

# Some Aspects of Employment and Unemployment in Agriculture

Manabendu Chattopadhyay

*In this article are discussed some crucial aspects of the employment and unemployment conditions in Indian agriculture.*

*In Section I, we shall try to take a view about the works already done by different research workers in this field. In Section II, we shall take yet another look at the 'surplus labour model' with the help of fresh results involving disaggregated data for Assam. In Section III, we shall discuss the seasonal pattern of employment in agriculture for the region of Assam. In Section IV, we shall try to give a picture regarding the nature and extent of underemployment in agriculture for some regions in India with the help of another statistical analysis. In Section V, we shall present our views of the unemployment in agriculture and its policy implications.*

## I

### Review of Research

SINCE the 1940s, much literature on economic development has come out, based on the belief that most underdeveloped countries have a considerable surplus population in agriculture. Estimates of it have ranged from 20 to 50 per cent of the total agricultural population. This surplus population could be removed without any significant reorganisation of agriculture and without reducing agricultural production (Lewis 1954; Rosenstein Rodan 1957; Coale and Hoover 1958; Leibenstein 1957; Enke 1962; Wonnacott 1962; Hains and Fei 1961; Mellor and Stevens 1956; Eckaus 1955; Sen 1966). Opposition to this view has been voiced recently (Viner 1957; Sowani 1959; Schultz 1964; Hopper 1965; Oshima 1958; Paglin 1965). The controversy has centred around the definition and method of estimation of unemployment, on the one hand, and the generalisation about the phenomena for the country as a whole on the basis of a single objective reality, on the other.<sup>1</sup> It is necessary, therefore, to clear the concept and to examine the issue according to the multi-dimensional situation in India.

There are two distinct concepts in the expression 'surplus labour': (i) static concept: the concept referring to that amount of population in agriculture which can be removed from it without any change in the method of cultivation, without leading to any reduction in output; (ii) dynamic concept: this concept refers to that amount of population (potential surplus) which can be removed from agriculture without its output falling, assuming a change in the method of cultivation — through reorganisation in fixed and variable capital and a re-

arrangement or re-allocation of work, or a thorough change in the method of cultivation including additional use of both fixed and variable capital.

The empirical literature that has grown on this subject does not clearly make this distinction. Consequently, the results of the studies do not represent an unambiguous picture of underemployment.<sup>2</sup> Also, the empirical studies are based on data from which the phenomenon of surplus labour cannot be proved as a general law. Nevertheless, some of the research workers have generalised about the phenomenon with such data.<sup>3</sup> It is our view, therefore, that the whole problem of estimating surplus labour should be re-examined to appraise the reality more precisely.

We may turn our discussion to the different approaches to estimating unemployment, advanced by different research workers in this field. We can first refer to three popular approaches authored by A K Sen (Sen 1966, 1975) — namely, (i) the production approach, (ii) the income approach, (iii) the recognition approach. According to Sen, "the concept of unemployment has to be viewed not only in the light of production and income, but also in terms of the perception of the people caught by the statistician's slide-rule. The problem is not quite comparable to counting the number of surplus cattle in India or Thailand" (Sen 1975). To appreciate the usefulness of the approaches as advanced by Sen, S K Rao explored the common and the separate components of unemployment implied in the two concepts, (i) and (ii), through the analysis of set theory. He showed that "it is difficult to imagine someone who is income unemployed but is not production unemployed" (Rao 1973). Rao argued, therefore,

that "in terms of policy, it is useful to retain the separate identity of these two groups of people; the policies suitable to tackle the employment of one group may not be suitable to the other" (Rao 1973).

For avoiding this kind of problem of measurement, Dandekar and Rath put forward a method of measuring unemployment and underemployment by taking income approach as a criterion of employment (Dandekar and Rath 1971). Raj Krishna has recently endorsed this as an alternative method (Raj Krishna 1973). Raj Krishna writes: "I shall not discuss the productivity criterion further, because with the available evidence the existence of zero marginal productivity cannot be proved and so for the operational purpose of measuring unemployment in statistical surveys the income criterion may be deemed to be a good proxy for the productivity criterion" (Raj Krishna 1973). It follows from Raj Krishna's statement that the productivity criterion of unemployment can be examined only by the marginal productivity norm, and since the existence of the marginal productivity norm cannot be proved the existence of productivity criterion of employment cannot also be proved. Therefore, he has taken the income criterion as a proxy of measure of unemployment.

