9

Agrarian Change and the Demand for Farm Labour

INTRODUCTION

The process of polarization in the size distribution of farms that we have indicated in the preceding Chapter will affect employment in agriculture because:

First, labour requirements on different size classes of arms have differing proportions of hired labour. Thus for example, small farms fulfil a lower proportion of their labour requirement with hired labour compared to medium sized farms, due to the relatively greater propensity of small farmers to use family labour. On the other hand, large farms (over 150 acres), although they use virtually no family labour, have a propensity to replace human labour with machines, over time. One of the important reasons for labour, displacing mechanization on large farms is that with multiple cropping, there has been both an increase in the frequency of peak season demand for labour as well as a constriction in the time period available for performing labour operations at the peak season. As a result of the latter, for a given quantity of labour, a larger number of labourers are required. This generates two types of pressures on the farmer to mechanize:

(i) Due to imperfections in the labour market the farmer finds it difficult to hire a large number of labourers in

a short time period.

(ii) The farmer faces an acute supervision problem due to the difficulty of mobilizing a large number of labourers to perform work tasks to his satisfaction. During our field survey in 1978, we found that in the irrigated regions the persistent explanation of large farmers for mechanization, was not so much high wages of farm labour, but the difficulty of getting hold of them in time, and then ensuring that they do their job "carefully".

It appears then, that given the propensity of small farmers to use family labour rather than hired labour, and given the tendency of the large farmer to bring about labour displacing mechanization, a polarization in the size distribution of farms is likely to dampen the growth rate in demand for hired labour.

Second, polarization in the size distribution of farms could affect employment also because differing man days per acre are required on farms of different sizes. This effect will occur to the extent that there are differences between size classes of farms with respect to.:

(i) The percentage share of cropped area devoted to crops with relatively higher labour requirement, in each agro climatic zone

(ii) Cropping intensities.

(iii) Crop yields per acre.

In Sections I to III, we will consider the differences in the various size classes of farms in terms of each of these factors. In Section IV we will consider M.H. Khan's survey data on the man days per acre requirement in different size classes in some of the important districts of the Punjab.

SECTION I

CROPPING PATTERNS AND THE IMPLICATIONS FOR EMPLOYMENT IN EACH AGRO-CLIMATIC ZONE OF THE PUNJAB

On the basis of crop and climate data contained in a recent WAPDA report, and district-wise cropping pattern data given in the 1972 Agriculture Census, we have classified the districts of the Punjab into three agro-climatic zones:

(1) The Wheat-Rice Zone. This zone is characterized by hotter temperatures, high humidity, high rainfall and low wind. The districts falling in this zone are, L Sheikhupura, Gujranwala and Sialkot.

(2) Wheat-Cotton Zone. This zone has the hottest temperature; moderate humidity; low rain; and moderate wind. The following districts constitute this zone: Jhang, Multan, Sahiwal, Bahawalpur Bahawalnagar, Rahim Yar Khan, Muzaffargarh and D.G. Khan.

(3) Mixed Cropping Zone. The climatic conditions in this region are hot, with moderate humidity, moderate rain and moderate wind, compared with the other two zones. The following districts fall within, this region: Faisalabad, Gujrat, Sargodha, Jhelum, Rawalpindi, Campbellpur and Mianwali.

Let us now consider the percentage share of cropped acreage devoted to each of the major crops in the various size classes in some of the important districts in each agro- climatic zone. According to WAPDA estimates, the man days per acre requirement in the Punjab, is lower for wheat than it is for either rice or cotton in irrigated areas (See table 7).

TABLE 7

PUNJAB

LABOUR REQUIREMENTS OF MAJOR CROPS (IRRIGATED)

CROPS	MAN DAYS PER ACRE
Wheat (Low Yield)	16.7
Wheat (High Yield)	21.7
Rice (Low Yield)	30.1
Rice (High Yield)	37.7
Cotton (Low Yield)	28.3
Cotton (High Yield)	35.6
Kharif Fodder (Low Yield)	10.3
Kharif Fodder (High Yield)	11.6
Pulses (Low Yield)	8.9
Pulses (High Yield)	13.0
Sugarcane (Low Yield)	49.5
Sugarcane (High Yield)	58.7
Maize (Low Yield)	22.8
Maize (High Yield)	27.8

Source: WAPDA, 1980 (Un-official). Based on WAPDA XAES Survey Data.

