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***SEASONALITY OF FARM LABOUR USE IN AN AREA
OF MYMENSINGH DISTRICT****

M. A. S. Mandal**

ABSTRACT

This paper presents an empirical analysis of the seasonality of farm labour use on the basis of data collected from 160 rural households. Two seasonal peaks in labour use were observed. The first peak was observed in the months of March-May, while the second peak occurred in August. A comparison between farm size groups revealed that medium farms, compared to small farms and large farms, seemed to have made available higher amount of labour in the second peak. One of the reasons for this is that the medium farmers did not hire out much family labour so that they could meet the peak season labour demand.

I. INTRODUCTION

In recent years a few empirical studies have been conducted on the seasonal aspect of farm labour use (Muqtada 1975 ; Clay 1978 ; Ahmed 1978 ; Masum 1979). One of the methodological problems of these studies stems from the flimsy data base used. Seasonal data on labour use has not been collected through direct farm survey over different periods of the year. Instead, seasonal break-down of labour use has been done quite arbitrarily by using operationwise labour use data with respect to somewhat impressionistically devised crop-calendar. The method used by Ahmed (1978) is more dubious because he has broken down annual labour requirements in a Comilla village week by week depending on information drawn from only 10 farms (and one agriculture officer) interviewing respondents only twice a year. The naive assumption underlying such approach is that farm work is unevenly distributed between crop operations but uniformly divided over the periods covered by particular crop operation. This

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ignores, by implication, the possibility that labour use can also vary considerably over the time covered by individual crop operations (Jabbar and Faruque 1978).

The purpose of this paper is to measure and analyse seasonal use of human labour through an intensive and direct farm survey. The analysis will be done with particular emphasis on farm size and tenure status of rural households. Data for this study were collected from 160 rural households in Shimla-Padurbari area of Mymensingh district. Sample households were purposively selected in clusters and data were collected through intensive farm survey for the period October 1976—September 1977.

This paper is organized as follows : Section II discusses briefly the characteristics of sample households. Section III analyses availability and seasonal use of family and hired labour by farm size and tenure groups. Section IV measures and discusses the change in labour use brought about by shifts in acreage between crops. Conclusions are drawn in the final section.

II. LAND OWNERSHIP, FARM SIZE AND TENURE CHARACTERISTICS OF SAMPLE HOUSEHOLDS

One third of sample households were virtually landless owning no cultivable land at all, while the top one-sixth occupied about one-half of total farm and non-farm land. When comparison was confined to only owners of cultivable land, 56 per cent owned less than 2.0 acres and collectively shared only 25 per cent of total land, 28 per cent owned 2.0-4.0 acres and shared 30 per cent of the total land. The top 16 per cent owned above 4.0 acres and shared about 46 per cent of total land (Table 1).

Table 2 shows average farm land owned, rented and cultivated by different farm size groups.¹ Two interesting points emerging from the table are : (i) farmers' owned land normally determined the operational size of farm, average farm size being 2.47 acres, and (ii) average acres cultivated by small farmers and medium farmers were consistently higher than average acres owned by them, while the larger farmers cultivated much less land than they owned.

More than two-thirds of all farms were involved in tenancy, 14 per cent as rentiers and about 50 per cent as renters.² It was also found that about one-fifth of total cultivated land was operated under share-tenancy (Table 3).

TABLE I DISTRIBUTION OF LAND OWNERSHIP AMONG HOUSEHOLD GROUPS

Household groups	Households		Non farm land		Farm land		Total owned land		Average acres owned
	Number	%	%	%	%	%	%		
Landless households	48	30.0	8.9	a	100.0	1.3	0.08		
Land owning households	112	70.0	91.1			98.7	2.80		
(in acres)									
0.01—0.99	28	17.5	8.7	5.8	6.2	0.71			
1.0—1.99	35	21.8	19.7	17.9	18.3	1.65			
2.0—2.99	26	16.3	22.7	22.8	22.8	2.79			
3.0—3.99	5	3.1	5.7	6.4	6.3	3.52			
4.0—4.99	7	4.4	8.8	11.8	11.3	4.56			
5.0—7.49	4	2.5	4.2	8.5	7.8	6.22			
7.5+	7	4.4	21.3	26.8	26.0	11.83			
Small owner (0.01—1.99)	63	56.3	31.2	23.8	24.7	1.23			
Medium owner (2.0—3.99)	31	27.6	31.0	29.3	29.3	2.99			
Large owner (4.0+)	18	16.1	37.8	46.9	45.7	7.97			
All owners	112	100.0	100.0	100.0	100.0	2.80			
All households	160	100.0	100.0	100.0	100.0	1.99			

a not applicable

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TABLE 2 AVERAGE FARM LAND OWNED, RENTED AND CULTIVATED PER FARM BY FARM SIZE GROUPS

