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APPENDIX B

DISTRIBUTION OF INCOME ACCORDING TO INCOME-GROUPS

Income-groups (Rs.)				Percentage of families in this group	Percentage of income received by this group	Percentage of families in this group and lower ones	Percentage of income received by this group and lower ones	
Below	500	1961	..	..	34.69	15.36	34.69	15.36
		1967	..	..	3.77	0.74	3.77	0.74
500 —	750	1961	..	..	36.74	32.18	71.43	47.54
		1967	..	..	3.77	1.25	7.54	1.99
750 —	1,000	1961	..	..	12.25	14.54	83.68	62.08
		1967	..	..	15.09	6.85	22.63	8.84
1,000 —	1,500	1961	..	..	10.20	18.81	93.88	80.89
		1967	..	..	18.87	12.35	41.50	21.19
1,500 —	2,000	1961	..	..	2.04	4.85	95.92	85.74
		1967	..	..	28.31	27.04	69.81	48.23
2,000 —	3,000	1961	..	..	4.08	14.26	100.00	100.00
		1967	..	..	20.75	27.58	90.56	75.81
3,000 —	4,000	1961	..	..	—	—	—	—
		1967	..	..	3.77	7.17	94.33	82.98
4,000 and above		1961	..	..	—	—	100.00	100.00
		1967	..	..	5.67	17.02	—	—
Total		1961	100.00	100.00	—	—
		1967	100.00	100.00	—	—

PATTERN OF INCOME DISTRIBUTION IN RURAL AREAS

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The introduction of improved technology has accelerated the pace of transformation of the farm economy from subsistence level to profitable farm business. The green revolution in recent years has led to an increase in incomes of the farming

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community. Consequently this increase in income has an impact on the income of the other sections of the rural population depending directly or indirectly on agriculture.

One of the major objectives of Indian planning has always been to promote equality in income and wealth distribution and progressive reduction of concentration of incomes, wealth and economic power and to achieve the goal of socialist pattern of society. Keeping this objective in view, inequalities in income distribution must show signs of narrowing down with the rapid agricultural development in the rural areas. An attempt was made to estimate personal disposable income and its distribution among the categories of rural population, viz., farm families, farm labour families and non-farm families. The major objectives of the study were (1) to compare the per capita and per household incomes of different categories of rural population and (2) to study the concentration and variation in the income distribution.

METHODS AND MATERIAL

For this purpose, Jagraon and Sidhwan Bet development blocks of Ludhiana district were purposively selected. Five villages (3 from Jagraon block and 2 from Sidhwan Bet Block) were selected at random, the selection was in proportion to the population. The population of households of these villages was distinguished into three categories as (a) farm families, (b) farm labour families and (c) non-farm families. From each of these household categories 40 per cent of the families were selected at random from each selected village, thus selecting 54 farm families, 46 farm labour families and 29 non-farm families. Data collected from these families were the incomes during 1967-68 and 1968-69. Throughout this paper, the income concept used is that of disposable income. Disposable income was obtained by adding all the incomes, viz., net self-employment income, rent, interest, wages, salaries and gifts, etc., received by all the members of the family.

Estimates

If Y_{ij} is the income of the j th family of the i th category and m_{ij} is the size of the family, per capita income is given by

$$I_{ij} = \frac{Y_{ij}}{m_{ij}}$$

$$\bar{I}_i = \frac{\sum_{j=1}^{n_i} Y_{ij}}{\sum_{j=1}^{n_i} m_{ij}}$$

Where n_i is the number of sample families selected from the i th category.

$$I = \sum W_i \bar{I}_i$$

Where W_i is the weight given to the i th category worked out in proportion to the total population ($\sum W_i = 1$).

\bar{I} is the estimated average income per capita of the rural population of the area under study.

The variation of the household incomes within each category was compared with the help of the coefficient of variation and mean deviation from the mean.

To examine the concentration and disparity in the income distribution, the proportion of persons and of households in each income-size class was estimated. Log normality of the income distribution was tested with the help of probit test. Gini's concentration ratios were worked out to study the disparity in the income distribution.