TABLE 8[a]
PERCENTAGE OF CROPPED ACREAGE UNDER WHEAT, RICE AND COTTON BY DISTRICT AND SIZE CLASS

AGRO-CLIMATIC ZONE, WHEAT-COTTON (HOTTEST, MODERATE HUMIDITY, LOW RAIN, MODERATE WIND)

	Percentage Cropped Area under Wheat	Percentage Cropped Area under Rice	Other Mainly Fodders	Total Cropped Area
LAHORE Size of Farm				
Less than 7.5	39.2	8.9	51.9	100
7.5 to < 25	38.0	8.0	54.0	100
25 to < 50	37.0	10.0	53.0	100
50 to < 150	38.0	11.0	51.0	100
150 and above	44.0	6.0	50.0	100
SHEIKHUPURA				
Less than 7.5	40.3	27.6	32.1	100
7.5 to < 25	4.05	26.0	33.6	100
25 to < 50	39.0	28.0	33.0	100
50 to < 150	42.0	30.0	28.0	100
150 and above	46.0	30.0	24.0	100
GUJRANWALA				
Less than 7.5	40.7	26.5	32.8	100
7.5 to < 25	40.4	27.0	32.6	100
25 to < 50	40.0	27.0	33.3	100
50 to < 150	42.0	31.0	27.0	100
150 and above	48.0	32.0	20.0	100
SIALKOT				
Less than 7.5	44.0	19.7	36.3	100
7.5 to < 25	43.5	21.0	35.5	100
25 to < 50	42.0	25.0	33.0	100
50 to < 150	44.0	29.0	27.0	100
150 and above	48.0	39.0	13.0	100

Source: Pakistan Census of Agriculture, 1972, Vol. II, Part 2, (Punjab). Agriculture Census Organization, Ministry of Food and Agriculture, Government of Pakistan, Lahore 1975.

TABLE 8[b]

PERCENTAGE OF CROPPED ACREAGE UNDER WHEAT, RICE AND COTTON BY DISTRICT AND SIZE CLASS

AGRO-CLIMATIC ZONE, WHEAT-COTTON (HOTTEST, MODERATE HUMIDITY, LOW RAIN, MODERATE WIND)

	Percentage Cropped Area under Wheat	Percentage Cropped Area under Cotton	Other Mainly Fodders	Total Cropped Area
MULTAN Size of Farm				
Less than 7.5	35.8	29.4	34.8	100
7.5 to < 25	36.6	30.7	32.7	100
25 to < 50	36.0	32.0	32.0	100
50 to < 150	36.0	35.0	29.0	100
150 and above	37.0	37.0	26.0	100
SAHIWAL				
Less than 7.5	36.0	26.0	38.0	100
7.5 to < 25	38.4	28.4	33.2	100
25 to < 50	36.0	28.0	36.0	100
50 to < 150	37.0	31.0	32.0	100
150 and above	35.0	39.0	26.0	100
BAHAWALPUR				
Less than 7.5	40.0	24.7	35.3	100
7.5 to < 25	35.7	24.7	39.6	100
25 to < 50	35.0	25.0	40.0	100
50 to < 150	36.0	28.0	36.0	100
150 and above	40.0	35.0	26.0	100

Source: Pakistan Census of Agriculture, 1972, Vol. II, Part 2, (Punjab). Agriculture Census Organization, Ministry of Food and Agriculture, Government of Pakistan, Lahore 1975.

TABLE 8[c]

PERCENTAGE OF CROPPED ACREAGE UNDER WHEAT, RICE AND COTTON BY DISTRICT AND SIZE CLASS

AGRO-CLIMATIC ZONE MIXED CROPPING (HOT, MODERATE, HUMITIDY, MODERATE RAIS, MODERATE WIND).

	Percentage cropped area under Paddy	Percentage cropped area under Cotton	Percentage cropped area under Sugarcane	Percentage cropped area under Wheat	Others, Mainly Fodders	Total Cropped Area
FAISALABAD Size of Farm						
Less than 7.5	6.9	11.5	5.3	41.0	35.3	100
7.5 to < 25	2.0	13.5	9.4	40.4	34.7	100
25 to < 50	3.0	16.0	7.0	41.0	33.0	100
50 to < 150	3.0	21.0	6.0	39.0	31.0	100
150 & above	1.0	21.0	2.0	47.0	28.0	100
JHELUM						
Less than 7.5	49.3	-	-	-	50.7	100
7.5 to < 25	47.8	-	-	-	52.2	100
25 to < 50	46.0	1.0	-	-	53.0	100
50 to < 150	47.0	1.0	-	-	52.0	100
150 & above	92.0	13.0	-	-	25.0	100
SARGODHA						
Less than 7.5	37.0	9.2	4.8	2.9	46.1	100
7.5 to < 25	33.4	10.4	4.4	3.0	48.8	100
25 to < 50	26.0	7.0	3.0	2.0	62.0	100
50 to < 150	21.0	6.0	2.0	1.0	70.0	100
150 & above	22.0	8.0	3.0	1.0	66.0	100

Source: Pakistan Census of Agriculture, 1972, Vol. II, Part 2, (Punjab) Agriculture Census Organization, Ministry of Food and Agriculture, Government of Pakistan, Lahore, 1975.