Farm size groups (in acres)	Average in acres						Proportion of	
	Farm land owned	Farm land rented out	Farm land rented in	Farm land cultivated	Owned land rented out	Cultivated land rented in	5	6
0.01—0.99	0.56	0.06	0.21	0.21	0.21	11.3	29.9	
1.0—1.99	1.39	0.27	0.36	1.48	1.48	19.3	24.0	
2.0—2.99	1.97	0.04	0.55	2.48	2.2	2.2	22.2	
3.0—3.99	2.89	0.27	0.84	3.46	9.5	9.5	24.3	
4.0—4.99	3.32	0.15	1.16	4.33	4.4	4.4	26.8	
5.0—7.49	3.32	0.15	1.16	4.33	4.4	4.4	26.8	
7.5+	13.81	5.75	a	8.06	41.6	a	a	
Small farm (below 2.0)	0.98	0.17	0.28	1.09	17.0	17.0	25.9	
Medium farm (2.0—3.99)	2.23	0.11	0.63	2.75	4.9	4.9	22.9	
Large farm (4.0+)	6.20	1.30	0.65	5.55	20.9	20.9	11.8	
All farms	2.31	0.32	0.48	2.47	14.0	14.0	19.5	

a. none

TABLE 3 DISTRIBUTION OF HOUSEHOLDS BY TENURE GROUPS AND THEIR RELATIVE SHARE OF LAND OWNED, RENTED AND CULTIVATED

Tenure groups	Proportion of		% share of		Proportion of	
	All households	All farms	Owned land	Cultivated land	Owned land rented out	Cultivated land rented in
Owner	33.7	45.7	66.1	48.7	21.2	na
Rentier-owner	10.0	13.5	41.3	25.5	34.0	na
Pure-owner	23.7	32.2	24.8	23.2	na	na
Owner-tenant	36.3	49.2	33.9	49.6	na	35.9
Pure-tenant	3.7	5.1	na	1.7	na	100.0
Landless labourer	26.3	na	na	na	na	na
All farms	73.7	100.0	100.0	100.0	14.0	19.5
All tenures	100.0	na	100.0	100.0	14.0	19.5

na. Not applicable.

a. All tenures include all households.

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III. AVAILABILITY AND SEASONAL USE OF LABOUR

Availability of Fixed Labour

Farms get fixed labour supply from two sources, family and annually hired labour. The amount of family labour available to a farm family for a particular period is dependent on the size of family and its composition by age and sex, the extent of non-farm occupations available to male members, and participation rate of available male members in actual farm work. It was indicated elsewhere that the participation rate of males of working age did not increase but diminished as the farm size increased (Mandal 1979, p. 99).

Table 4 shows standard man-units³ of total fixed labour available per acre of land by farm size and tenure groups. One of the shortcomings of this estimate is that availability of fixed labour could not be shown for different periods of the year because of the absence of data. It was observed that man-units available per acre of cultivated land by small farms and medium farms were much lower than average man-units available per acre of owned land, while on large farms the opposite was the case. One explanation for this finding is that small farmers and medium farmers having relatively more fixed labour per unit of their owned land rented in additional land to increase their operational farm size, while large farmers having too little fixed labour per unit of their owned land rented out part of it conceivably to the former. Therefore on large farms fixed labour availability per acre of cultivated land increased. The proportion of total fixed labour contracted as annually hired labour were almost similar for medium farms and large farms but considerably higher than in the case of small farms.

Seasonal Use of Labour

Seasonal hiring out of family labour

Fixed labour available to a household can be hired out to other farms and/or can be employed on farm for producing crops, provided there is enough land with required work animals, farm implements, credit and other material inputs. In this study 16 per cent of farms and 38 per cent of all households hired out their fixed labour to other farms during the period October 1977 to September 1977 (Table 5). Inter-size/tenure group comparison revealed that 50 per cent of very small farms, 83 per cent of puretenants and all landless households had to hire out labour, while no farm above 3.0 acres hired out labour at all. The monthly hiring out of family labour by small farm show that the extent of hiring was higher in the months of January-February and October-November and lower in the months of March-April and July-August.

TABLE 4 AVERAGE STANDARD MAN-UNIT OF FAMILY, ANNUALLY HIRED AND TOTAL FIXED LABOUR AVAILABLE PER ACRE FOR FARM WORK BY FARM SIZE/TENURE GROUPS

Size/Tenure groups	Man-unit per owned acre			Man-unit per cultivated acre			Annually hired man-unit as % of	
	Family	Annually hired	Total fixed family labour	Family	Annually hired	Total fixed family labour	Family man-unit	Total fixed family man-unit
	1	2	3=1+2	4	5	6=4+5	7	8
Farm size groups :								
Small	2.07	0.03	2.10	1.37	0.02	1.39	1.46	1.44
Medium	0.99	0.13	1.12	0.60	0.05	0.65	8.33	7.69
Large	0.41	0.03	0.44	0.51	0.03	0.54	7.32	6.82
Tenure groups :								
Owner	0.98	0.05	1.03	1.02	0.06	1.08	5.88	5.56
Rentier-owner	0.23	0.04	0.27	0.35	0.05	0.40	14.29	12.50
Pure-owner	1.30	0.06	1.36	1.30	0.06	1.36	4.62	4.41
Owner-tenant	1.91	0.09	2.00	0.74	0.03	0.77	4.05	3.90
Pure-tenant	na	na	na	1.46	a	1.46	a	a
All farms	1.39	0.07	1.46	0.90	0.04	0.94	4.44	4.26

a. none
na. not applicable

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TABLE 5 PROPORTION OF HOUSEHOLDS CASUALLY HIRING OUT FAMILY LABOUR BY FARM SIZE/TENURE GROUPS

