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in order to bring in new profitable enterprises. Naturally, this kept the farm income at a very low level. The supply of land being inelastic and its substitute being not in large supply the profits in irrigated regions get capitalized largely in the form of increased land values. In other words, farmers in the irrigated region deriving enough margin of economic surplus over water charges imputed the residual value to land input and thereby increased the value of land.

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and  
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### REGIONAL VARIATIONS IN LABOUR INPUTS PER ACRE‡

The Farm Management Studies,<sup>1</sup> conducted in different regions of India during 1954-55 and 1955-56 showed that there are significant differences between regions in the per acre input of labour in agricultural operations. An attempt is made in this paper to focus attention on the extent of such differences and also to enquire into the factors responsible for this. Data on employment in different regions are given in Table I. In U.P., 49.1 labour days were employed per

TABLE I—LABOUR INPUTS PER ACRE IN MAN-DAYS ACCORDING TO THE SIZE OF LAND CULTIVATED IN 1955-56

Size of holding (acres)	Regions				
	U. P.	West Bengal	Madras	Bombay	Punjab
Less than 5	67.7	53.4	73.6	40.5	24.0
5 — 10	53.6	47.9	42.2	35.2	24.0
10 — 20 (10 — 15)*	48.3	33.1	25.9	25.9	22.5
20 and over (15 and over)*	38.9	37.0	21.6	17.2	19.4
Average	49.1	48.5	37.3	21.8	21.1

*Note :* The above table has been compiled from the data collected by the Farm Management Studies in 1955-56.

\*In case of West Bengal size of holding follows 10 to 15 acres instead of 10 to 20 acres and 15 and over instead of 20 and over.

cropped acre, while in the case of Punjab, it was only 21.1. In the case of West Bengal the average was 48.5 labour days, in Madras 37.3 and Bombay only 21.8. The range of variation is indeed not small. Relatively the per acre employment

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1. Farm Management Studies were conducted in 1954-55 and 1955-56 in the regions of Punjab, U.P., M.P., West Bengal, Madras and Bombay. Two contiguous districts were selected in each of these regions for conducting this enquiry.

in Punjab was only 42.9 per cent of that in U.P. and 43.5 per cent of that in West Bengal. So also between other regions, the variations were substantial. It is possible to think of a number of factors that might be responsible for this situation. Important among these are (a) cropping pattern, (b) irrigation, (c) size of holding and (d) availability of labour in a particular region.

Before proceeding to examine these factors against the actual observations of the Farm Management Studies, it would be worthwhile to discuss in some detail the importance of these factors. To consider the first among these, the importance of cropping pattern in influencing labour requirement cannot be disputed. It is only common place that there are certain crops which require more of labour and others which require less of it. For example, paddy, jute, sugarcane, cotton, etc., require more of labour compared with that of wheat, gram, jowar and bajri. In the former set of crops, inter-culture operations are essential which necessitates employment of large number of workers. Though such operations are advisable for the latter set of crops too, they are rarely done. Moreover, the former set of crops, unlike the latter, need to be irrigated at regular intervals which also partly accounts for the larger manpower employed.

Availability of irrigation could also be taken as a potent factor in providing larger employment per acre. In the first instance, the process of irrigation itself calls for larger employment. There are also other ways in which irrigation promotes larger employment. It helps the cultivators to adopt such intensive forms of cultivation as requiring additional manpower. Larger use of fertilizer and manure becomes easy when there are irrigation facilities. Moreover, the availability of irrigation facilities may help to bring about changes in the cropping pattern, which also is an important factor in determining the employment. Mode of irrigation also influences labour employment. In canal irrigation labour employed per cropped acre will be less than that under well irrigation, because under the former, work like drawing the water and allied operations are not involved.

Theoretically, because of the economies of scale, with every increase in the size of holding the per acre employment of labour is likely to decline at least upto a certain level. Besides this, where farming is done on family basis, there is a tendency for using more and more of family labour; especially when opportunities for alternative employment do not exist.

The availability of labour has also certain impact upon employment. If pressure of population is high and alternative avenues of employment are scarce, there is a likelihood of larger employment per acre in agriculture.

Now that the impact of these factors on employment has been dealt with in some detail, we may proceed to verify from the data made available through the Farm Management Studies,<sup>2</sup> the extent to which these were responsible for divergences in the intensity of employment between different regions selected therein. The labour input per acre is relatively more in U.P., West Bengal and Madras compared to the other two regions. (See Table I).

2. The data used here are those relating to the Cost Accounting method in the Studies conducted in 1955-56. M. P. region has been excluded as the data were available only in value terms and not in physical terms.