RESULTS AND DISCUSSION

The distribution of per household disposable income of farm families, farm labour families and non-farm families is presented in Tables I, II and III. The average income in 1967-68 amounted to Rs. 9,412.11, Rs. 1,763.68 and Rs. 3,244.57 per household, respectively for farm families, farm labour families and non-farm families. These incomes increased correspondingly to Rs. 10,616.44, Rs. 2,032.21 and Rs. 3,680.07 in 1968-69. The percentage increase amounted to 12.80, 15.23 and 13.43. With this increase in the household income, the distribution pattern of this income was also changed. During 1967-68, about 30 per cent of the farm families had an annual income of above Rs. 10,000 and the proportion of such families in 1968-69 was about 41 per cent. Similar phenomenon was observed for the other categories.

TABLE I—DISTRIBUTION OF FARM FAMILIES BY HOUSEHOLD INCOME LEVEL FOR 1967-68 AND 1968-69

Disposable income (Rs.)	1967-68			1968-69		
	Percentage of households	Cumulative percentage	Average income per household	Percentage of households	Cumulative percentage	Average income per household
Below 3,000	14.81	14.81	2,741.37	12.96	12.96	2,304.00
3,000—4,000	7.41	22.22	3,673.00	9.26	22.22	3,408.00
4,000—5,000	9.26	31.48	4,541.40	5.56	27.78	4,762.00
5,000—6,000	9.26	40.74	5,430.60	14.81	42.59	5,491.00
6,000—8,000	12.96	53.70	6,898.43	9.26	51.85	6,649.20
8,000—10,000	16.67	70.37	9,161.33	7.41	59.26	8,959.50
10,000—15,000	9.26	79.63	12,392.40	24.08	83.34	12,877.23
15,000—20,000	9.26	88.89	17,258.80	3.70	87.04	15,833.50
20,000 and above	11.11	100.00	23,794.83	12.96	100.00	30,540.00
Overall	100.00	—	9,412.11	100.00	—	10,616.44

TABLE II—DISTRIBUTION OF FARM LABOUR FAMILIES BY HOUSEHOLD INCOME LEVEL
FOR 1967-68 AND 1968-69

Disposable income (Rs.)	1967-68			1968-69		
	Percentage of house- holds	Cumulative percentage	Average income per household	Percentage of house- holds	Cumulative percentage	Average income per household
500—1,000	8.70	8.70	725.00	6.52	6.52	800.00
1,000—1,500	32.60	41.30	1,178.67	26.09	32.61	1,281.67
1,500—2,000	23.91	65.21	1,700.00	21.74	54.35	1,685.80
2,000—2,500	17.39	82.60	2,168.75	19.56	73.91	2,202.22
2,500—3,000	8.70	91.30	2,703.50	8.70	82.61	2,630.50
3,000 and above	8.70	100.00	3,420.00	17.39	100.00	3,562.75
Overall	100.00	—	1,763.68	100.00	—	2,032.21

TABLE III—DISTRIBUTION OF NON-FARM FAMILIES BY HOUSEHOLD INCOME LEVEL
FOR 1967-68 AND 1968-69

Disposable income (Rs.)	1967-68			1968-69		
	Percentage of house- holds	Cumulative percentage	Average income per household	Percentage of house- holds	Cumulative percentage	Average income per household
1,000—2,000 ..	20.69	20.69	1,533.33	13.79	13.79	1,700.00
2,000—3,000 ..	34.48	55.17	2,650.40	24.14	37.93	2,547.14
3,000—4,000 ..	13.79	68.96	3,330.00	27.59	65.52	3,395.00
4,000—5,000 ..	20.69	89.65	4,437.33	13.79	79.31	4,712.50
5,000 and above	10.35	100.00	6,146.67	20.69	100.00	6,013.67
Overall ..	100.00	—	3,244.57	100.00	—	3,680.07

Income analysis on per capita (Tables IV, V and VI) basis showed that the farm families enjoyed the highest income, the average for this group being Rs. 1,004.08 during 1967-68 and Rs. 1,130.73 in 1968-69. On the other hand, the per capita income for farm labour families was the lowest, being Rs. 312.02 for 1967-68 and Rs. 365.47 for 1968-69. And these averages for non-farm families worked out to be Rs. 546.83 and Rs. 620.97 for 1967-68 and 1968-69, respectively.