Size/Tenure groups	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct-Dec ^a	Wholeyear total	
Farm size groups :												
(in acres)												
0.01—0.99	46.2	46.2	38.5	38.5	42.3	38.5	30.8	34.6	38.5	42.3	50.0	
1.0—1.99	11.5	15.4	15.4	11.5	15.4	11.5	11.5	15.4	11.3	15.4	15.4	
2.0—2.99	2.9	2.9	2.9	2.9	5.9	5.9	5.9	5.9	5.9	2.9	5.9	
3.0+	a	a	a	a	a	a	a	a	a	a	a	
Tenure groups :												
Owner	14.8	14.8	12.9	11.1	12.9	11.1	11.1	12.9	11.1	12.9	16.7	
Rentier-owner	a	a	a	a	a	a	a	a	a	a	a	
Pure-owner	21.0	21.0	18.4	15.8	18.4	15.8	15.8	18.4	15.8	18.4	23.7	
Owner-tenant	5.2	6.9	5.2	5.2	8.6	8.6	6.9	8.6	8.6	6.9	8.6	
Pure-tenant	83.3	83.3	83.3	83.3	83.3	66.7	50.0	66.7	66.7	83.3	83.3	
Landless labourer	95.2	97.6	97.6	100.0	92.8	95.2	97.6	100.0	76.2	97.6	100.0	
All farms	13.6	14.4	12.7	11.9	14.4	12.7	11.0	12.7	12.7	13.6	16.1	
All tenures	35.0	36.3	35.0	35.0	35.0	34.4	33.8	35.6	29.4	35.6	38.2	

a. none 1 Data on labour hiring-out for the period October-December were collected in a single visit and therefore they are presented together.

The observed monthly variation in the proportion of households hiring out labour can be explained using peak season—slack season dichotomy. In the present study area, two seasonal peaks of labour use were identified, the first one being in the months of March-May and the second and the highest peak occurring in August. One would see from Diagram 1 that the first peak coincided with land preparation, sowing/transplanting, raking and weeding of irrigated HYV Boro, irrigated Local Boro, rain-fed broadcast Aus and Jute. The second peak coincided with harvesting of broadcast Aus, Jute and T. Aus and with the land preparation and transplanting of T. Aman. The periods January-February and October-November were observed as slack seasons of agricultural operations. A relatively low proportion of very small farmers hired out labour in peak months because they had to employ a part of family labour in this period on their own farms. In peak periods almost all landless households worked as hired labourers, but in slack period not all of them could get work because the very small farmers who had little to do this time also joined the labour market as suppliers (Table 5).

It is noted that a number of farmers did not hire out family labour at all, even when employment on their own farms was very low and work on other farms was available. This can be explained partly by unique seasonal demand of crops for labour which goes up for a short period and creates work opportunities for family labour on their own farms as well as on other farms at the same time. Therefore, as the family labour becomes technically locked-in on their own farms they can hardly avail themselves of the advantage of rising labour demand on other farms. Of course, the very small and needy farmers who cannot resist the food grain need, do ignore their own farm operations and sell their labour out. However, the more important reason for non-participation in the labour market as hired workers is termed as 'social hierarchy'. In traditional south-east Asian societies manual work on other farmers' land as hired wage labourers attaches degrading social status to the individual and his family. Therefore, relatively large farmers and also few small farmers who can afford it would prefer unemployment on their own farms rather than to attach stigma to them by working for others.

Seasonal hiring in of casual labour

Landless labourers and very small farmers were the sole supplier of casual labour and they both came from the same locality or from outside the village. On the demand side, almost all farms were found to hire in casual labour although the proportions of small farms and pure-tenant farms were a little less than others (Table 6). One can see a seasonal variation so that almost all medium farms and large farms hired in casual labour in the peak months of March-May, while about one third of them hired such labour in slack months of February, October and November. Similar variations in casual

