Size of Holdings and Productivity

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In no field has the failure of Indian planning been as acute as in agriculture.

Under the circumstances, the controversy in The Economic Weekly on the relation between the size of holdings and productivity per acre is not without a certain amount of practical interest.

In an earlier note (Annual Number, 1962), I had put forward three specific observations obtained from the Farm Management Surveys, and had tried to explain all the observations in terms of one particular hypothesis, viz, that the cost of labour to family-based farms is lower than the cost of labour to wage-based farms.

This note raises somewhat broader questions, aid puts forward three different approaches to the problem. Their theoretical backgrounds are explained and the need to put them to empirical testing is pointed out.

The note also answers, incidentally, Dipak Mazumdar's criticism (Special Number, 1963) of my original hypothesis.

BEFORE we proceed further, a point relating to the background of all this controversy should be stressed. The inverse relationship between the size of holdings and productivity per acre that has been derived on the basis of field-class data, is not yet something that can be taken as a well-established fact. I hasten to add this because I have not yet seen any attempt to use individual holding data to establish this conclusion, and when one deals with averages, it is possible to be misled. My own guess is that I have not been widely misled, but it is still worth bearing in mind that the statistical basis of the observations around which all this controversy is centred, is not really something that has been proved beyond the legitimate doubts of exacting statisticians. With that reservation, I proceed to explain the observation, assuming it to be true:

Three alternative lines of explanation should be distinguished. We can call them respectively

(i) technique-based,
(ii) labour-based, and
(iii) fertility-based explanations.

In principle we can suggest a fourth, viz, a capital-based, explanation, if we wish to suggest that the statistical basis of the observations around which all this controversy is centred, is not really something that has been proved beyond the legitimate doubts of exacting statisticians. With that reservation, I proceed to explain the observation, assuming it to be true:

however, a sense in which capital investment is cheaper for the small farmer, and this can be discussed in the context of the labour-based explanation.

Labour-Based Explanation

I find the technique-based explanation the weakest of the three, though I would not like to rule it out altogether. In its simplest form this can take the shape of assuming "diseconomies of large scale". In this form the argument is open to the obvious objection that diseconomies of scale can be avoided by the big farmer by splitting his big piece of land into small bits and cultivating them in these smaller units. In fact there are very few evidences of any such diseconomy proper associated with scale. There is, however, a more sophisticated form of this argument. Because of personal participation and supervision that a small business allows, a small holding may permit the use of some techniques — efficient ones — that cannot be used in larger holdings. Some techniques require not only inputs in the usual sense but also loving care, and Adam Smith had directed our attention to the "affection" that small property inspires. It may be difficult to make a paid labourer do what the owner himself would. For a well-reasoned development of this line of argument I have only to refer the reader to Amlan Datta's essay on the subject (Essays on Economic Development, Essay 7).

The second line of argument is the one I adhered to in my earlier note referred to above. In a situation of wide-spread unemployment, the opportunity cost of labour to a family-based farm is very low, but for various reasons (mainly perhaps sociological), the wage rate does not go down below a certain level, considerably higher than the opportunity cost. As a consequence the family-based farmer applies 'labour more liberally with less restraint than the wage-based farmer, and this naturally leads to a higher productivity per acre of the small farms because these are mostly family-based farms rather than wage-based ones. Before this argument is further developed, a few preliminary questions can be sorted out including the ones that Dipak Mazundar has raised (Special Number, 1963).

First of all, it should be noted that an extreme case of this difference is given by the possibility of marginal opportunity cost of labour being zero in a family-based economy. This will be the case when unemployment is really rampant. In a more general case the relevant opportunity cost may be given by the wage rate suitably weighted by a certain probability of finding a job, the probability being less than 1. If p is the probability of getting a wage-job, and w the wage rate, the opportunity cost of labour can be taken to be equal to (p. w). Since p < 1, (p. w) will be below w. In extreme cases of full employment we have p = 1, and the two values coincide; in the other extreme case of hopeless unemployment as long as p=0, and the value of the opportunity cost becomes nil. But as long as p < 1, we shall ex-
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pect, given other things, a lower output per acre for wage-based farms, because labour will be applied there with greater restraint, and will not be carried beyond the point where marginal productivity of labour is equal to the wage rate. On the family-based farm, however, labour will be applied more freely up to the point where marginal productivity of labour equals (p.w). The extreme case only heightens this contrast.

Secondly, if there is full employment in a “busy” season and un-employment in a “slack” season, the argument still holds. Since there is complementarity between labour applied in different seasons, the lower opportunity cost of labour in the “slack” season (compared with the corresponding wage rate) makes the cost of a composite unit of labour less than the average wage. Thus greater utilisation of labour takes place even in this case for smaller farms. This, as I understand it, is the core of Mazumdar’s argument, shorn of its somewhat more complex background. It is really an extension of the cheap-family-labour lure of explanation rather than a new kind of explanation. But I think it is an important extension.