TABLE IV—DISTRIBUTION OF PERSONS FOR FARM FAMILIES BY INCOME LEVEL
FOR 1967-68 AND 1968-69

Disposable income per person (Rs.)	1967-68			1968-69		
	Proportion of persons	Cumulative proportion	Average income per person	Proportion of persons	Cumulative proportion	Average income per person
Below 400 ..	12.06	12.06	294.79	9.29	9.29	293.28
400—600 ..	17.59	29.65	528.83	10.28	19.57	501.71
600—800 ..	21.74	51.39	742.21	19.76	39.33	677.07
800—1,000 ..	12.84	64.23	829.00	18.38	57.71	888.33
1,000—1,400 ..	17.79	82.02	1,191.75	16.60	74.31	1,172.46
1,400—1,800 ..	9.09	91.11	1,512.24	9.49	83.80	1,526.85
1,800—2,200 ..	1.58	92.69	2,109.00	7.90	91.70	1,956.55
2,200 and above	7.31	100.00	3,076.73	8.30	100.00	3,141.57
Overall ..	100.00	—	1,004.08	100.00	—	1,130.73

TABLE V—DISTRIBUTION OF PERSONS FOR FARM LABOUR FAMILIES BY INCOME LEVEL
FOR 1967-68 AND 1968-69

Disposable income per person (Rs.)	1967-68			1968-69		
	Proportion of persons	Cumulative proportion	Average income per person	Proportion of persons	Cumulative proportion	Average income per person
Below 250 ..	24.23	24.23	191.06	16.02	16.02	210.45
250—300 ..	23.08	47.31	265.83	15.23	31.25	280.43
300—350 ..	21.54	68.85	315.59	21.48	52.73	319.70
350—400 ..	8.46	77.31	365.00	14.45	67.18	362.62
400—500 ..	14.62	91.93	425.71	16.80	83.98	441.46
500—600 ..	7.30	99.23	524.21	13.28	97.26	551.95
600 and above ..	0.77	100.00	650.00	2.74	100.00	748.56
Overall ..	100.00	—	312.02	100.00	—	365.47

TABLE VI—DISTRIBUTION OF PERSONS FOR NON-FARM FAMILIES BY INCOME LEVEL FOR 1967-68 AND 1968-69

Disposable income per person (Rs.)	1967-68			1968-69		
	Proportion of persons	Cumulative proportion	Average income per person	Proportion of persons	Cumulative proportion	Average income per person
Below 300 ..	18.61	18.61	237.44	12.79	12.79	250.00
300—500 ..	30.23	48.84	392.37	24.42	37.21	401.61
500—700 ..	25.00	73.84	602.00	27.32	64.53	580.17
700—900 ..	13.37	87.21	747.61	15.12	79.65	770.15
900—1,100 ..	6.98	94.19	940.00	14.53	94.18	951.61
1,100 and above	5.81	100.00	1,169.80	5.82	100.00	1,335.20
Overall ..	100.00	—	546.83	100.00	—	620.97

Two indices of inequality, mean deviation from mean and coefficient of variation computed for each category are presented in Table VII. These indices measure the divergence of per household income from the average income per household. The higher the indices, the greater is the dispersion of the household income around the average and therefore the greater is the inequality among the households within each category.

