e. the absolute differences have widened while the percentage differentials have widened and then have shown narrowing. In 11 districts on the other hand, both absolute and relative wage differentials between the same districts have shown narrowing.

Appendix II-1

Average Daily Agricultural Wage Rates in 16 Districts during July to June 1966-67

District	Months												
	July	August	September	October	November	December	January	February	March	April	May	June	Average
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Jamnagar	3.62	3.68	3.46	3.44	3.43	3.50	3.89	3.77	3.67	3.64	3.78	3.43	3.61
2. Junagadh	3.20	3.05	3.16	3.39	3.36	3.60	3.48	3.54	3.50	3.32	3.20	3.48	3.36
3. Rajkot	3.14	3.17	3.29	3.28	3.35	3.35	3.18	3.23	3.30	3.28	3.04	3.25	3.24
4. Bhavnagar	2.47	2.59	2.47	2.49	2.41	2.50	2.67	2.55	2.49	2.43	2.66	2.65	2.53
5. Surendranagar	3.09	2.64	2.83	3.33	3.09	2.95	2.80	2.75	2.80	3.00	2.81	2.67	2.90
6. Amreli	2.45	2.60	2.60	2.67	2.78	2.82	2.67	2.72	2.72	2.79	2.86	2.75	2.70
7. Kutch	2.93	2.88	3.15	3.13	3.08	3.09	3.03	3.02	2.92	2.68	2.81	3.02	2.97
8. Ahmedabad	2.56	2.78	2.78	2.67	2.58	2.84	2.62	2.85	2.85	2.45	2.75	3.33	2.76
9. Mehsana	2.52	2.39	2.40	2.37	2.39	2.44	2.55	2.55	2.60	2.75	2.57	2.54	2.51
10. Banaskantha	2.06	2.09	2.19	2.14	2.20	2.23	2.29	2.29	2.22	2.25	2.14	2.13	2.19
11. Sabarkantha	2.07	2.14	2.13	2.12	2.02	2.19	2.14	2.14	2.22	2.03	2.15	2.12	2.12
12. Kaira	2.02	2.12	2.12	2.03	2.16	2.21	2.25	2.17	2.17	2.18	2.27	2.33	2.17
13. Baroda	1.68	1.53	1.65	1.69	1.67	1.79	1.78	1.74	1.76	1.88	1.83	1.86	1.74
14. Panchmahals	1.62	1.61	1.68	1.66	1.64	1.61	1.60	1.66	1.63	1.84	1.80	1.88	1.69
15. Broach	1.62	1.69	1.74	1.79	1.66	1.83	1.84	1.78	1.88	1.92	1.91	1.92	1.80
16. Surat	1.52	1.66	1.77	1.65	1.76	1.76	1.69	1.69	1.66	1.75	1.71	1.78	1.70

Source: Calculated from wage rates reported in Gujarat Labour Gazettes, 1966, 1967.

Note: Daily wage in each month is the simple average of wage rates reported from different centres in each district.

Appendix II-2

Average Daily District Agricultural Wage Rates expressed as Percentage of Total of All Districts Wage Rates During 1956-57 to 1967-68

District	Year 1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Jamnagar	8.8	8.6	8.6	8.5	9.0	9.2	9.4	7.4	8.7	9.2	9.0	8.6
2. Junagadh	6.7	7.8	7.7	8.0	8.6	7.6	8.5	8.2	9.4	9.0	8.4	8.3
3. Rajkot	[illegible]	[illegible]	8.3	8.1	8.0	8.1	7.7	8.0	8.0	8.8	8.1	8.0
4. Bhavnagar	7.0	5.8	7.7	7.5	7.3	7.1	6.0	6.2	6.0	6.2	6.3	6.1
5. Surendranagar	7.5	8.8	6.9	7.0	6.6	6.5	7.0	7.4	7.3	7.3	7.2	6.6
6. Amreli	5.6	5.6	7.0	6.8	7.9	7.6	6.1	7.4	7.4	6.8	6.7	6.7
7. Kutch	7.9	7.5	6.5	7.3	7.8	7.8	7.4	6.6	6.4	6.6	7.4	7.6
8. Ahmedabad	6.5	5.9	6.1	6.4	5.7	6.2	6.3	6.5	6.7	6.3	6.9	6.5
9. Mehsana	5.3	6.3	5.5	5.3	5.9	6.2	6.4	6.5	6.1	6.1	6.2	6.2
10. Banaskantha	5.9	5.9	5.8	5.9	5.4	5.3	5.5	5.8	5.3	5.3	5.4	5.9
11. Sabarkantha	5.3	4.9	4.9	4.9	5.5	5.7	5.8	6.1	5.7	5.5	5.3	5.3
12. Kaira	6.6	6.5	6.7	6.4	5.9	5.6	5.7	5.8	5.1	5.2	5.4	5.8
13. Baroda	4.8	4.8	4.4	4.1	4.0	4.7	5.0	4.7	4.4	4.6	4.3	4.7
14. Panchmahals	4.1	3.7	3.8	3.7	3.7	3.6	3.9	3.7	3.9	4.2	4.2	4.0
15. Broach	4.0	4.1	5.1	3.9	3.8	4.1	4.6	4.5	4.2	4.4	4.5	4.5
16. Surat	4.5	4.4	4.4	5.8	4.1	3.8	4.0	4.2	4.4	4.4	4.2	4.3
Total of average rates (Σw_i)	25.6	26.7	28.0	29.3	30.6	32.0	32.0	32.8	35.7	37.1	40.0	44.1

Source: Calculated from Table II-2.

Note: The wage rate in each district is expressed as percentage of Σw_i (Total of all district wage rates in each year). This removes the effect of absolute size and only relative positions are highlighted.