Diagram 1 : Distribution of Crop Operations Over the Months by All Sample Farms

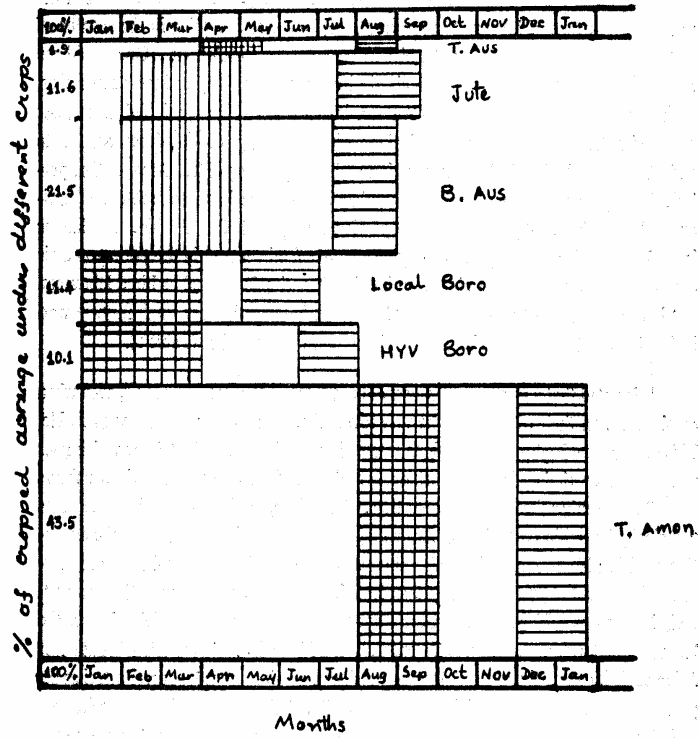


TABLE 6 PROPORTION OF FARMS EMPLOYING CASUAL LABOUR BY FARM SIZE/TENURE GROUPS

Months	Farm size groups			Tenure groups			All farms
	Small	Medium	Large	Owner-	Owner-	Pure-	
				tenant	tenant	tenant	
January	48.1	70.2	89.5	57.4	74.1	16.7	63.6
February	46.2	29.8	31.5	44.4	29.3	50.0	37.3
March	55.8	80.9	84.2	66.7	74.1	66.7	70.3
April	73.1	95.7	100.0	85.2	89.7	77.7	86.4
May	67.3	97.9	100.0	85.2	86.2	66.7	84.7
June	34.6	55.3	52.6	40.7	48.3	66.7	45.8
July	44.2	91.5	89.5	72.2	72.4	33.3	70.3
August	76.9	100.0	100.0	85.2	98.3	50.0	89.0
September	28.8	55.3	63.2	50.0	44.8	a	44.9
October	17.3	40.4	26.3	31.5	24.1	33.3	28.0
November	17.3	40.4	57.9	20.3	48.3	a	33.0
December	63.5	91.5	73.7	74.1	79.3	66.7	76.3
Total	98.1	100.0	100.0	100.0	100.0	83.3	99.2

hiring in of labour were also observed for small farms and for tenure groups although about one-third of small farms did not hire in any labour even in peak months.

This was also revealed in this study that not only the proportion of farms hiring in casual labour increased with farm size but also the proportion of total labour used as casual labour showed a positive relationship with it. Seasonal demand for labour further intensified dependence on casual labour more critically for large farmers who had to hire labour on per farm basis about seven times higher than did small farmers in peak months (Table 7). If we could break down our reference period from months to weeks or to days, we would have observed that a very large amount of labour (or alternatively a large number of labourers) were needed by large farms in a single week or in a single

day to do certain essentially important crop operations like transplanting, weeding and harvesting. Given more or less the limited supply of casual labour for a short period, it is therefore quite likely that large farms may not be able to hire in as much labour as would be required in peak periods. This is also observed in Table 8 that wage rate went up in peak periods. Therefore, even if required amount of labour was available large farmers using resources on equi-marginal principles were likely to use less labour per unit of land in peak period so that marginal productivity of labour was higher than the prevailing wage rate.

TABLE 7 AVERAGE MAN-DAYS CASUALLY HIRED-IN PER FARM BY FARM SIZE/TENURE GROUPS

Months	Farm size groups			Tenure groups			All farms
	Small	Medium	Large	Owner	Owner-tenant	Pure-tenant	
	Man-days casually hired-in						
January	2.8	5.7	27.5	11.6	5.3	0.7	7.9
February	4.1	2.2	11.1	7.0	2.2	3.7	4.5
March	5.8	12.1	23.4	12.5	10.8	3.0	11.1
April	6.6	17.6	40.7	18.1	16.0	5.5	16.5
May	4.9	24.5	54.9	22.9	20.5	4.0	20.8
June	1.7	4.2	6.7	4.2	2.9	2.5	3.5
July	2.2	9.9	20.3	9.9	7.3	0.5	8.2
August	7.7	19.0	42.9	20.3	17.2	2.3	17.9
September	1.1	5.2	11.6	7.2	2.3	a	4.4
October	0.4	1.1	1.0	0.9	0.7	0.7	0.8
November	0.5	1.8	2.8	0.6	2.3	a	1.4
December	3.3	12.2	14.1	9.1	8.6	3.3	8.5
Total	41.1	115.5	257.0	124.3	96.1	26.2	105.5

a, none

TABLE 8 AVERAGE DAILY WAGE RECEIVED AND PAID BY FARM SIZE/TENURE GROUPS

Months	Farm size/tenure groups						
	Landless labourer	0.01-0.99	1.0-1.99	2.0-2.99	3.0-4.99	5.0+	All households
	Taka per man-day						
January	7.1	6.6	7.7	7.0	7.2	7.1	7.1
February	6.0	6.1	6.3	6.1	6.3	6.0	6.1
March	6.1	6.1	6.6	6.5	6.6	6.4	6.3
April	6.6	6.8	7.6	7.1	7.1	7.9	7.0
May	7.7	7.6	7.8	7.6	7.4	7.4	7.6
June	6.9	7.3	7.6	7.6	7.3	7.4	7.2
July	7.9	8.1	8.3	8.2	8.6	8.1	8.2
August	8.3	8.5	8.9	8.7	8.9	8.9	8.6
September	7.0	8.2	8.1	8.1	7.9	8.1	7.7
October	5.8	6.1	6.6	6.2	5.7	7.3	6.1
November	5.7	6.5	7.0	6.4	6.6	7.0	6.2
December	6.9	7.2	6.9	7.4	7.2	8.3	7.2
Whole year	6.8	7.1	7.5	7.4	7.4	7.6	7.2

While evidence presented above suggest that farms in each size/tenure group hired in labour more or less throughout the year, this goes against the popular myth that peasant farms rely almost exclusively on family labour and therefore do not hire in any wage labour (Chayanov 1966 ; Hunt 1978). Both Chayanov and Hunt incorporate in their models an interesting assumption. They assume that peasant farmers have relative abundance of land (Soviet Russia Chayanov's reference area, and Eastern Kenya, Hunt's study area) and can thus adjust their farm size according to the availability of fixed family labour, and therefore they do not require to hire in wage labour. Whilst the logical sequence of this argument is accepted the premise needs examination. In reality, in a land scarce situation like Bangladesh and most of India such complete adjustment of labour with land is practically impossible. Therefore, farmers cultivating relatively more land than their fixed labour would permit and all those faced with season-

lity of labour requirements do indeed hire in casual labour even though some small peasants may hire out labour as well.