TABLE VII—COEFFICIENT OF VARIATION AND MEAN DEVIATION FROM MEAN OF PER HOUSEHOLD INCOMES OF DIFFERENT CATEGORIES OF RURAL POPULATION : 1967-68 AND 1968-69

Categories	1967-68		1968-69	
	Mean deviation = $\frac{1}{n} \sum |x_i - \bar{x}|$	Coefficient of variation = $\frac{\text{s.d.}}{\text{mean}} \times 100$	Mean deviation = $\frac{1}{n} \sum |x_i - \bar{x}|$	Coefficient of variation = $\frac{\text{s.d.}}{\text{mean}} \times 100$
1. Farm families	5233.83	71.27	6594.85	96.04
2. Farm labour families	601.83	43.31	685.87	42.42
3. Non-farm families	1134.07	44.39	1295.93	44.16
Overall	—	77.91	—	84.17

The value of mean deviation from the mean is the least for farm labour families indicating that the household incomes are closer to the mean. This coefficient for farm families is the highest, the average dispersion from mean is about Rs. 5,233.83.

Although the coefficient of variation is a measure of dispersion, but it is sensitive to the extreme deviations. Small value of this coefficient will indicate the absence of extreme dispersing deviations. Again the coefficient of variation is the least for farm labour families and highest for farm families.

DISTRIBUTION OF INCOME

Log normality of income distribution (per household as well as per capita) was tested with the help of probit relationship. The value of this coefficient is 96.04, 42.42 and 44.16 per cent for farm families, farm labour families and non-farm families, respectively.

q_x = Proportion of persons with income x or less.

Y = Probit of q_x .

A linear relationship of the type $Y = a + b \log x$ was fitted to the given data for the year 1968-69. The results obtained along with the values of R^2 (coefficient of multiple determination) are presented in Table VIII.

TABLE VIII—PROBIT REGRESSION LINE FOR DIFFERENT CATEGORIES : 1968-69

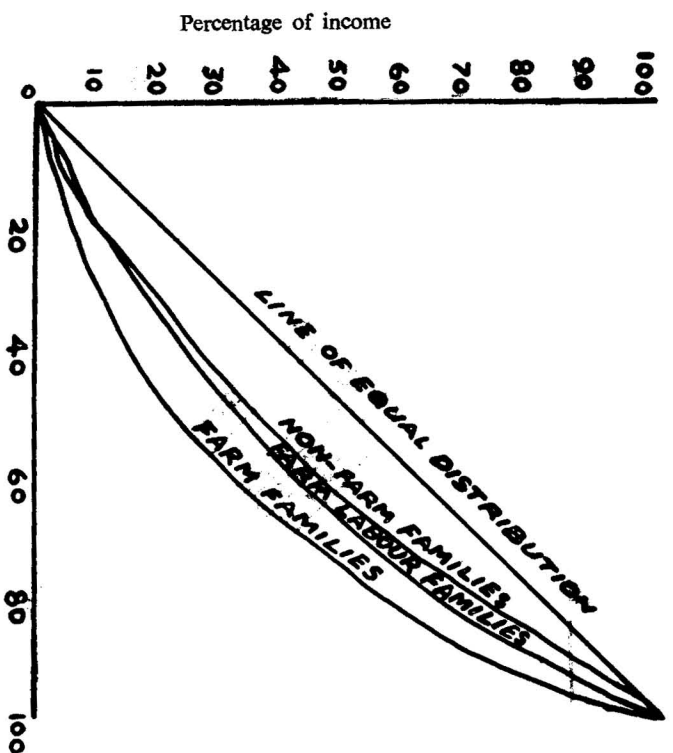
Category	Household income		Per capita income	
	Probit= $a+b \log x$	R^2	Probit= $a+b \log x$	R^2
Farm families	Probit= $-5.70 + 2.81 \log x$	0.95*	Probit= $-4.93 + 3.43 \log x$	0.99
Farm labour families ..	Probit= $-9.08 + 4.38 \log x$	0.87*	Probit= $-6.96 + 4.48 \log x$	0.98*
Non-farm families	Probit= $-10.51 + 4.46 \log x$	0.94*	Probit= $-11.86 + 6.77 \log x$	0.98*

* Significant at 5 per cent level.

