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PROBLEM OF SUB-MARGINAL FARMING IN WEST BENGAL.

by

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The concept of low income or sub-marginal farm may be defined from two very different approaches. An American agricultural economist* in discussing the nature of assistance given to low income farmers in the North "defines a low income farmer as one whose income is too low to enable him and his family to enjoy a decent American standard of living and to have a reasonable degree of security for the future." Obviously, such a definition will vary from persons to persons and from one country to another. This ethical humanist approach fixes the norm from extra-economic considerations and cannot be contradicted from economic stand point.

But the concepts like 'marginal', 'economic' or 'optimum' can also have a strictly precise scientific definition. But that is valid only in a competitive set up where they can be defined from condition characteristic of perfect competition viz., that cost of production equals prices and that cost of production is at a minimum.

The moment however, these concepts are brought down from a rigidly defined competitive structure to a system of imperfectly developed competition or even a semi-subsistence economy it becomes a difficult matter to define them properly. The use of these terms in agricultural economics is such a case in point.

As it is, competitive structure in agriculture is much different from that in industry specially in countries like India where subsistence economy on a family farm basis still dominates over the greater part of our Agricultural activity. Labour in this case is mostly self-employed and whatever is hired is unorganised and localised. Capital investment is very low, sometimes being at the most a plough and a pair of bullocks only; labour cost is high but the labour being mostly family labour can neither be retrenched nor dispensed with. In such cases concepts like 'marginal' and 'optimum' lose their significance as there is no question

* R. C. Smith—"Assistance to Low Income Farmers," Journal of Farm Economics 1939.

of retirement in case of loss nor any scope of expansion when there is profit.

In this respect the observations of some agricultural economists* are worth quoting. "The above discussion, like most economic theory, has assumed primarily with reference to production for market by employing factors of production having a market valuation and by enterpreneurs motivated primarily by the objective of maximum net profit .....agricultural competition continues to be influenced by certain peculiarities which do not conform closely to the pecuniary assumptions intrinsic in conventional theories."

A few examples may be cited.

(1) "Rent is often fixed even in Europe by custom and not competition (2) The family as a whole, not the individual, is frequently the unit of competition in labour's valuation of itself. Much family labour fails to respond to the inducement of commercial wage rates because of the obvious economic, social and psychological advantages of a continuing family connection. In areas where agriculture is not predominantly commercial there is frequently the added influence of lack of outside alternatives.

"Such considerations emphasise the need for modified farm management techniques, methods of land valuation and classification for small farm, especially for acres characterised by a good deal of production for home use. In fact some of the previous farm management conclusions with regard to most remunerative size of farms probably be invalidated if the considerations mentioned were taken into account.

"These considerations suggest also the possible desirability of modifications in the assumptions and conclusions of marginal theories, and moreover help to explain such economic and social phenomenon as the persistence of apparently unprofitable types of farming; continued use of areas clearly sub-marginal for pecuniary economy; excessive rentals and land values, or for instance rack-renting in Ireland and the resistance of village economy to the intrusion of agricultural capitalism."

Another insurmountable difficulty in determining the marginal and remunerative size of farm in places like Indian is the impossiblity of getting proper figures of farm business. Farms here being mostly run on a family basis and monetary transactions being often carried on with-

* Gray & Regan—"Land Economic Theory." Journal of Farm Economics 1940.

out proper accounting it is almost impossible to get any reliable figures of cost and prices on a scale that will give our conclusions any validity.

Considering these difficulties a new approach to this problem has been suggested in this paper which by-passes actual cost and price considerations but is based on certain realistic assumptions regarding the economic behaviour of the farmers which are deduced from the observation of actual data rather than formulated on theoretical considerations. The method was first suggested by one of the authors (Ghosh).* It has however been modified and made more exact in the present paper.

As the capital invested, expenditure, net income etc., cannot be obtained, here a simpler approach has been tried. It is to consider the relative change in the area owned by a farmer and the area he cultivates; the latter includes the area he may not own but cultivates on lease or a share-cropping basis.