One may wonder why small farmers, most of whom themselves hire out wage labour, hire in such labour from others. Of course, on balance small farmers hired out more labour than they hired in on per farm basis (Table 9). The possible reasons for this are as follows: (i) seasonality of agricultural practices makes it necessary for even very small farms to hire in extra labour for very short peak periods; (ii) most small farmers in our study area did not have any work animal of their own and therefore, they had to hire in animal power for ploughing and raking. Customarily, when one hires animal

TABLE 9 AVERAGE MAN-DAYS HIRED BY THOSE WHO HIRED OUT AND HIRED IN CASUAL LABOUR IN THE LOWEST FARM SIZE GROUPS

Months	Farm size groups (in acres)					
	(0.01—0.99)			(1.0—2.99)		
	Hired out 1	Hired in 2	Net change 3=1-2	Hired out 4	Hired in 5	Net change 6=4-5
	Man-days per farm					
January	19.3	0.2	19.1	22.5	2.8	19.7
February	17.1	3.0	14.1	10.2	1.2	9.0
March	16.6	2.5	14.1	9.0	0.3	8.7
April	18.7	4.6	14.1	8.5	7.3	1.2
May	11.4	3.4	8.0	11.0	9.3	1.7
June	11.7	0.5	11.2	18.7	1.0	17.7
July	10.3	0.8	9.5	11.5	2.0	9.5
August	16.2	4.6	11.6	9.2	7.8	1.4
September	11.2	0.5	10.7	15.7	1.2	14.5
October-December	28.9	2.4	26.5	10.3	3.5	6.8
Total	161.4	22.5	138.9	126.6	36.4	90.2

Note: No farm above 3.0 acres hired out family labour.

power one would hire not only the services of a pair of animals but also the services of its owner who ploughs himself. It happens even if hirer's own family labour is available for ploughing; (iii) it was observed that social custom induced farmers to practise mutual hiring of labour, particularly for ploughing, laddering, weeding and harvesting operations.⁴ Joint work in a team (some times involving division of labour) facilitates faster and efficient work. No doubt this proves that there is some cooperative spirit among the peasant farmers who are often branded as absolutely individualistic in nature. However, cooperation has to be clearly to the individual's advantage to be assured of success ; and (iv) yet another factor reported to have influenced hiring of casual labour by very small farmers was the earlier commitment to sell labour in peak periods to relatively larger farmers who also acted as money lenders. It was surprising to see that such small farmers locked-in against earlier monetary payments had to hire in labour to work on their own farms, while they themselves went out to work for others so as to repay debts.

Seasonal distribution of annual labour use

Inter-size group comparison revealed that labour use (family plus hired) over the months showed a more or less similar pattern, except that medium farms seemed to have coped with higher labour requirements in the second peak relatively better than others (Table 10). One plausible explanation is that, on the one hand, unlike very small farms, medium farms did not sell much family labour so as to make all family labour available for farm work at the peak seasons of crop operations. Yet another explanation is that unlike very large farms, medium farms cultivated relatively small and manageable acreages so that reasonable amount of casual labour could be obtained for hiring when required. This was one of the reasons why medium farms used relatively more labour per unit of land and achieved higher production than did small farms and large farms (Mandal 1979, p. 212).

We will now turn to see the seasonal variation in labour use with respect to tenancy. An appropriate method will be to compare seasonal labour use directly between owned land and rented land of owner-tenant farmers.⁵ Distribution of annual labour use on owned land and rented land is shown in Table 11. One can note that there was a difference in the proportion of peak season labour use between owned land and rented land of owner-tenant farms. They used larger proportion of labour on their owned land than on rented land over the major part of the first peak (April-May) and the entire second peak (August). This strengthens our argument that owner-tenant farmers did not only discriminate against rented land in terms of total labour use but neglected certain peak season crop operations on rented land in order to give preference to their

TABLE 11 SEASONAL DISTRIBUTION OF ANNUAL LABOUR USE ON OWNED LAND AND ON RENTED LAND CULTIVATED BY THE SAME OWNER-TENANT FARMERS

Months	Owned land			Rented land		
	Family	Hired	Total	Family	Hired	Total
	Per cent of annual labour per acre					
January	5.1	7.1	5.9	7.2	4.8	6.3
February	8.9	3.6	6.7	10.2	5.1	8.2
March	9.0	8.2	8.7	12.9	18.4	15.1
April	17.5	18.0	17.7	12.1	16.6	13.9
May	10.9	20.8	14.9	15.3	16.6	15.8
June	1.9	2.4	2.1	3.9	6.6	5.0
July	6.4	7.1	6.7	7.4	6.9	7.2
August	26.7	19.1	23.6	19.6	13.9	17.3
September	6.4	1.9	4.6	5.9	1.8	4.3
October	0.4	0.8	0.6	0.2	0.6	0.4
November	0.8	2.7	1.6	0.6	1.2	0.8
December	6.0	8.3	6.9	4.7	7.5	5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

owned land. This also partially explained the observed lower use of labour and lower production on rented land than on owned land of owner-tenant farms (Mandal 1979, p. 227).