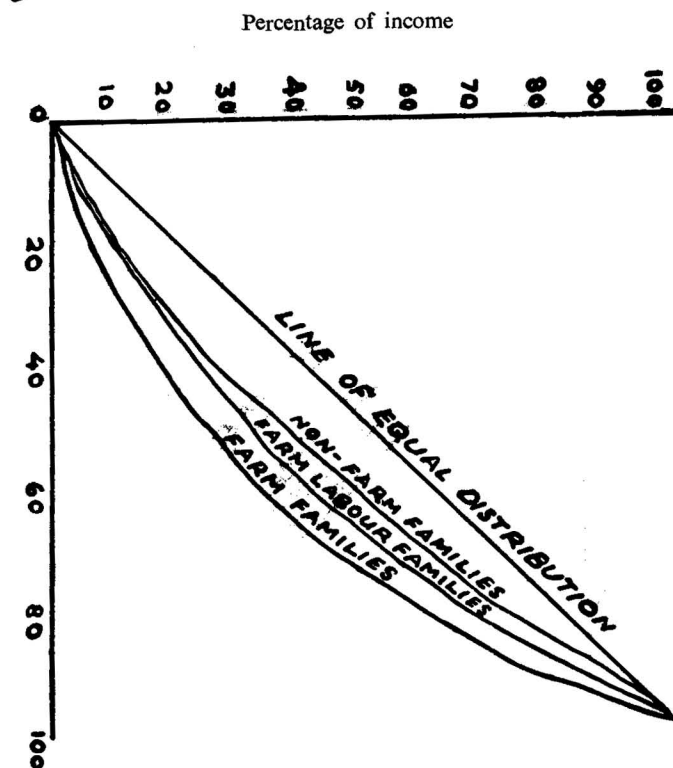
This table clearly shows a linear relationship between the probits and $\log x$ and thus indicating the log normality of the income distribution.

CONCENTRATION OF INCOME

For the purpose of studying concentration, the most useful distribution of income is that which indicates the share of aggregate income received by various segments of the groups being studied. Therefore, the selected families were averaged in ascending order of the household income separately for each category. These sample families were broken into five segments (each with 20 per cent of the families) and then the share of each of these segments in the total income was worked out and is shown in Table IX.



Percentage of Households : 1968-69



Percentage of Households : 1967-68

Figure 1—Share of Different Segments of Rural Households in the Total Income: 1967-68 and 1968-69