In the selected region of Punjab only 21.1 man-days of labour were employed per cropped acre. In this region 58.3 per cent of the gross cropped area was under food crops. The food crops grown were wheat and wheat and gram (grown as mixture). These crops, as is well known, employ relatively less labour than crops like jute and sugarcane. The number of man-days employed in the cultivation of irrigated and unirrigated wheat was 27.6 and 16.6 respectively. In the case of wheat and gram (grown as mixture), employment was 19.6 man-days on irrigated and 12.1 man-days on unirrigated land. The labour intensive crops grown in this region were the American and the *desi* cotton. These are mainly grown on irrigated land and the labour days employed on these crops were 31.0 on the American cotton and 32.8 on the *desi* cotton. The employment of labour per acre taking all the crops in the selected region of Punjab was 23.7 man-days on irrigated land and 11.0 on unirrigated land. This very low per acre employment in the Punjab may be due to the cropping pattern which has been mentioned above.

In Bombay region 88.2 per cent of the gross cropped area was under food crops, the major crops grown being bajri, jowar, wheat and gram. Irrigation is not so important a factor in the determination of employment in this region as only 10.2 per cent of the total cultivated area was under irrigation in this region. The labour employed per acre on irrigated and unirrigated wheat was 49.6 and 14.1 man-days respectively. The other crops, namely, bajri and jowar employed 14.3 and 10.8 man-days respectively per cropped acre. These crops are grown mainly under dry conditions. Hence the labour employment is relatively far less. The overall average of labour employed in the selected region of Bombay was only 21.8 labour-days per cropped acre. The very low per acre employment here may be partly due to the larger extent of crops grown under dry conditions and the cultivation of food crops (wheat, jowar and barji) which employ relatively less labour.

In the selected areas of Madras 83.4 per cent of the gross cropped area was under food crops, more or less the same proportion as in Bombay. Food crops grown were paddy, *ragi*, jowar and bajri and the cash crops were cotton and groundnut. Irrigation facilities were available for 22.3 per cent of the total cultivated area. Paddy is one of the most important crops grown in this region and covered 9.9 per cent of the gross cropped area. For raising paddy on an acre of irrigated land 100.8 man-days were found to be employed. Another important crop grown is *ragi* which covered 14.5 per cent of the cropped area; the labour employed per acre for this crop on irrigated and unirrigated land was respectively, 79.9 and 30.7 man-days. The other crops grown are jowar and bajri which covered 12.1 per cent and 15.2 per cent of the gross cropped area respectively. Bajri is grown both on irrigated and unirrigated land and the labour employed per acre on these two types of land was 17.2 and 16.6 man-days respectively. In Bombay region as was seen earlier, labour days employed on bajri and jowar were only 14.3 and 10.8 respectively. Though these crops, namely, bajri and jowar, are grown also in Bombay, the per acre employment is relatively higher in Madras. In Madras, cotton cultivation is done on both irrigated and unirrigated land and this crop covered 8.9 per cent of the gross cropped area. The labour employed on irrigated and unirrigated land per acre was 74.8 and 12.3 man-days respectively. Larger employment of labour in Madras may be attributed to the cropping pattern

there; as the crops like paddy, *ragi*, and cotton are grown extensively in this region. With regard to the employment in jowar and bajri, however, the difference was not found to be appreciable between Madras and Bombay. Since these crops occupy only a relatively low proportion of area in Madras, the importance of cropping pattern as an influencing factor become all the more evident.

In the selected region of West Bengal 67.6 per cent of the gross cropped area was under paddy and 16 per cent under jute and mesta. In the cultivation of paddy 48.2 man-days were employed per acre in this region. In Madras, on the other hand, 100.8 man-days were employed for the same crop. This wide variation between the two regions can be explained by the fact that in Madras, unlike in West Bengal, paddy cultivation is carried on largely with the help of well irrigation. No doubt, the per acre employment on this crop is high in both the regions, but in the case of Madras, irrigation is certainly accentuating the employment of labour. The other important crops grown in West Bengal are jute and mesta, which are also labour intensive. The labour employed per acre was 91.8 man-days for jute and 88.2 man-days for mesta. The overall average of this region was 48.5 man-days per cropped acre. The higher employment per acre will have to be attributed at least partially to the cultivation of paddy, jute, and mesta which are all labour intensive crops.

In the selected region of U.P., the major crops grown are wheat, gram and paddy. These crops together covered 48.4 per cent of the gross cropped area; 21.6 per cent was under sugarcane, 23.8 per cent under fodder crops and the rest under miscellaneous crops. The labour employed per acre in this region was 49.1 man-days. This is highest compared to all other regions selected for discussion here. Irrigation appears to be an important factor in influencing employment of labour in this region as 71.6 per cent of the cultivated area was under irrigation. Another factor that is responsible for larger per acre employment is the cropping pattern. Sugarcane which was occupying 21.6 per cent of the gross cropped area is a very labour intensive crop. Sugarcane is grown by two methods in this area, namely (a) Planted and (b) Ratoon. The labour employed on one acre of planted sugarcane was 71 man-days and on Ratoon, 47. Among the food crops, wheat is considered to be the most important and it is grown both on irrigated and unirrigated land. The labour employed was 30 and 26 man-days per acre on irrigated and unirrigated area respectively. Next important crop is paddy and its cultivation is mainly done on unirrigated land, in low lying fields. The labour employed on one acre of paddy was 36 man-days.