IV. SHIFTS IN CROP ACREAGE AND LABOUR USE

In recent years there have been considerable shifts in crop acreage because of the introduction of the short-duration non-photosensitive variety of rice. For instance, in tubewell irrigated areas the growing season of Boro rice largely overlaps with the growing season of Aus rice and Jute and consequently considerable acreages have been shifted from Aus, Jute and minor Rabi crops to Boro rice. This shifts in acreage have in turn created great changes in the demand for labour over the seasons and in totality.

It has been observed empirically that a change from B. Aus to irrigated HYV Boro increased total labour use by 63 per cent for all farms, while a change from B. Aas to irrigated Local Boro increased labour use by only 6 percent (Tables 12 and 13). Table 14 shows that a change from irrigated Local Boro to irrigated HYV Boro increased total

labour use by more than 50 per cent, implying a positive impact of improved crop variety on labour use.⁶ It can be further mentioned from the tables that irrigation did not only increase total labour requirements in aggregate terms but it also showed strong positive increase in labour requirements in January, February and June which are, as we have seen, slack periods of agricultural employment. Furthermore, as the two irrigated Boro crops do not require any labour in the peak months of August, a little smoothing of observed peak in the labour use profile can be attributed to irrigation and to changes in cropping pattern.

TABLE 12 CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM RAINFED BROADCAST AUS TO TUBEWELL IRRIGATED HYV BORO (IR-8) BY FARM SIZE GROUPS

Crops and change (in md/ac)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Small									
B. Aus (1)	—	2.8	10.1	10.4	16.4	2.8	8.4	0.3	51.2
HYV Boro (2)	2.6	21.4	25.3	14.7	0.5	11.7	5.7	—	81.9
Change (2-1)	2.6	18.6	15.2	4.3	-15.9	8.9	-2.7	-0.3	30.7
%	nd	664	150	41	-97	318	-32	-100	60
Medium									
B. Aus (1)	—	4.8	5.4	9.5	12.7	2.2	8.5	—	43.1
HYV Boro (2)	7.5	9.6	23.0	11.1	2.4	12.6	4.7	—	70.9
Change (2-1)	7.5	4.8	17.6	1.6	-10.3	10.4	-3.8	—	27.8
%	nd	100	325	17	-81	473	-45	—	65
Large									
B. Aus (1)	—	2.7	7.7	10.2	15.2	1.7	7.7	0.3	45.5
HYV Boro (2)	5.2	13.8	26.0	11.7	1.6	11.1	3.2	—	72.6
Change (2-1)	5.2	11.1	18.3	1.5	-13.6	9.4	-4.5	-0.3	27.1
%	nd	411	238	15	-89	553	-58	-100	60
All farms									
B. Aus (1)	—	3.7	7.4	10.0	14.5	2.3	8.3	0.2	45.4
HYV Boro (2)	5.2	14.9	24.4	12.5	1.6	12.0	4.8	—	75.4
Change (2-1)	5.2	11.2	17.0	2.5	-12.9	9.7	3.5	-0.2	29.0
%	nd	303	230	25	-89	422	-42	-100	63

nd. not defined.

md. man-days

TABLE 13 CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM RAINFED BROADCAST AUS TO TUBEWELL IRRIGATED LOCAL BORO BY FARM SIZE GROUPS

Crops and change (in md/ac)		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Small										
B. Aus	(1)	—	2.8	10.1	10.4	16.4	2.8	8.4	0.3	51.1
Local Boro	(2)	14.2	14.3	10.1	9.3	4.6	0.2	—	—	52.7
Change	(2-1)	14.2	11.5	0.0	-1.1	-11.8	-2.6	-8.4	-0.3	1.5
		nd	411	0	-11	-72	-93	-100	1-00	3
Medium										
B. Aus	(1)	—	4.8	5.4	9.5	12.7	2.2	8.5	—	43.1
Local Boro	(2)	13.3	5.3	12.1	7.6	6.7	—	—	—	45.0
Change	(2-1)	13.3	0.5	6.7	-1.9	-6.0	-2.2	-8.5	—	1.9
		nd	10	124	-20	47	-100	-100	—	4
Large										
B. Aus	(1)	—	2.7	7.7	10.2	15.2	1.7	7.7	0.3	45.5
Local Boro	(2)	21.2	4.0	9.2	10.0	3.6	—	—	—	48.0
Change	(2-1)	21.1	1.3	1.5	-0.2	-11.6	-1.7	-7.7	0-3	2.5
		nd	48	19	-2	-76	-100	-100	-100	5
All farms										
B. Aus	(1)	—	3.7	7.4	10.0	14.5	2.3	8.3	0.2	46.4
Local Boro	(2)	15.0	9.4	10.7	8.8	5.2	0.1	—	—	49.2
Change	(2-1)	15.0	5.7	3.3	-1.2	9.3	-2.2	-8.3	-0.2	2.8
		nd	154	45	-12	-64	-96	-100	-100	6

nd. not defined

TABLE 14 CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM TUBEWELL IRRIGATED LOCAL BORO TO TUBEWELL IRRIGATED HYV BORO BY FARM SIZE GROUPS