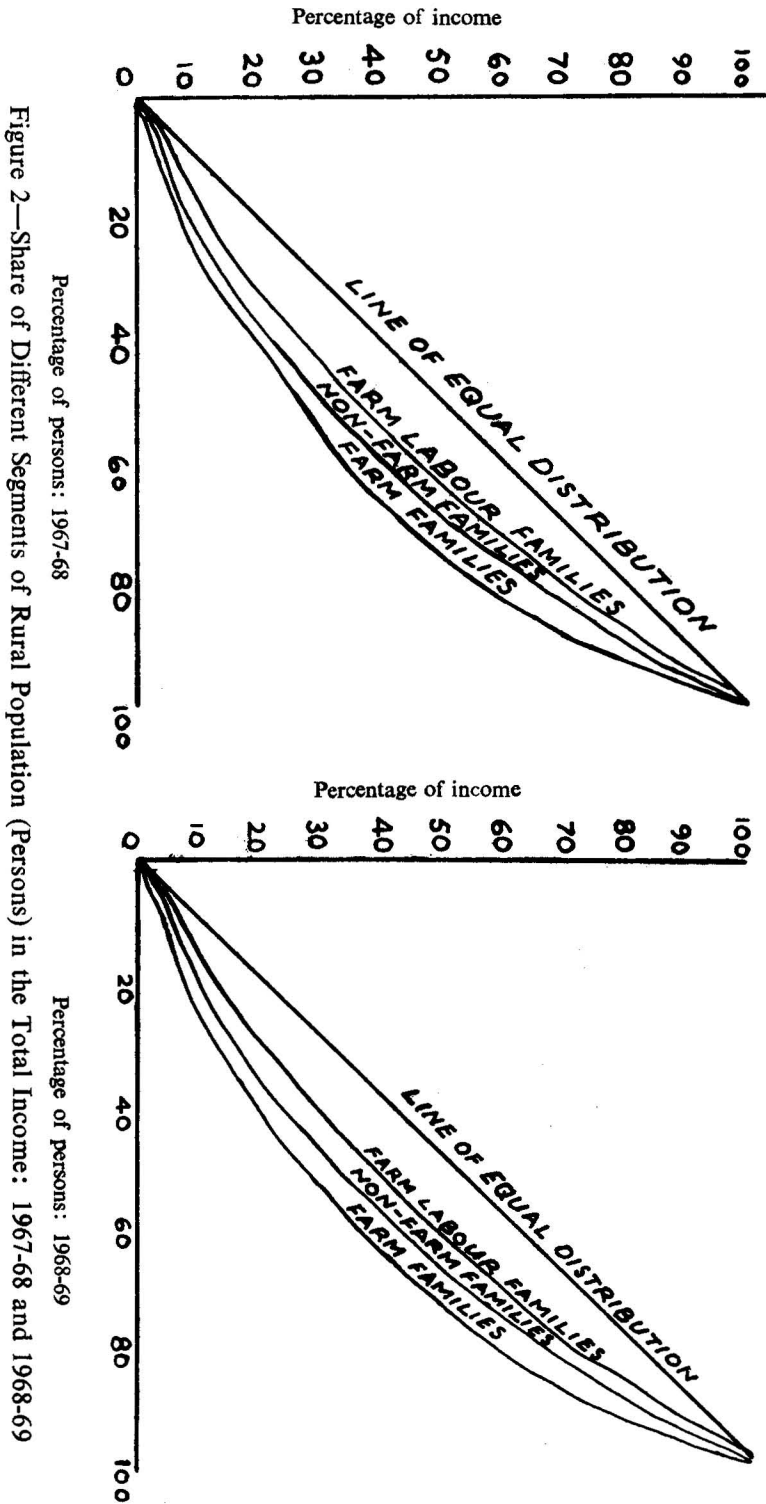


Figure 2—Share of Different Segments of Rural Population (Persons) in the Total Income: 1967-68 and 1968-69

The lower 20 per cent of the population (persons) share a small proportion of the total income (7 per cent for farm families, 12 per cent for farm labour families and 9 per cent for non-farm families). The percentage share of the upper segment worked out to be about 43 per cent, 30 per cent and 34 per cent for farm families, farm labour families and non-farm families, respectively. There is not much of variation in the percentage share of these segments from 1967-68 to 1968-69.

To depict the concentration of income distribution, Lorenz curves were drawn on the basis of per household incomes and per capita incomes separately for each category and these are presented in Figures 1 and 2. There is not much of variation between the years, but the variation in concentration is between groups.

GINI RATIO

A useful tool to summarise the degree of concentration of a given income distribution is called the Gini ratio—which is defined as twice the area between Lorenz curve and the Egalitarian line. Hence the more equal the income distribution, the closer the ratio is to zero and the greater the degree of inequality, the closer the ratio to one.

TABLE XI—GINI RATIO OF THE DISTRIBUTION OF THE HOUSEHOLD INCOME AND PER CAPITA INCOME FOR DIFFERENT CATEGORIES OF RURAL POPULATION : 1967-68 AND 1968-69

Categories	Gini ratio*			
	Per household income		Per capita income	
	1967-68	1968-69	1967-68	1968-69
Farm families .. ..	.37	.43	.33	.34
Farm labour families ..	.27	.27	.20	.19
Non-farm families ..	.20	.22	.27	.26

* Gini's ratios were worked out under the assumption of log normality of income distribution.

The concentration ratio for income per household and income per capita for farm families is the highest. Household incomes are more evenly distributed among non-farm families, the concentration ratio is only .20 and .22 for 1967-68 and 1968-69, respectively. And the distribution of per capita income for farm labour families is comparatively more even as the concentration of this category is the lowest which is .20 for 1967-68 and .19 for 1968-69.