The data used in this paper have been obtained in a survey conducted by the Indian Statistical Institute covering 475 square-mile cells picked up at randum from the province. Families covered in the survey were 80,000. The survey was carried out during 1946-47. In this paper we refer to 'farmers' or 'cultivators' in a narrow sense i.e. those families whose principal source of income is from cultivation of the soil either as an owner or as a tenant. Mixed types of occupation have been deliberately avoided as the realistic assumption regarding the role of the cultivated holding etc., in his economy cannot be laid down so easily.

Two distinct levels have been fixed basing ourselves on the following assumptions.

1. In a cultivator economy, irrespective of the area owned, the cultivator must have under the plough an irreducible minimum of area to keep his family employed at least on a subsistence level. From this assumption the existence of a 'subsistence' or 'floor' of the farm size is deduced. This is akin to the 'wolf point' of Pareto in the income distribution curve.

2. The marginal size of holding is that holding below which there is a tendency of taking in more land to cultivate.

Table (1) gives mean area owned or cultivated, the average number of plough cattle and the average size of family of the cultivators in West Bengal classified by the area owned.

* A. Ghosh—Marginal Size of holding in Bengal (To be published in Sankhya).

Table (1)

Land owned per family (acres)	No. of families	Average per family			
		Land cultivated (acres)	Land owned (acres)	Size of family	No. of plough cattle
(1)	(2)	(3)	(4)	(5)	(6)
0— 0.0	1236	3.8320	——	4.8834	1.3802
— 1.0	690	4.3055	1.4011	4.9657	1.4783
1— 2.0	1431				
2— 3.0	1275	3.4447	2.3328	5.1270	1.8125
3— 4.0	901	4.2725	3.2991	5.6958	2.0632
4— 5.0	699	5.0745	4.1433	6.1416	2.3047
5— 6.0	453	5.8002	5.2750	6.3957	2.4967
6— 7.0	345	7.5449	6.3591	6.8405	2.7623
7— 8.0	197	7.1720	7.2817	7.0609	3.0406
8— 9.0	189	8.3809	8.2614	7.5767	3.3439
9—10.0	122	8.6836	9.2582	7.3114	3.0902
10—11.0	136	9.8676	10.1221	8.7132	3.7573
11—12.0					
12—13.0	124	10.7008	11.3484	8.0080	4.2500
13—14.0	65	11.9923	13.3354	8.1230	3.8153
14—15.0	46	12.3347	14.2609	9.2391	4.1304
15—16.0	32				
16—17.0	44	15.4539	15.6434	9.6842	4.3552
17—18.0	29	13.0517	17.2448	8.4827	4.0000
18—19.0	24	15.8666	18.8583	9.0416	5.2916
19—20.0	10	17.2900	19.5700	10.2000	5.7000
20—21.0	38	16.3684	20.5921	10.3684	5.7631
above 21.0	121	19.6482	26.2393	13.6099	5.8653

As has already been remarked, since bullocks are the only important capital investment and family the main source of labour for most cultivators the average size of land owned, plough cattle and size of family give, therefore, a close approximation of the available resources of the farmer.

From the general movement of the data in table (1) two points may be noted. For varying size of family and cattle and area owned, the area cultivated seems to be fairly on the same level without any increasing trend upto a little above 4 acres. This points to the correctness of the first assumption regarding the existence of a subsistence level of farming below which a 'pure' cultivator cannot afford to cultivate.

As area owned, size of family and plough cattle go on increasing, the area cultivated tends to increase up to about 9 acres. After 9 acres have been exceeded, even for a steady increase in those factors, the area cultivated does not increase proportionately. It tends proportionately to decrease. This points to the existence of the second level of an optimum size which can be tilled on a family farm basis under present technical and managerial conditions.

For accurate determination of the marginal and subsistence levels of farming straight lines were fitted on the logarithms of the four variables considered here.