WHEAT-RICE ZONE

As table 8 (a) shows, in Lahore the percentage of cropped area in the less than 7.5 acre size class, that is devoted to wheat is 39.2% and that devoted to rice is 8.9%. On the other hand, of the area cropped in the 7.5 to legs than 25 acre size class, a smaller proportion is devoted to wheat as well as rice compared to the small size class. In She Sheikhupura, the percentage share of rice in the cropped acreage of the small size class is higher than in the 7.5 to less than 25 acres. The percentage share of cropped acreage in the small size class (less than 7.5 acres) is almost the sane as that of the size class 7.5 to less than 25 acres. In the case of Gujranwala however, the percentage share of rice in the cropped acreage of the size class is lower than that of the 7.5 to less than 25 acre size class. Similarly in Sialkot the percentage of cropped acreage in the small size class devoted to rice is lower than in the size class 7.5 to less than 25 acres. In all four of the districts in the wheat-rice zone, the percentage share of cropped acreage in the larger size class (50 to less than 150 acres) devoted to rice is higher than in the small size class. Similarly in 3 out of the 4 districts in this agro-climatic zone, the percentage of area cropped in the highest size class, that is devoted to rice, is higher than in the small size class. Thus in two out of the four districts in the wheat-rice zone, (Gujranwala and Sialkot), the percentage share of rice in the cropped acreage of the small size class is lower than in the case of the size class 7.5 to less than 25 acres.

WHEAT-COTTON ZONE

As table 8 (b) shows, for Multan and Sahiwal the percentage share of cropped acreage in the small size class, that is devoted to cotton is lower compared to size class 7.5 to less than 25 acres. The percentage share of cropped acreage devoted to wheat is slightly lower in the small size class than in the lower medium class, in the case of Multan and Sahiwal.

However in the case of Bahawalpur, the percentage share of cropped acreage devoted to wheat is substantially higher in the small size class compared to the lower medium size class. In the case of all three districts in the wheat cotton zone shown In table 8 (b), the percentage share of cropped acreage of the large size class devoted to cotton, is greater than the lower medium size class.

MIXED CROPPING ZONE

In Sargodha the percentage cropped acreage of the small size class devoted to wheat, is higher compared to the size class 7.5 to less than 25 acres. For paddy the percentage share in the two size classes is about the same, is slightly lower for cotton and slightly higher for sugarcane. In the case of Faisalabad the percentage cropped acreage of the small-size class devoted to cotton and sugar-cane is lower, and that for paddy and wheat is higher compared to the size class 7.5 to less than 25 acres. [Table 8 (c)].

It appears from an analysis of the 1972 Agriculture Census data, that it is only in the wheat- cotton zone that the percentage share of cropped acreage devoted to the high labour intensity crop (cotton), in the small size class is slightly lower compared to the size class 7.5 to less than 25 acres. In the case of the other two agro-climatic zones, no clear cut picture emerges with respect to the relative degree of labour intensity in the cropping patterns of the small and lower medium size classes respectively. However, apart from Sargodha and Lahore districts in all three agro- climatic zones the percentage share of the cropped area devoted to crops with a relatively high labour intensity is higher in the larger size classes compared to the size class 7.5 to less than 25 acres.

Our own survey data on cropping patterns in 6 districts of the Punjab, has been used to derive table 9, on cropping

patterns by size of farm. This table 9 shows that the percentage of cropped acreage devoted to maize, irri rice, and cotton (which are crops with a relatively high man days per acre requirement) is substantially lower in the small-size class compared to the size class 8 to less than 25 acres. The percentage share of cropped acreage devoted to maize is only 0.9% in the small size class (8 to less than 25 acres) compared to 8.1% in the 8 to less than 25 acres size class. Similarly the percentage of cropped acreage in the less than 8-acre size class devoted to cotton is 2.7% and to irri rice is 6.2% compared to the 8 to less than 25 acres where the percentage shares of cotton and irri rice are 18.1 and 10.5 respectively. However the tendency for the cropping pattern in the small- size class to have a lower requirement of man days per acre is counteracted to some extent by the higher percentage of cropped acreage in the small- size class devoted to vegetables (which are known to have a high labour input per acre) than in the lower medium size class, where the percentage share is only 0.9%.

