

A NOTE ON THE MARGINAL AND THE OPTIMUM SIZE OF HOLDING IN BENGAL

By A. GHOSH

Statistical Laboratory, Calcutta.

The concepts of marginal, economic and optimum size of production units have a very precise significance only in a competitive set up where they can be clearly defined from the conditions characteristic of perfect competition.

The moment 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. In fact, these terms lose the strictly scientific significance ascribed to them in economics and a number of non-economic considerations enter into the system to determine these concepts. The use of the concepts, in defining the marginal size of holding or the optimum size of holding in agriculture is a case in point. As it is, competitive structure in agriculture is much different from that in industry specially in an area like Bengal, where subsistence economy and family labour still dominate over agriculture to a great extent. Most of the farmers work in their own field and do not employ outside labourers. Hired labour is unorganised and localised. Capital investment is very low, sometimes being at the most, a plough and a pair of bullocks only. Cost of labour is high. But the labour being mostly family labour can neither be retrenched nor dispensed with. In such cases it is extremely difficult to define any precise concepts like marginal and optimum size of farm as there is no question of retirement in case of loss nor any scope of expansion when there is profit.

The object of this note is to study this problem from a purely empirical point of view. As information relating to the capital expenditure, net income etc., are not available we have considered the relative movement of the area owned by a farmer and the area he cultivates, the area cultivated being inclusive of not only the area he owns but the area he takes on lease, or share cropping and exclusive of the area he gives out on share-cropping or lease.

Attempt has been made to find out logical breaking points that will afford somewhat natural divisions between the different groups of farmers. In trying to find out a method of classifying farms, Benedict and others (1941) remarked "The division with respect to the problem of finding logical breaking points that will afford somewhat natural division between the modal groups must be arbitrary, because there are few if any clearcut division line between groupings. For the distinction between family, commercial farms and large-scale farms the chief consideration has been to approximate the scale at which farms approach a more clearly industrialised type. For the

distinction between family, commercial farms and small non-commercial farms the division has been made at a point where the sales of product in the commercial markets begin to be fairly significant...".

It may be noted that even the word "significant" has no objective basis. The difficulty thus involved in finding logical breaking points is quite clear. The method of approach in this note, however, attempts to remove much of this scope for subjective bias and to lay down a comparatively mechanical procedure.

The data analysed here have been obtained in a random sample survey conducted by the Indian Statistical Institute in 1946 over the entire province of Bengal. The sample unit was one square-mile cell selected at random and 475 such cells were surveyed with a total of 80,000 families.

Of these 80,000 families, only cultivator families numbering 22,204 have been selected for this study. A cultivator family is defined as one whose major source of income comes from cultivation of the soil owned, or, rented by him. The reason for selecting only cultivator families is to exclude the more mixed types for which the realistic assumptions regarding the role of the cultivated holding etc., cannot be laid down easily. Further technical factors have been assumed to be constant.

The assumptions on which the conclusions are based are given below.

1. In a cultivators' economy the cultivator must cultivate an irreducible minimum of area to keep his family employed at least on a subsistence level whatever may be the area owned by him.

2. Given the technical factors the optimum holding is that holding beyond which a cultivator tends to let out his land as the area owned by him increases.

Table (1) shows the area cultivated for different ranges of area owned.

Table 1

| Area owned in acres | Percentage of families giving in share | Percentage of families taking on share | Area actually cultivated in acres (mean per family) | Area cultivated / Area owned x 100 |
|---------------------|--|--|---|------------------------------------|
| 0 | — | — | 3.2 | — |
| 0.5 | | | 2.8 | 560 |
| 1.5 | | | 2.6 | 173 |
| 1.0 | 10.4 | 24.4 | 2.8 | 280 |
| 2.5 | | | 3.3 | 132 |
| 3.5 | 20.2 | 34.3 | 4.0 | 114 |
| 4.5 | | | 5.0 | 111 |
| 5.5 | | | 5.8 | 105 |
| 6.5 | | | 6.6 | 102 |
| 7.5 | 29.0 | 25.7 | 7.3 | 97 |
| 8.5 | | | 8.2 | 96 |
| 9.6 | | | 8.6 | 91 |
| 10.6 | | | 10.0 | 95 |
| 13.0 | 51.9 | 15.8 | 11.2 | 86 |
| 17.5 | | | 14.7 | 84 |