Thirdly, Mazumdar’s argument for preferring the above explanation to the one I had put forward does not seem to me to follow from the data he quotes. He says, in criticising my explanation, “... the explanation breaks down when we note the fact that in the data presented by the Farm Surveys, both small and large farms make use of some hired labour. So long as any hired labour is used, the marginal supply-price of labour to the farm will be given by the ruling wage rate, and consequently input of labour would be carried to the same point in farms of various sizes, so long as the production function is the same”. (p 1259). This argument overlooks the fact that the data presented by the Farm Management Surveys are size-class averages and do not state the position of any individual holding. Just because in the average data it is found that in each class a certain amount of hired labour is used, it does not follow that all or even the bulk of the farms in the smaller size-groups use hired labour at the margin. Mazumdar takes the given amount of hired labour in each size-group, and assumes that it is spread evenly on all pieces of land of that size-group (somewhat like butter on a toast). In fact in the other extreme we might find a case when hired labour is used in a very small number of farms, and even then the class-average will show some hired labour for this size-group. I am not claiming that this last is in fact the case, which it probably is not, but only that the data that Mazumdar quotes is insufficient for his argument. We require not only the average figure for his argument but also some information on the proportion of farms where any hired labour is used. In fact, more complete individual holding data are what are needed to substantiate (or invalidate) Mazumdar’s line of explanation.

Fertility-based Explanation

Now, irrespective of whether we take the simpler version of the labour-based explanation or the extension proposed by Mazumdar, we have a picture of a more free application of labour in smaller holdings and a consequent larger output per acre. We can now look at the third approach. The fertility-based explanation is quite different from all this. What we could suggest here is that the smaller farms have higher output per acre because they are more fertile. The only work I know of in this line is that of A M Khusro in his unpublished note, “Some Basic Generalizations in Indian Agriculture.” The Farm Management Surveys deal with crude figures of acreage without any correction for fertility. Khusro finds that when a correction for fertility is made, “farm business-income per corrected acre is now seen in almost all States to increase slightly by the size of farm,” which is the reverse of the relation with uncorrected acres.

Khusro does not go into any explanation of his important observation, but if I had to justify the fertility-based explanation, I should proceed this way. Even if we start from a situation of no relation between fertility of land and the size of holdings, a positive relation between the two will be soon established through a more rapid expansion of population on the more fertile land than on less fertile ones. If two pieces of land are of the same size but holding A is more fertile than holding B, the farmer will provide a greater opportunity of earning income, so that family size may expand faster in the former case. This will lead to quicker subdivision of A than of B, and soon a correlation may be established between smallness of the size of the holdings and fertility of soil. This argument is easy to see in the context of interregional variation, because it has been often observed that in fertile areas population expands faster both because of natural increase as well as migration. But the picture can be expected even within a given region, particularly because the fertility of a family to withstand famines and other catastrophes is greater if the land it owns is fertile than if it is not. Thus, the correlation between size and fertility is not an odd result, but one that can be expected on good economic grounds.

Having put forward this explanation, I should, however, like to cypress a reservation about empirically testing the validity of the hypothesis of fertility variation. Fertility data are notoriously difficult to come by, and in some publications what is taken to be “fertility’s” is often nothing more than a figure based on past productivity per acre, which tends to make the fertility-based explanation of productivity differences quite circular, Khusro does not take data of this kind, but takes land revenue data as indicators of fertility. Personally I have some reservations also on this because very often land revenues are based on other considerations such as ability to pay, which may be more related to productivity than to fertility. But Professor Khusro’s attempt to bring fertility into the discussion seems to be on the right line.

Now in this note I have done no more than state some hypotheses and have tried to clarify their economic bases. On the economic grounds put forward here I would expect some truth in the fertility-based explanation. Professor Khusro’s data seem to support this and it will be interesting to have other empirical studies taking sonic basis for evaluating fertility other than
land revenue. But again on economic grounds I would expect some truth in the labour-based explanation also. And we should further note the fact that the amount of labour applied per acre does seem to be greater for smaller farms, a fact that was quoted in my earlier note (Annual Number, 1962). This lends support to the labour-based explanation, and its theoretical basis is indeed quite sound. We can also bring in capital in this context, because a substantial part of capital investment in small farms takes the form of direct labour input in capital projects, so that the cheap cost of labour is reflected in the cheap cost of capital of this type. The technique-based hypothesis is also not to be dismissed, at least not in its more sophisticated form, even though my guess will be that this is a much less important factor in the context of present Indian farming. The real question is, it seems to me, not which of these hypotheses is right, but what are their relative importance. And that can be determined only by an empirical study, and the main object of putting forward these hypotheses in this note is to stimulate precisely this kind of empirical work.

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