SECTION II

CROPPING INTENSITY AND LABOUR DEMAND

Our field survey data on cropping intensity confirms the oft- demonstrated inverse relationship between farm size and cropping intensity. We find that cropping intensity for the small size class is 211% compared to 138% in the 8 to less than 25 acres category. (See table 10). Thus the cropping intensity factor would suggest a higher demand for labour in terms of man days per acre for the small size class of farms compared to the lower medium size class.

TABLE 10

CROPPING INTENSITY BY SIZE CLASS OF FARM

Size of Farm (Acres)	Rean Cropping Intensity of Gross Cropped Area / Farms: Cultivated Area	Number of Farms
Less than 8	2.11	9
8 to < 12.5	1.38	16
25 to < 50	1.42	12
50 to < 150	1.25	8
150 and above	1.14 (1.18)*	22
All Sizes	1.39	67

(i) Correlation Coefficient of Correlation between Cropping Intensity and Farm Size = -0.27179
T Test Significance: Significant at the2.5% level

(ii) Correlation Coefficient excluding Campbellpur District is -0.20358
T Test Significance: Significant at the 6% level

Source: Field Survey 1978.

**Note:* Figure in parenthesis: cropping intensity of all farms in this size class excluding the farms of Campbellpur district, which is the only UNIRRIGATED region in our sample. In Cambellpur region our sample contains only farms in the size class 150 acres and above.

SECTION III

YIELDS PER ACRE AND LABOUR DEMAND.

Differences in yields per acre for each crop as between size Classes would indicate different levels of labour demand essentially at the time of harvesting. Apart from this different yield levels might also reflect different levels of labour input per acre during the process of producing the crop. This would be so to the extent that differences in physical yields per acre are the result of different levels of labour input per acre in seed-bed preparation (e.g. the number of ploughings and plankings); the frequency of fertilizer application, the number of watering, cultural practices, and finally the frequency of pesticide application.

Table 11 shows the physical yields per acre by size class of farm, for each of the major crops. Figures for wheat, the most important crop in each of the regions surveyed showed a continuous increase in yield per acre across size classes from the lowest to the highest size class. The yield per acre for the lowest size class is 21.45 maun4s per acre,: compared to 32.69 maunds in the highest size class. The wheat yield per acre for the 8 to less than 25 acres size class is only slightly greater than that of the size class below 8 acres. In the case of cotton the yield per acre for the less than 8-acre size class is 8 maunds per acre, compared to 9.14 maunds per acre in the 8 to less than 25-acre size class. Similarly the irri rice yield is 33.3 maunds per acre in the small size class compared to 36.47 maunds per acre in the size class 8 to less than 25 acres, and over 40 maunds per acre, in the size classes above 50 acres. However in the case of Basmati rice the yield per acre was much higher for the mall size than the lower medium size class, and was also high for the size classes above 25 acres. For both Basmati and irri rice the highest yield is to be found in the size class 50 to less than 150 acres, but tapers off a little for the largest size class 150 acres and above.

Thus for three of the major crops, i.e. wheat, cotton and un rice, the yield per acre for the size class below 8 acres in our data is lower than for the size class 8 to less than 25 acres. The same is true for the number of ploughings and plankings, the intensity of fertilizer use and the intensity of pesticide use (See tables 12, 13 and 14). This implies that with the increase in the percentage share of the number of small farms at the expense of lower medium farms, the growth rate in demand for labour would be dampened. (The absolute demand for labour would have grown since yields and cropping intensities for all farm sizes have grown over the Green Revolution period). Not only would the growth in demand for labour be slowed down for the above reasons, but a]so the growth in demand for hired labour may be reduced, since in small farms a larger proportion of the labour requirements are fulfilled by family labour. At the other end of the size class scale, as an increased proportion of farm area falls in large-sized farms at the expense of lower medium-sized farms, the demand for hired harvest labour would tend to initially get stimulated and then depressed. The initial stimulation in the demand for hired harvest labour would occur due to:

(i) The higher yields in the larger size classes of farms compared to farms in the 8 to less than 25 acres size class (as indicated above).