Crops and change (in md/ac)		Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Small									
Local Boro (1)		14.2	14.3	10.1	9.3	4.6	0.2	—	52.7
HYV Boro (2)		2.6	21.4	25.3	14.7	0.5	11.7	5.7	81.9
Change (2-1)		-11.6	7.1	15.2	5.4	-4.1	11.5	5.7	29.2
%		-82	50	150	58	-89	5750	nd	55
Medium									
Local Boro (1)		13.3	5.3	12.1	7.6	6.7	—	—	45.0
HYV Boro (2)		7.5	9.6	23.0	11.1	2.4	12.6	4.7	70.9
Change (2-1)		-5.8	4.3	10.9	3.5	-4.3	12.6	4.7	25.9
%		-44	81	90	-46	-64	nd	nd	58
Large									
Local Boro (1)		21.2	4.0	9.2	10.0	3.6	—	—	48.0
HYV Boro (2)		5.2	13.8	26.0	11.7	1.6	11.1	3.2	72.6
Change (2-1)		-16.0	9.8	16.8	1.7	-2.0	11.1	3.2	24.6
%		-75	245	183	17	-56	nd	nd	51
All farms									
Local Boro (1)		15.0	9.4	10.7	8.8	5.2	0.1	—	49.2
HYV Boro (2)		5.2	14.9	24.4	12.5	1.6	12.0	4.8	75.4
Change (2-1)		-9.8	5.5	13.7	3.7	-3.6	11.9	4.8	26.2
%		-65	59	128	42	-69	11900	nd	53

nd. not defined

We will now attempt to show a perverse impact of irrigation on demand for labour. Tables 15 and 16 show that on the whole total labour use decreased by 27 per cent when farmers had to forgo a very labour intensive fibre crop, Jute, in order to grow irrigated HYV Boro rice. Labour requirements decreased 53 per cent when a change occurred from Jute to irrigated Local Boro rice. It can be mentioned that tubewell irrigation

TABLE 15: CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM JUTE TO TUBEWELL IRRIGATED HYV BORO (IR-8) BY FARM SIZE GROUPS

Crops and change (in md/ac)		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Small										
Jute	(1)	—	2.7	12.3	38.9	28.8	0.6	9.3	14.3	106.9
HYV Boro	(2)	2.6	21.4	25.3	14.7	0.5	11.7	5.7	—	81.9
Change	(2-1)	2.6	18.7	13.0	-24.2	-28.3	11.1	-3.6	-14.3	-25.0
%		nd	693	106	-62	-98	1850	-39	-100	-23
Medium										
Jute	(1)	—	6.1	10.1	33.9	29.9	0.1	4.8	16.9	101.8
HYV Boro	(2)	7.5	9.6	23.0	11.1	2.4	12.6	4.7	—	70.9
Change	(2-1)	7.5	3.5	12.9	-22.8	-27.5	12.5	-0.1	-16.9	-30.9
%		nd	57	128	-67	-92	12500	-2	-100	-30
Large										
Jute	(1)	—	2.7	10.1	34.5	31.0	0.6	5.0	17.2	101.1
HYV Boro	(2)	5.2	13.8	26.0	11.7	1.6	11.1	3.2	—	72.6
Change	(2-1)	5.2	11.1	15.9	-22.8	-29.4	10.5	-1.8	-17.2	-28.5
%		nd	411	157	-66	-95	1750	-36	-100	-28
All farms										
Jute	(1)	—	4.2	10.9	35.8	29.7	0.4	6.5	16.0	103.5
HYV Boro	(2)	5.2	14.9	24.4	12.5	1.6	12.0	4.8	—	75.4
Change	(2-1)	5.2	10.7	13.5	-23.3	-28.1	11.6	-1.7	-16.0	-28.1
%		nd	255	124	-65	-95	2900	-26	-100	-27

nd. not defined

TABLE 16 CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM JUTE TO TUBEWELL IRRIGATED LOCAL BORO BY FARM SIZE GROUPS

Crops and change (in md/ac)		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	
		Small									
Jute	(1)	—	2.7	12.3	38.9	28.8	0.6	9.3	14.3	106.9	
Local Boro	(2)	14.2	14.3	10.1	9.3	4.6	0.2	—	—	52.7	
Change	(2-1)	14.2	11.6	-2.2	-29.6	-24.2	-0.4	-9.3	-14.3	-54.2	
%		nd	430	-18	-76	-84	-67	-100	-100	-51	
		Medium									
Jute	(1)	—	6.1	10.1	33.9	29.9	0.1	4.8	16.9	101.8	
Local Boro	(2)	13.3	5.3	12.1	7.6	6.7	—	—	—	45.0	
Change	(2-1)	13.3	-0.8	2.0	-26.3	-23.2	-0.1	-4.8	-16.9	-56.8	
%		nd	-13	20	-78	-78	-100	-100	-100	-56	
		Large									
Jute	(1)	—	2.7	10.1	34.5	31.0	0.6	5.0	17.2	101.1	
Local Boro	(2)	21.2	4.0	9.2	10.0	3.6	—	—	—	48.0	
Change	(2-1)	21.2	1.3	-0.9	-24.5	-27.4	-0.6	-5.0	-17.2	53.1	
%		nd	48	-9	-71	-88	-100	100	-100	-53	
		All farms									
Jute	(1)	—	4.2	10.9	35.8	29.7	0.4	6.5	16.0	103.5	
Local Boro	(2)	15.0	9.4	10.7	8.8	5.2	0.1	—	—	49.2	
Change	(2-1)	15.0	5.2	-0.2	-27.0	-24.5	-0.3	-6.5	-16.0	54.3	
%		nd	124	-2	-75	-82	-75	-100	-100	-53	

