A NOTE ON CONCENTRATION OF INCOME IN BENGAL VILLAGES

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If $\phi(x)$ stands for number of persons possessing income between x and $x + dx$ rupees, N total number of persons in the community and A and B lowest and highest possible income, then the number of individuals possessing an income of x rupees or more is given by

$$y(x) = \int_x^B \phi(x)\, dx \qquad \qquad \text{.. (1)}$$

Pareto has empirically shown that this can be approximated very closely by

$$y(x) = a x^{-\nu} \qquad \qquad \text{.. (2)}$$

where ν is always near about 1.5.

If p_x stand for the percentage of individuals possessing x or more and if q_x is the percentage of total income possessed by this percentage of the population, it can be easily shown that

$$q_x = 1 - (1 - p_x)^{1/\delta} \qquad \qquad \text{.. (3)}$$

where

$$\delta = \nu/(\nu - 1)$$

Equation (3) when plotted gives a clear picture of the distribution of income in a community. Gini's concentration ratio ρ within given by

$$\rho = 1/(2\nu - 1) \qquad \qquad \text{.. (4)}$$

gives a numerical measure of the inequality of income distribution

The object of the present note is to investigate how far the Pareto graduation is applicable to family income in Bengal villages. Two series of material have been used for this purpose. The first relates to the income of 680 families collected in the course of a complete survey of 12 villages surrounding Sriniketan (Visvabharati Institute of Rural Reconstruction) conducted by the Institute in 1937 under the technical guidance of Professor P. C. Mahalanobis. The second series relates to 232 families in six villages (Silimpur, Hatsahar, Amanipara, Ghorsal, Naopara, Roair.) in Bogra District collected in 1941 by Ramkrishna Mukherjea.

TABLE 1. ACCUMULATED FREQUENCY OF FAMILIES.

range of percapita income in Rs.		Sriniketan observed	Sriniketan graduated	Bogra observed	Bogra graduated
(1)		(2)	(3)	(4)	(5)
10 and above		—	—	232	756
20 " "		599	907	222	244
30 " "		460	497	186	126
40 " "		368	324	127	79
50 " "		283	233	83	55
60 " "		213*	170*	56	41
75 " "		159	128	42	28
100 " "		90	83	24	18
150 " "		49	46	10	9
200 " "		26	30	8	6
300 " "		15	16	2	3
400 " "		11	11	1	2
500 " "		8	8	1	1
600 " "		7	6	—	—
700 " "		4	5	—	—
800 " "		3	4	—	—
900 " "		3	3	—	—
1000 " "		3	3	—	—

* The values have been obtained by graduation.

The following equations give the results of income graduation :

Sriniketan : $\log y = 4.8882 - 1.4839 \log x$ .. (5)

Bogra : $\log y = 4.0077 - 1.6224 \log x$ .. (6)

The following table gives the values of r, ρ and δ for the two localities surveyed.

locality	r	ρ	δ
Sriniketan :	1.4830	0.5082	3.0665
Bogra :	1.6294	0.4427	2.5888

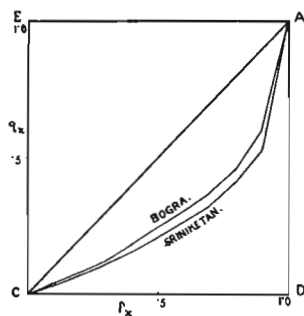The curves of concentration are drawn from the following equations

Sriniketan : $q_x = 1 - (1 - p_x)^{0.3261}$ .. (7)

Bogra : $q_x = 1 - (1 - p_x)^{0.3863}$ .. (8)

and the graphs are shown below.

CHART 1.   THE CONCENTRATION CURVES FOR BOGRA AND SRINIKETAN

The samples are not large enough to draw final conclusions but the close agreement between distributions relating to two sets of villages lying wide apart (one sample from West and the other from North Bengal) probably indicates a general tendency. In wealthy capitalist countries like U. S. A. where production is mechanised the Pareto curve is known to give a good fit with an average value of r of 1.56 ± 0.12 for the period 1914 to 1919. It is interesting to notice that the same graduation is applicable even to the income distribution in Bengal villages where modes of production are still primitive and predominantly agricultural, and actual incomes are small compared to those in U. S. A.

A large value of ρ (which is the ratio of area between AC and the concentration curve to the area of ADC) indicates a markedly unequal income distribution. The position in Bengal villages in this regard appears to be much the same as in most highly industrialized countries. This suggests that the characteristic income distribution (given by the Pareto curve) is more fundamental than methods of production, and that class structure of society is possible in a predominantly agricultural and industrially backward society in which mechanical methods of production have scarcely intruded.

The authors propose to discuss the class structure in Bengal village society in a future communication.

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