(ii) The fact that in the larger size classes almost the entire harvest labour requirements are fulfilled by hired labour.

However, for large farms, over time, powerful pressures would be set in motion towards the mechanization of various farming operations, thereby depressing the demand for labour. These pressures as discussed at the beginning of this Part II, are:

TABLE 12

NUMBER OF PLOUGHINGS AND PLANKINGS BY CROP AND FARM SIZE

Size of Farm	No. of Ploughings Per Acre (Bullock & Tractor)	No. of Ploughings Per Acre (Bullock & Tractor)	Crop	No. of Farms Growing the Crop
	(a)	(b)	(c)	(d)
Less than 8	3.8	2.3		6
8 to < 25	5.2	3.0	Wheat	9
25 to < 50	7.1	4.6		12
50 to < 150	9.1	4.0		8
150 and over	8.3	4.0		22
Less than 8	2.5	--	Cotton	2
8 to < 25	6.4	5.0		5
25 to < 50	6.8	4.0		6
50 to < 150	7.0	4.3		3
150 and over	5.8	3.9		9
Less than 8	3.8	1.5	Rice	5
8 to < 25	5.6	2.8		7
25 to < 50	6.4	3.6		10
50 to < 150	8.2	3.6		5
150 and over	7.8	3.3		13

Less than 8	4.7	2.0		3
8 to < 25	3.5	--	Sugar	4
25 to < 50	14.0	9.3	Cane	4
50 to < 150	12.8	8.6		5
150 and over	11.8	5.0		4
Less than 8	4.0	2.0		1
8 to < 25	5.5	5.0	Maize	2
25 to < 50	5.0	3.0		3
50 to < 150	6.3	3.5		4
150 and over	7.8	3.8		9
Less than 8	3.5	-		4
8 to < 25	3.5	2.0	Fodder	4
25 to < 50	3.7	2.4		10
50 to < 150	4.8	2.6		8
150 and over	5.4	2.9		16
Less than 8	5.0	8.0		2
8 to < 25	14.0	14.0	Vegetables	1
25 to < 50	12.0	8.0		1
50 to < 150	9.0	5.0		2
150 and over	6.6	3.6		5
Less than 8	-	-	Ground	0
8 to < 25	-	-	Nuts	0
25 to < 50	-	-		0
50 to < 150	-	-		0
150 and over	5.6	3.6		5

Source: Field Survey 1978

TABLE 13

INTENSITY OF FERTILIZER USER BY SIZE OF FARM (RS. PER ACRE)

Size of Farm (Acres)	Expenditure on Fertilizer Per Acre All Regions	Expenditure on pesticide Per Acre Excluding Cambellpur
	Rs./Acre	Rs./Acre
	(a)	(b)
Less than 8	72.35	72.35
8 to < 25	117.51	117.51
25 to < 50	140.57	140.57
50 to < 150	207.10	207.10
150 and over	158.05	199.17
All Sizes	139.59	147.00

Correlation Coefficient: (All regions) = 0.23887
T. Test Significance: (All regions)=Sig. at 5% level

Source: Field Survey 1978

Note: Campbellpur is the only unirrigated region in our Sample. For this region our sample contains only farms which are 150 acres and over. In Cambellpur, (being unirrigated) the use of fertilizer by farmers is very low.

TABLE 14

INTENSITY OF PESTICIDE BY SIZE OF FARM (RS. PER ACRE)

Size of Farm (Acres)	Expenditure on Fertilizer Per Acre All Regions	Expenditure on pesticide Per Acre Excluding Cambellpur
Acres	**Rs./Acre**	**Rs./Acre**
Less than 8	3.09	3.09
8 to < 25	10.23	10.23
25 to < 50	12.63	12.63
50 to < 150	12.23	12.23
150 and over	21.05	27.24
All Sizes	13.49	14.35
All regions Correlation Coeff: 0.266085 T Test: Sig. at 2.5% level.		

Source: Field Survey 1978

Note: Campbellpur is the only unirrigated region in our Sample. For this region our sample contains only farms which are 150 acres and over. In Cambellpur, (being unirrigated) the use of fertilizer by farmers is very low.

(1) There is the problem of hiring a large number of labourers within a short time in an imperfect labour market. This problem has become particularly acute since multiple cropping has constricted the time period of the peak season demand.

(2) There is an acute supervision constraint in a situation where a large number of labourers have to be induced to perform farming operations. For example close monitoring of labourers is required at the time of rice planting, where badly-spaced saplings could adversely affect yield.