### *Irrigation*

We may now examine whether and if so to what extent employment between regions selected in this study depends on the availability of irrigation. The proportion of irrigated area to total cultivated area and man-days employed per cropped acre in the selected regions are given in Table II.

TABLE II

	Punjab	Bombay	Madras	West Bengal	U. P.
1. Percentage of irrigated area to total cultivated area .. .. .	75.3	10.2	22.3	11.5	71.6
2. Man-days employed per cropped acre	21.1	21.8	37.3	48.5	49.1

Except for Punjab and West Bengal, irrigation appears to be an influencing factor. In the case of West Bengal, though the proportion of irrigated area is much less, the labour employed per cropped acre was still very high compared to some other regions. This is not without explanation. West Bengal gets a good amount of rainfall and is able to cultivate labour intensive crops like paddy and jute without the help of any irrigation. As was said earlier between Madras and West Bengal, particularly in the case of paddy, irrigation has acted as a very important factor in larger per acre employment in the former State. Taking the case of Punjab, in spite of much larger proportion of irrigated area the per acre employment is low compared to all other regions. This may be partly due to the existence of canal irrigation which requires relatively less labour as compared to well irrigation. More important, perhaps, is the relative scarcity of labour.

### *Size of Holding*

It could be seen from Table I that in all the regions, as the size of holding increases, the labour employed per acre decreases. This may, as was mentioned earlier, be due to the economies of scale that come about with increase in the size of holding. It may also be that smaller holdings are resorting to intensive cultivation requiring larger manpower. (The factor which is relatively more abundant in these holdings impelled by the need for larger income). As in most of the farms, farming is carried on a family basis, the smaller farms found it easy to employ more labour. The question that remains to be examined in this section is the influence of size distribution of holding on employment.

TABLE III—DISTRIBUTION OF FARMS ACCORDING TO SIZE AND LABOUR EMPLOYED PER CROPPED ACRE

Regions	Labour employment per cropped acre in man-days	Average size of holding (acres)	Number of farms in each size group				Total
			Less than 5	5-10	10-20 (10-15)*	20 and over (15 and over)*	
1. West Bengal	48.5	3.13	165	28	4	3	200
2. Madras	37.3	7.91	98	60	28	14	200
3. U. P.	49.1	10.30	48	76	52	21	197
4. Punjab	21.1	17.05	13	57	70	60	200
5. Bombay	21.8	21.82	20	23	55	62	160

\*In case of West Bengal size of holding follows in this manner: 10—15 instead of 10—20, 1 and over instead of 20 and over.

If the size distribution of holding was the influencing factor one would expect the employment per acre to be the highest in West Bengal and lowest in Punjab. The situation is more or less the same except in the case of U.P., where there were only 48 holdings in the size group of less than 5 acres, other factors like sugarcane cultivation (cropping pattern) may be responsible for the larger per acre employment.

*Availability of Labour*

In India farming is carried on largely on a family basis. It is well-known that possibilities of employment in other avenues like industries are few in our country. Under such conditions there is a tendency to use more of family labour, sometimes to an extent where the marginal production of the worker may be even negative. Under such conditions one would expect that the labour employed would also be influenced by the land-man ratio.

Data on per capita cultivated area in the selected holdings of regions and employment per cropped acre are given in Table IV.

TABLE IV

	West Bengal	U. P.	Madras	Punjab	Bombay
1. Land per capita (acres)	0.44	1.31	1.49	1.84	6.48
2. Employment per cropped acre (man-days)	48.5	49.1	37.3	21.1	21.8

Except for U.P. and Punjab land-man ratio appears to be an influencing factor. In the case of U.P. per capita land was only 1.31 acre, which was more than that of West Bengal, but employment per acre was the highest among all the regions. Other factors that were considered, like the importance of sugarcane in this region must be responsible for this situation. On the other hand, in the case of Punjab, per capita land was 1.84 acre but the employment per cropped acre was lowest compared to all other regions. Probably, this may be due to the scarcity of labour and the availability of alternative avenues of employment in small scale industries. In Punjab, there is a "great dearth of labour at the time of harvesting of *rabi* crops. The crops ripen all at one time and a little delay in harvesting causes enormous loss on account of shedding of the grains. All the cultivators who have larger areas and who feel that they cannot cope with the situation single handed, try to avail of the earliest opportunity to engage labour for harvesting. This competition among growers creates a boom period for the labour which enjoys three to four times the wage rate ordinarily paid to them."<sup>3</sup>

*Conclusion*

The foregoing analysis shows that the variation in the intensity of labour employed between different regions is not based on any one particular factor. Various factors like cropping pattern, irrigation, size distribution of holding and even the availability of manpower are individually and collectively responsible for this. While in some States one or more of these factors may be important, in others another combination of these factors may be more effective. The point is that such regional variations are explainable, at any rate to a considerable extent, in terms of the factors underlying them.

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3. Studies in Economics of Farm Management in Punjab, Report for the Year 1954-55, p. 18.

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