Let x_1 denote land cultivated per family
x_2 ,, ,, owned ,, ,,
x_3 ,, plough cattle ,, ,,
x_4 ,, size of family

Let $x_1 = \text{Log}_{10} x_1$, $x_2 = \text{Log}_{10} x_2$, $x_3 = \text{Log}_{10} x_3$, $x_4 = \text{Log}_{10} x_4$

Then, $\bar{x}_1 = 0.96358$ Let $S_{11} = (x_1 - \bar{x}_1)^2$ $S_{12} = \sum(x_1 - \bar{x}_1)(x_2 - \bar{x}_2)$
$\bar{x}_2 = 0.94693$ $S_{22} = (x_2 - \bar{x}_2)^2$ $S_{13} = \sum(x_1 - \bar{x}_1)(x_3 - \bar{x}_3)$
$\bar{x}_3 = 0.53112$ $S_{33} = (x_3 - \bar{x}_3)^2$ $S_{14} = \sum(x_1 - \bar{x}_1)(x_4 - \bar{x}_4)$
$\bar{x}_4 = 0.89111$ $S_{44} = (x_4 - \bar{x}_4)^2$ $S_{23} = \sum(x_2 - \bar{x}_2)(x_3 - \bar{x}_3)$
$S_{24} = \sum(x_2 - \bar{x}_2)(x_4 - \bar{x}_4)$
$S_{34} = \sum(x_3 - \bar{x}_3)(x_4 - \bar{x}_4)$

$S_{11} = 0.940068$ $S_{12} = 1.380671$ $S_{13} = 0.694215$ $S_{14} = 440581$
$S_{22} = 2.166685$ $S_{23} = 1.065676$ $S_{24} = 0.663099$
$S_{33} = 0.544645$ $S_{34} = 0.334962$
$S_{44} = 0.224264$

Solving for the constants in the equation
we have $x_1 = 0.96358 + 0.211931\,(x_2 - \bar{x}_2) + 0.455744\,(x_3 - \bar{x}_3) + 0.657229\,(x_4 - \bar{x}_4)$
i.e. $x_1 = -0.062703 + 0.211931 x_2 + 0.455744 x_3 + 0.657229 x_4$

The nature of the fit obtained may be appreciated from the multiple coefficient of 0.97 between the observed and expected values calculated as follows :

$x = 19$, 4 constants to be fitted $\therefore$ df $= 15$
s.s. due to error $= 0.041514$
per degree ,, ,, ,, $= 0.002768$
s.s. due to estimates $= 0.898554$
and S_{11} $= 0.940068$
$R^2 = (0.978)^2$ *i.e.* $R = 0.978$

The concept of opitimum holding for fixed size of family and fixed number of plough cattle.

Optimum holding is that holding below which a cultivator prefers to cultivate more even without any change in his technical factors.

In the curve fitted for x1, x2, x3, x4, if we put x1, = x2 for given values of x3 and x4 we get a series of values of x1, x2, which we may say, represent the optimum holding for the given size of cattle and family. Optimum holding of course varies from family to family according as their supply of labour and capital as represented by size of family and cattle increases or decreases. The difference in the actual value of x1, for a given x3, x4, and the value of x1 for x1, = x2 will give the excess or otherwise of the amount from the optimum size.

Table (2) gives the actual values of x1 and values at x1 = x2 for given x3 which will illustrate this point.

Table (2)

Range of acreage owned	Actual value of x_1 (Land cultivated)	Value of x_1 for $x_1=x_2$ optimum (holding)	Actual values of (land owned) x_2	plough cattle x_3	size of family x_4	Col. (2) as % of Col. (3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0— 2	4.3055	3.972	1.4011	1.4783	4.9657	108
2— 3	3.4447	4.590	2.3328	1.8125	5.1270	75
3— 4	4.2725	5.401	3.2991	2.0632	5.6958	79
4— 5	5.0745	6.131	4.1433	2.3047	6.1416	83
5— 6	5.8002	6.643	5.2750	2.4697	6.3957	87
6— 7	7.5449	7.448	6.3591	2.7623	6.8405	101
7— 8	7.1720	8.084	7.2817	3.0406	7.0609	89
8—9	8.3809	9.058	8.2614	2.3439	7.5767	92
9—10	8.6836	8.401	9.2582	3.0902	7.3114	103
10—11	9.8676	10.150	10.1221	3.7573	8.7132	97
11—13	10.7008	10.896	11.3486	4.2500	8.0080	98
13—14	11.9923	10.361	13.3354	3.8153	8.1230	116
14—15	12.3347	12.076	14.2609	4.1304	9.2391	102
15—17	15.4359	12.951	15.6434	4.3552	9.6842	119
17—18	13.0517	11.040	17.2448	4.0000	8.4827	118
18—19	15.8666	13.688	18.8583	5.2916	9.0416	116
19—20	17.2900	18.980	19.5700	5.7000	10.2000	91
20—21	16.3684	16.120	20.5921	5.7631	10.3684	101
21 & above	19.6482	20.432	26.2390	5.8653	13.6099	96