SECTION IV

THE TOTAL QUANTITY OF' LABOUR INPUT PER ACRE AND THE PROCESS OF POLARIZATION

Our earlier discussion indicates that the polarization in the size distribution of farms might dampen the growth rate in demand for hired labour, in so far as small farms have lower yields in some of the principal crops compared to medium. sized farms; small farms use cropping patterns that in the case of some regions have a smaller man days per acre requirement than the lower medium-sized farms; and finally, small farms have a tendency to fulfil a larger percentage of their labour requirement with family labour rather than hired labour, compared to lower medium-sized farms. These factors however may be counter-acted to some extent by the higher cropping intensity on small farms compared to lower medium farms.

Let us consider briefly M.H. Khan's evidence on the total quantity of human labour used per acre by size class, for wheat and rice respectively[2] As table 15 shows, two out of the three districts of the Punjab for which labour use data is provided for Mexi Pak wheat, the medium size class 12.5 to

less than 25 acres has a higher per acre requirement of wheat compared to both the small and large size classes. Thus for example, in the case of Gujranwala, the Mexi-Pak require ment of total man days per acre Is 15.7 for the lower medium size class (12.5 to less than 25 acres), compared to the small size class which requires 14.1 man days per acre, and the large size class (over 50 acres) which requires 7.3 man days per acre. Similarly in the case of Lyallpur the total man days per acre requirement for the lower medium size class is higher than for the size classes at the lower and upper and of the size class scale: Being 16.8 man days per acre for the 12.5 to less than 25 acre size class, compared to 14.7 man days in the smallest size class and 5.4 man days in the highest size class.

In the case of irri rice, data is available for only two districts, Gujranwala and Sahiwal. In the case of the latter district, the lower medium size class has a much higher man days per acre requirement, compared to the size classes at the "ends of the scale. However this is not the case for Gujranwala, where the size class below 12.5 acres has a higher man days per acre requirement (17.9), than for the 12.5 to less than 25- acre size class where the figure is 14.7 man days/acre. For Basmati rice, both Sahiwal and Gujranwala show a higher man days per acre requirement for the less than 12.5-acre size class, compared to the 12.5 to less than 25-acre size class. For Lyallpur, however, it is the lower medium size class which has by far the highest man days per acre requirement. When we consider the man days per acre requirement for irri rice. In the large size class, we find that in both the districts for which data is given (Gujranwala and Sahiwal) the man days per acre requirement for the over 50-acre size class is lesser than for any other size class.

M.H. Khan's data may not be sufficient to make a generalization about the pattern of man days per acre by size class of farm for the Punjab. However, what one can suggest

are the implications for such regions where the man days per acre for farms at the lower and upper ends' of the size class scale are smaller than for farms in the lower medium size class. In such regions, the polarization in the size distribution of farms suggested in Part I of this paper, will have an adverse effect on the growth of demand for labour, especially hired labour.

SUB-SECTION V: THE DETERIORATING ECONOMIC CONDITION OF POOR PEASANTS IMPLICATIONS FOR THE LABOUR MARKET.

In this sub-section we will examine our field survey data to show that the economic condition of a significant proportion of small and lower medium farmers may be deteriorating. In a situation where real wages of agricultural labour are increasing the deteriorating economic condition of small farmers would tend to push an increasing number into agricultural wage labour This, as we shall indicate, would have interesting implications for the nature of the labour market.

We define as poor peasants those who are using predominantly family labour on their farms, i.e. their ratio of total net labour hired-in to family labour is less than one. In our sample, 72% of the farmers in this size class have a farm size below 25 acres.

As the result of the development of capitalist farming, the relationship between the small farm sector and the large farm sector has undergone a change. This change, while it has been associated with a dramatic improvement in the economic condition of big farmers, has resulted in a triple squeeze on the poor peasants:

1. Money costs of poor peasants have increased.

This is because of two main factors

i) In puts which were formerly non-monetized (e.g. seed, animal manure) or inputs which the poor peasant formerly did not use at all (e.g. tractor ploughings, pesticides, chemical fertilizers) he now has to buy in the market The need to purchase tractor ploughings is partly linked with the reduced ability of many poor peasants to maintain farm animals. This is because of reduced area devoted to fodder following loss of some of their rented-in area. At the same time the poor peasants' access to the fodder and pasture lands of the landlords has been reduced as the latter mechanized his operations.

ii) The second factor in the rise in money costs is the shift from share-cropping to money rents, which have increased sharply during the Green Revolution period.