nd. not defined

made a very significant positive impact on labour use when acreage shifted from B. Aus to Local Boro rice which was followed by another rain-fed rice crop, T. Aus (Table 17). However, even this additional crop, T. Aus, could not compensate for the loss in total labour use when a shift occurred from Jute to Local Boro rice (Table 18). Besides, such a shift in acreage increased labour use for harvesting T. Aus in August and therefore intensified the second peak of demand for labour.

TABLE 17. CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM RAINFED BROADCAST AUS TO TUBEWELL IRRIGATED LOCAL BORO FOLLOWED BY RAINFED TRANSPLANTED AUS, BY FARM SIZE GROUPS

Farm size groups	B. Aus (md/ac) (1)	Local Boro followed by T. Aus (md/ac) (2)	Change (2-1)	%
Small	51.2	88.5	37.3	73
Medium	43.1	88.9	45.8	106
Large	45.5	97.9	52.4	115
All farms	46.4	91.9	45.5	98

TABLE 18 CHANGES IN LABOUR USE AS A RESULT OF CHANGE FROM JUTE TO TUBEWELL IRRIGATED LOCAL BORO FOLLOWED BY RAINFED TRANSPLANTED AUS BY FARM SIZE GROUPS

Farm size groups	Jute (md/ac)	Local Boro followed by T. Aus	Change	%
	(1)	(2)	(2-1)	
Small	106.9	88.5	-18.4	-17
Medium	101.8	88.9	-12.9	-13
Large	101.1	97.9	- 3.2	- 3
All farms	103.5	91.9	-11.6	-11

V. CONCLUSIONS

Seasonality of agricultural operations affects use of labour on farms. In this study of 160 rural households two seasonal peaks of labour use were observed. The first peak was observed in the months of March-May while the second peak occurred in August. In the study area the months of January, February, June, October and November were identified as slack seasons of agricultural operations requiring relatively less labour than in peak seasons.

It was evidenced that absolute amounts of fixed labour available per cultivated acre were much lower on large farms than on either small farms or medium farms. Therefore, seasonal demand for labour intensified the dependence of large farmers on casual labour. Given more or less the limited supply of casual labour in a short peak period, it is likely that large farmers may not be able to contract as much labour as would be required during this period. On the other hand, although small farms had relatively abundant labour supply, they could work only part of peak periods on their own farms and therefore hired out maximum man-days in these periods. In general, medium farms, compared to small farms and large farms, seemed to have made available

higher amount of labour in the second peak. This was because medium farms did not hire out much family labour so as to meet the peak season labour demand.

Seasonal variation was also observed for owned land and rented land cultivated by the same owner-tenant farms. It was evidenced that in seasonal peaks, there was discrimination against share-rented land with respect to labour use. In tubewell irrigated areas cropping pattern has changed, which in turn changed the demand for labour both in totality and over the months and smoothed seasonal peaks to some extent.

Notes :

1. In the present study farms cultivating below 2.0 acres were called small farmers, while those cultivating between 2.0 and 4.0 acres were called medium farmers. Large farms cultivated over 4.0 acres.
2. Five distinct tenure groups identified in this study were as follows : (i) Rentier-owner, cultivating only part of their owned land and renting out the rest, (ii) pure-owner cultivating only their owned land, (iii) owner-tenants, cultivating both owned and rented in land, (iv) pure-tenant, owning no land but cultivating rented in land and (v) landless labourers, neither owned nor cultivated any land themselves. The author now realizes that a more meaningful classification of tenancy should have been attempted by combining both land and labour.
3. A standard man-unit was estimated to be equivalent to 330 man-days of actual work assuming in general 30 days not available for farm work due to sickness.
4. Clay (1976) reported that in Joydevpur area of Bangladesh more than three-fourths of harvesting labour were hired labour, mode of payment being a stipulated share of wet paddy. Rudra and Mukhopadhyaya (1976) observed caste system in West Bengal as a plausible explanation for hiring in labour because it does not allow certain higher castes to do any manual work in agriculture. Therefore even very small farmers of such higher castes hire casual labour.
5. Inter tenure group comparison with respect to seasonal labour use was attempted in author's thesis (see Mandal 1979, p. 143). Since the number of farms under pure-tenant category was very low, the results of direct test between owned land and rented land of owner-tenant farms are presented here.
6. One can compare the results presented here with those estimated by Clay (1978) under different cropping patterns in seven districts of Bangladesh. However, one should remember that the seasonal breakdown of labour use in Clay's paper was done on the basis of an impressionistic crop calendar.

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