Apart from occasional fluctuations it can be seen that generally all cultivators owning upto 9 acres actualy cultivate holdings which are less than they would prefer to cultivate. That is to say, their labour power and their capital is not fully utilised. Cultivators owning above 9 acres generally cultivate holdings consistent with their available man-power and cattle and anything they own beyond that they obviously give out on share or lease. One rather interesting feature is to be noted in the lowest range of ownership. Actually in this range the families exhaust their manpower and cattle. This can be easily explained. Owning mostly little land and forced to live more on share-cropping (which means actually less than half the crop goes to them) such families are forced either to change their occupation or to get more land for cultivation at any cost. The families owning upto 6 or 7 acres also cultivate holdings which are less than they can efficiently manage but their urgency is less compared to this group.

From this trend of the data we may therefore say that all families owning less than 9 acres actually have sub-marginal holding and families above 9 acres in their possession actually cultivate holdings which are optimum in our sense. 9 acres is thus a sort of dividing line. Using the technique explained previously, curves were fitted excluding first plough-cattle and second both plough-cattle and size of family.

Thus with x_2, x_3 and x_4

we have

$x_1 = 0.96358 + 0.211931\ (x_2 - \bar{x}_2)\ 0.455744\ (x_3 - \bar{x}_3) + 0.657229\ (x_4 - \bar{x}_3)$

$= -0.062703 + 0.211931 x_2 + 0.455744 x_3 + 0.657229 x_4$. Excluding cattle *i.e.* with x_2 and x_4

$x_1 = 0.96358 + 0.378409\ (x_2 - \bar{x}_2) + 0.845692\ (x_4 - \bar{x}_4)$

$= -.148351 + 0.378409 x_2 + 0.845692 x_4$

Excluding cattle and family size, *i.e.* with x_2 only

$x_1 = 0.96358 + 0.637227\ (x_2 - \bar{x}_2)$

$= 0.360171 + 0.637227 x_2$

i.e. $\log x_1 = 0.360171 + 0.637227 \log x_2$

It was found that more than 90% of the variation in land cultivated is explained by the fitted line. The Multiple correlation coefficient with constants fitted being .978, for 3 constant (i.e. excluding cattle) the Multiple correlation coefficient .970; for two constant (i.e. excluding cattle and family size) the Multiple correlation came up to .967. After applying suitable statistical tests it was found that the effect of plough-cattle is negligible and the effect of family size also can be taken to be negligible with reasonable confidence. With only two constants we get only one marginal holding size.

Thus $\log_{10} x_1 = 0.360171 + 0.637227 \log_{10} x_2$

For marginal holding,

$$\log x_1 = \log x_2 = 0.9928$$

Hence $x_1 = x_2 = 9.8356$ acres.

$\log x_1 A + 0.637227 \log_e x_2$

Thus $\dfrac{x_2}{x_1} \dfrac{dx_1}{dx_2} = 0.6372$

The amount of land cultivated is therefore highly inelastic with respect to the amount owned. This inelasticity arises from the State of technique available in the country.

The following table gives the number of families and p.c. to total belonging to the three broad groups thus defined.

TABLE (3)

Economic levels	Range	No. of families	P.C. to total
(1)	(2)	(3)	(4)
Subsistence level ..	0—5	6632	77.9
Sub-marginal	5—10	1306	15.3
Above the marginal ..	10—above	569	6.8
Total ..		8507	100.0

It will be seen, therefore, that 93.2% of the cultivators of Bengal have sub-marginal holdings and barely 6.8% have holdings above the margin. The following table will give a rough idea of the income of a cultivator corresponding to the land owned by him.