2. Slow growth in yields.

While there has been a sharp increase in cash costs payable by the poor peasant, his yield per acre has not increased proportionately. This is due to the fact that the poor peasant does not have the financial and political power (a) to acquire the required quantity of the new inputs (seed, fertilizer, tubewell water, pesticides); and (b) the poor peasant does not have control over the timing of their application. (This is especially true in cases where the poor peasant buys tube well water and tractor ploughings from neighbouring farms).

3. Selling Grain Cheap and Buying Dear.

> The third pressure on the real income of the poor peasant is that in a situation of rising cash requirements and indebtedness,, he is forced to sell a part of his subsistence output at harvest time. These harvest sales are at. low prices. However at the end of the year in many cases he has to buy grain in the market at high prices. Thus selling grain cheap and buying dear is another squeeze on the poor peasants' real income.

The squeeze on the real income of many poor peasants, associated with the changed social organization of production, is reflected in the changes in the quantity and quality of their diet. Poor peasants with farm size below 25 acres, contains a substantial number of farmers who have suffered an absolute decline in the quantity of food, and contains an even larger number who have suffered a decline in the quality of their diet. For example in the size category less than 8 acres, 33% of the farmers have suffered a decline in the quantity of diet, while 1.1% have experienced an improvement. In terms of the quality of diet, 67% of the farmers in the small size class have experienced a deterioration, while none have experienced an improvement.

To the extent that poor peasants are suffering a squeeze on their real Income, there would be a tendency for many of them especially in the face of rising wages, to engage in wage labour on neighbouring farms to supplement the income from their own farms; if we consider this tendency together with the observed tendency of the traditional agricultural labourers to migrate into towns, an interesting labour market phenomenon is explained: Labour shortages in some regions simultaneously with labour surpluses in others. This would tend to happen because, as an increasing proportion of agricultural labourers consist of small farmers, there would be a considerable reduction in labour mobility. (Small farmers who engage in wage labour as a supplementary source of income, do not normally venture so far away from their

farms looking for employment, or for such a length of time that their own farming operations may suffer).

CONCLUSIONS

This Part III of the Book discusses the potential for labour absorption in the crop production sector. The exercise has been conducted at two levels. First, estimates have been made of the possible increases in labour absorption that could take place over the next two decades if certain technological factors were fulfilled, for example, land reclamation, and improvements in irrigation efficiencies. It is seen that the positive impact of these changes on labour absorption would be considerably constrained if the present rapid rate of tractorization were to continue unchecked. Second, the changes in the size distribution of farms and the social organisation of agricultural production, and the impact of these changes on labour demand, have been analyzed.

In Chapter 7 it is suggested that the technical potential for increased agricultural production and labour absorption in Pakistan is based on three factors:

(1) Pakistan's crop yields for each of the major crops are about one-third of the potential of the particular seed varieties being used.

(2) An additional 27.8 million acres of land can be brought under irrigated cultivation through land reclamation.

(3) An additional 38 MAF of water can be added to the present farm gate availability of 73 MAF, by means of canal remodeling, surface storage and groundwater development.

Available evidence suggests that if the potential for

increased irrigation to the crop root zone could be realized, and increased Intensity of input use and improved cultural practices were to be achieved, then an average growth rate in land productivity of 5.3% over the next two decades is well within the bounds of possibility.

Land reclamation alone (27.8 million acres) could enable an increase In labour absorption of about 19.9 million persons. This could be raised further through increasing land productivity. However, the factor counteracting the prospect of increased labour absorption is the tendency for rapid mechanization.

Section V in Chapter 7 indicates the changes in the levels of labour absorption over the next two decades under differing policy packages. If no effort is made to reclaim additional land, or increase yields, and if the present pace of tractorization continues, then by the year 2002, there could be a decline in the population absorption amounting to 8.46 million persons. If, on the other hand, investment is made in land reclamation, improved irrigation and input use, and at the same time the growth rate of tractorization cut down by half, then an increase of population absorption of up to 24.957 million persons could occur by the year 2002, (20.499 m. on-farm and 4.458 m. non-farm).

Our analysis in Chapter 8 and Chapter 9 suggests that given the highly unequal distribution of landownership in Pakistan, the availability of HYV technology has induced the larger landowners to resume their land for self cultivation on large farms. An imperfect labour market where large farmers find it difficult to mobilize labourers quickly (even when they are available) and the difficulty of supervising the labour force, has created powerful pressure for mechanization. Data from field work combined with adjusted agriculture census figures show that land resumption by big owners has resulted in a polarization in the size distribution of farms. Given

the cropping patterns on different size classes of farms, and the polarization in the size distribution of farms could in many regions, result in a dampening of the demand for farm labour.