It may be seen that the percentage of families giving land on share goes on increasing and the percentage of families taking land on share is decreasing with the

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increase in area owned. But we also note that upto the group 5-10 acres the percentage of families taking land on share is higher than those giving land on share and that in the group 7-8 acres, the net tendency is to increase the area cultivated rather than to decrease it. We further note that: (1) in the regions 0, 0-1, 0-2, there is some sort of stability in the cultivated area, in spite of 'divergence' in the area owned. That is to say, for all practical purposes the families in the '0-2' group cultivate plots of almost similar size. In fact, families with less land have to cultivate more as they have to give away a relatively larger part as rent. This therefore is the subsistence level.

(2) After reaching the '6-7' acre group of holding, the cultivated area goes on diminishing relatively to the owned area. That is to say, instead of increasing their holdings, the cultivators begin to rent out their lands, once this stage is reached. This level therefore indicates the optimum utilization point for the average farm.

It is possible therefore on the basis of assumptions previously made to determine the size of optimum holding by fitting an appropriate curve to the two variables and finding out that point on the curve where the two are just equal. A logarithmic equation was fitted to the data both by taking all groups separately as also by taking 0-2 acres together and the rest separately. The relevant results are shown in table 2.

TABLE 2

| Acres owned (mid. pts. 'x') | Area cultivated 'y' | Log y observed | | | |
|--------------------------------|---------------------|-------------------|--------|--------|--------|
| 0.5 | 2.9 | 0.4624 | 0.4172 | 0.2562 | 0.3333 |
| 1.5 | 2.8 | 0.4150 | | 0.6878 | |
| 2.5 | 3.3 | 0.5185 | | 0.7369 | 0.5803 |
| 3.5 | 4.0 | 0.6021 | | 0.7726 | 0.6710 |
| 4.5 | 5.0 | 0.6990 | | 0.7977 | 0.7387 |
| 5.5 | 5.8 | 0.7634 | | 0.8177 | 0.7929 |
| 6.5 | 6.6 | 0.8195 | | 0.8344 | 0.8370 |
| 7.5 | 7.3 | 0.8633 | | 0.8467 | 0.8765 |
| 8.5 | 8.2 | 0.9138 | | 0.8612 | 0.9102 |
| 9.5 | 8.6 | 0.9345 | | 0.8724 | 0.9102 |
| 10.5 | 10.0 | 1.0000 | | 0.8824 | 0.9672 |
| 13.0 | 11.2 | 1.0492 | | 0.9037 | 1.0247 |
| 17.5 | 14.7 | 1.1673 | | 0.9334 | 1.1648 |

In case (1) all the points were included and the resulting equation was $\log y = 0.6433 - 0.2302 \log x$. In case (2) the figures 0, 0-1 and 1-2 were taken together and the equation was found to be $\log y = 0.3333 - 0.0207 \log x$.

It will be seen that in the second case the fit is much more satisfactory as this relationship of x and y does not obviously operate equally well in the range 0, 0-1, and 1-2, but starts operating only if the initial point is taken at a fairly high level as is the case in the Pareto curve. This strengthens the conclusion that 2 acres should be treated as an irreducible minimum or floor size of cultivated holding whatever the area owned for a cultivator family.

The optimum point in our sense is obtained where $x=y$ or $\log x=\log y$ which gives $x=y=7.5$ acres (approximately).

The above procedure of determining an optimum size of holding is however only an approximate procedure as various factors like rents, taxes etc., widely vary over regions and should be taken into account. But in a simple and comparatively backward economy as in Bengal such a method does go a great deal in precisely locating the minimum as also the optimum size of holding and is to be preferred to purely arbitrary and subjective approach to this problem.