TABLE (4)

Range of Area owned in acres	No. of families	Land owned per family	Income per family	Levels
(1)	(2)	(3)	(4)	(5)
			Rs.	
0— 0.9	25	0.856	667	Subsistence
1— 1.9	40	1.457	722	
2— 2.9	51	2.378	1000	
3— 3.9	34	3.310	1040	
4— 4.9	21	4.452	1231	
5— 5.9	25	5.488	1513	Sub-marginal
6— 6.9	24	6.350	1362	
7—10.9	16	9.100	1392	
12—12.9	1	12.400		Above-margin
14—14.9	3	14.400		

The table can give only a very rough idea of the income because of the inadequate number of families on which the result has been obtained specially in the higher groups.

The following figures give the income and expenditure components of the cultivator families for the different income groups.

TABLE (5)

Income per family	Income by source		Sale of crops	Expenditure by major items		
	Caste profession, wages etc.	Loans, sale of Assets etc.		Food, clothing, fuel etc.	Food etc. not-purchased but home-grown	Collected
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0— 600	18.4	19.1	62.5	29.2	53.9	17.0
600—1200	16.0	18.4	65.6	32.3	53.9	13.8
1200—1800	13.4	13.4	73.2	38.2	53.1	8.7
1800 & above	15.1	15.1	69.8	43.8	84.85	7.7

It will be seen the 'poorer' groups of cultivators derive more from wages etc., and slightly less from sale of crops. They also spend less cash

and consume more of homegrown products and food, fuel etc. collected from the fields.

It has been seen that major portion of the cultivators in Bengal cultivate holdings less than required for a subsistence level, under such circumstances the natural conclusion emerges that such families will be forced to go out to look for jobs elsewhere. Theoretically they would leave agriculture and find industrial jobs elsewhere, but unemployment in industry forces them to stay on the farm.

Not only that. "The small farm may be regarded as an opportunity to obtain food and shelter which may enable members of the family to take advantage of casual employment that would not yield sufficient income for subsistence as a single form of employment".

It is in this way that the poor sub-marginal cultivators balance their meagre budgets. As such they offer strong competition to the pure, landless agricultural labour and have better staying power than the landless labourers.

This will be clear from an analysis of the agricultural labourers and their principal family occupation.

Table (6) on (page 94) gives the estimated number of agricultural labourers and their composition both by the family occupation of the labourer concerned as also the other occupation of the individual.

Cols. (3)—(6) give the percentage composition of the agricultural labourers by their family occupation while cols. (8)—(11) give the estimated number of agricultural labourers (for the province) in each occupational group. It will be seen that 24.9 lakh of persons are partly or wholly engaged in agricultural labour. Of this however 8 lakhs or nearly one-third come from families who depend not on agricultural labour but on cultivation for their living primarily and on labour only as a secondary means of livelihood. 14 lakhs or roughly more than half come from families who depend wholly on agricultural labour. Thus the pure agricultural labour type amounts roughly to 14 lakh only out of 24.9 lakhs. It will also be of interest to note that out of 24.9 lakhs agricultural labourers only 8.9 lakhs have no other subsidiary individual occupation while 11.5 lakhs have other agricultural persuits as well and 4.4 lakhs have non-agricultural occupation along with agricultural labour. The 'pure' agricultural labourers i.e. those individuals who have no other occupation and whose families depend only on labour amount to only 7.0 lakhs or less than one-third of the total number of agricultural labourers.

TABLE (6)

Family occupation	Persons in the survey	P.C. of total persons engaged in agr. lab. as				Not engaged in labour	Estimated No. of persons in lakh for the province engaged in agr. labour as				Not engaged in agr. lab.	
		only occpn.	with agri.	with non-agri.	Total		only occpn.	with agr.	with non-agr.	Total		Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Cultivator	1,30,059	0.4	2.4	0.1	2.9	97.1	1.7	6.7	0.2	8.0	294.0	302.0
Agr. Labour	21,162	15.7	10.0	5.8	31.5	68.5	7.0	4.5	2.6	14.1	35.0	49.1
Other Agr.	13,432	0.3	0.3	0.4	1.0	99.0	0.1	0.1	0.1	0.3	30.9	31.2
All Agr.	1,64,653	2.4	3.2	0.8	6.4	93.6	8.2	11.3	2.9	22.4	360.0	382.4
Non-Agr.	73,045	0.4	0.2	1.0	1.6	98.4	0.7	0.3	1.5	2.5	167.1	169.6
All Occupations	2,37,698	1.8	2.3	0.9	5.0	95.0	8.9	11.6	4.4	24.9	527.1	552.0