It appears from the studies presented in Part IV that there is considerable potential for increased labour absorption at a purely technical level. However, this is to some extent counteracted by the changes in the social organisation of agricultural production resulting from the adoption of the HYV technology within the framework of a highly-skewed distribution of landownership.

NOTES

1. WAPDA. Revised Action Programme for Irrigated Agriculture. Main Report, 1979.

2. M.H. Khan: The Economics of the Green Revolution in Pakistan, Praeger Publishers. New York, 1975.

3. S.A. Hussain, Impact of Agricultural Growth on Changes in Agrarian Structure of Pakistan. D. Phil Thesis, 1980. Sussex, England.

APPENDICES

APPENDIX TABLE 2

PUNJAB

DISTRIBUTION OF FARMS AND FARM AREA

1960 And 1972

(PERCENTAGE)

Size of Farm (Acres)	1960				1972	
	UNADJUSTED		ADJUSTED			
	Number	Area	Number	Area	Number	Area
Less than 7.5	63.35	19.08	35.54	9.95	41.3	12
7.5 to < 12.5	15.14	16.77	27.88	20.35	23.8	18
12.5 to < 25	14.67	28.49	24.94	30.78	23.1	29
25 to < 50	5.42	20.21	8.88	20.23	8.8	21
50 to < 150	1.27	10.57	2.49	12.93	2.7	15
150 and above	0.14	4.88	0.27	5.57	0.3	6
Total	100	100	100	100	100	100

Source: Pakistan Census of Agriculture 1972.

Note: Adjustment procedure same as in the all-Pakistan case. See text.

APPENDIX TABLE 3

BALUCHISTAN

SIZE DISTRIBUTION OF FARMS AND FARM AREA

1960 AND 1972

(PERCENTAGE)

Size of Farm (Acres)	1960				1972	
	UNADJUSTED		ADJUSTED			
	Number	Area	Number	Area	Number	Area
Less than 7.5	44.67	5.72	22.89	2.48	36	5
7.5 to < 12.5	17.14	6.53	24.78	7.09	20	8
12.5 to < 25	16.75	11.80	22.36	11.41	21	15
25 to < 50	11.43	15.31	14.67	13.72	13	17
50 to < 150	7.43	22.91	11.40	25.10	8	23
150 and above	2.60	37.74	3.90	39.84	2	32
Total	100	100	100	100	100	100

Source: Pakistan Census of Agriculture 1972.

Note: Adjustment procedure same as in the all-Pakistan case. See text.

APPENDIX 2

A NOTE ON THE ADJUSTMENT PROCEDURE FOR SIZE DISTRIBUTION OF FARM AREA IN OUR FIELD SURVEY DATA 1978.

The distribution of farm area in 1978 in our sample data does not correspond to the size distribution of farm area in S the population because of over- sampling of the size class 150 acres and above; (i.e. The number of farms in the size class r 150 acres and over, as a percentage of total farms in our sample, is much larger than in the actual population). It is therefore necessary to adjust the size distribution of farm area in our sample to make it correspond to the population size distribution. This is done by distributing the total farm area in our sample amongst the various size classes according to the percentage distribution of farm area in the 1972 Census of Agriculture. The remaining task is to adjust the farm area in 1960 for each size class in our sample, in such a way that it becomes comparable with the adjusted sample figures for 1978, and yet the percentage increase in farm area over the period, within each size class, remains unchanged. This task is accomplished by adopting the following procedure:

For a given size class, let the unadjusted farm area in 1960 be = a. Let the unadjusted farm area in 1978 for the same size class be = b. We know the adjusted 1978 farm area (adjusted according to the 1972 Agriculture Census distribution as discussed in the text). Let this adjusted 1978 farm area be = b.

Then the adjusted 1960 farm area in our sample, in the size class concerned is $a = \frac{a}{b} \times b$

i.e. $\frac{a}{b} = \frac{a}{b}$

Thus, the procedure for arriving at the adjusted 1960 farm in a given size class consists of multiplying the adjusted 1978 figure for that size class by the ratio of the unadjusted 1960 and unadjusted 1978 farm area Since the above calculation, it means that the percentage increase over the period, of the farm area within the size class, is the same after adjustment as it was in the Un adjusted figures. Such a procedure allows us to observe the percentage change in farm area in each size class of our sample data, after the size distribution of the total farm area in our sample has been normalized.