The number of families depending on agricultural labour solely is almost equal to the number depending on it for a portion of their income. This hybrid composition of agriculture labourers raises some problems peculiar to this province.

Table (7) analysing the agricultural labourers by the land owned, by their family and the major occupation of their family makes our point quite clear.

TABLE (7)

Cultivable area owned in acres	P.C. of families under principal family occupation				Percent of labourers under principal family occupation			
	Cultivator	Agr. lab.	Non-Agri.	Total	Cultivator	Agr. lab.	Non-Agr.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0	8.4	50.9	57.7	30.4	17.5	75.8	66.8	41.9
0.1—1.99	37.3	45.9	34.1	36.9	47.0	2222.7	30.9	44.4
2.0—4.99	35.0	3.8	6.3	21.1	28.0	1.3	1.5	10.8
5.0—9.99	13.4	0.3	1.3	7.8	6.1	—	0.8	2.3
10 & above	5.9	0.1	0.6	3.7	1.4	0.2	—	0.6
Total ..	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

It will be seen that considerable section of the agricultural labourers have been recruited from the cultivator classes. Cols. (6)—(9) classifying the labourers by their family occupation and the area owned by their families will fully explain their position.

The large bulk of labourers (64.5% are recruited from the cultivator class having in their family less than 2 acres. A considerable proportion (28%) owns 2-5 acres. 17.5% come from families who are landless share croppers. Of the persons from agricultural labour families 76% and of non-agricultural families 67% of those who come for hired labour are from landless families and about 22.7% and 30.9% respectively are from families owning less than 2 acres. Of the total number of labourers 42% are from landless families, 44% from families with land less than 2 acres and 11% from families with 2-5 acres only, while 2.9% come from families with about 5 acres.

It will be obvious from the above discussion that the major problem of the sub-marginal farmer to-day is the inadequate size of his farm. He is tenaciously holding on to the small farm and trying to supplement his income mainly by offering himself as a hired labourer. The net result

of this is a stiff competition between the landless labourers and the part-time labourers which depresses the scope of employment of both.

For a real readjustment of this state of affairs at least the subsistence level of holding should be given to each cultivator as his own and not as a share-cropper. This will immediately put him into a comparatively secure position, release the pressure he exerts on the labour market. This will also put an end to the parasitical form of exploitation going on under the share-cropping system.

THE PROBLEM OF LOW INCOME FARMER

by

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Low-Income Farmers

Family farm is the most predominating organisational feature of Indian agriculture. Most of the farm operations are performed by family labour, hired labour being employed only during seasonal rush for agricultural work. Therefore, Farm Business Income,* instead of profit in the commercial sense, is a fair criterion for determining whether a farmer belongs to the low income group. Those farmers, who earn very low Farm Business Income, which is insufficient or just sufficient to maintain their families on a standard of living considered low even according to Indian standards, may be said to constitute the low income group in India.

The results of a study of the farm business income of 53 farmers, in different regions of the U.P., are summarised in Table No. 1. In case No. 1, the results refer to 22 farmers in East U.P. where the average annual rainfall is 44", and the main crops are paddy, small millets, sugarcane, barley, pea and arhar. Paddy is grown mostly without irrigation while sugarcane, barley and pea are raised with the help of well and tank irrigation. Case No. 2 refers to 6 farmers in a village situated at a distance of 2 miles from the city of Kanpur. Mostly vegetables are raised with the help of canal irrigation. The cultivation is rather intensive,

* "Includes profits in the business sense of the term, earnings of the family labour, the unpaid amount of the interest on account of the owned capital and the difference between the estimated rent and the actual revenue paid, in case the land is owned."