This is not at all a good explanation for rejecting the productivity criterion of unemployment estimates. There are some alternative methods (static and dynamic methods) other than the marginalist method, through which the surplus labour can better be explained. Raj Krishna himself admits that each criterion has its own utility relating to different policy questions and, therefore, one should not urge to seek, defend, or use, a single criterion which may be useful for all purposes. In

in contrast, he writes: "we ought, instead, to accept the simple fact that if the necessary data are available, the application of each one of the three or four criteria can give us three or four different estimates of unemployment for the same population; the combination of two or more of these will yield many more estimates; and each of these different estimates may have its own utility, in that, each answers an important but different policy question" (Raj Krishna 1973). The statement made by Raj Krishna has an important implication for the whole controversy of surplus labour estimation. But it can be said that he has not strictly followed this rationality in his own work.

It is noticed that he has tried to defend the income criterion by rejecting the productivity criterion with a very simple argument. The other research workers like Mellor, Pagin, Mathur, Rudra, etc. have also rejected the zero marginal product hypothesis; but, at the same time, some of them have tried to give an alternative method for analysing the labour use patterns on different sized farms (Mellor 1966, Pagin 1965, Mathur 1964, Rudra 1973a, 1973c, Sarkar 1957).

Raj Krishna added one new category, viz. the 'time criterion' (denoted by  $u_1$ ) which has not been considered by A. K. Sen. By taking the three criteria, viz. time, income, and willingness, he showed all possible variations in the unemployment estimates and illustrated the truth as quoted in the earlier para.

Thus, it follows from the works of S. K. Rao and Raj Krishna, that we should consider each criterion as a macro variable to the path of total employment and should frame policies against each macro variable for solving the problem of unemployment. From this point of view, each criterion has equal importance in the perspective of economic planning. But it cannot be denied that time criterion, willingness criterion, and productivity criterion, have got much importance compared to other criteria in the field of both official and unofficial estimates. The application of the time criterion as well as willingness criterion is very much noticed in the census as well as NSS estimates of unemployment in rural India. In the 1961 census, a person was defined as unemployed if he was without work on all days during the reference week preceding enumeration and was 'seeking

work. The NSS prior to 1973-74 used a similar definition as in 1961 census.

In 1971, the Expert Committee of the Planning Commission on unemployment explored some defects in this definition and recommended their choice as "... the unit of analysis or aggregation will be a day, though the data will be collected for a week. The level of unemployment during the different seasons/sub-rounds will be measured in terms of the total number of recorded days of unemployment, expressed as a percentage of the total number of days on which the respondents report themselves to be in the labour force (employed/unemployed) during the particular season or sub-round" (Planning Commission 1971). The NSS 27th round, whose results are awaiting publication, has followed this approach as recommended by the Committee.

Apart from the official estimates, there are some individual attempts at estimating surplus labour in India, mainly based on the productivity criterion. The data on other criteria, viz. income criterion and recognition criterion, are very scarce in India. So, the research works on these two criteria are very much limited compared to other criteria. That does not mean that the other criteria are superior to income and recognition criteria.

Thus, the controversy of unemployment estimates should not be centred upon the different approaches; rather, it should be centred upon the methodology of estimates under each approach. In this perspective, we shall briefly review the works done under the production approach.

The most voluminous work, which has an all-India coverage, has been undertaken on this problem by Shakuntala Mehra (Mehra 1966). Mehra calculated surplus labour in agriculture by taking the difference between the total work force employed and the total work force required. She assumed, in this context, that the labour requirement per acre is equal to the actual labour used by the biggest sized farms. This norm consists of the family workers plus all the hired workers.

A number of comments on Mehra's methodology have been made by concerned research workers (e.g. Rao, 1973, Ahuja 1975).<sup>4</sup>

The second empirical work, based on the production approach, was done by Ashok Rudra in 1973 (Rudra

1973a). Rudra estimated surplus labour by taking the difference between the number of male workers engaged in agriculture (family plus hired) and the minimum number of male workers required to deliver the peak-period workload at the rate of eight hours a day. In this connection, it should be mentioned that this type of approach of surplus labour estimation was followed by J. P. Bhattacharya (Bhattacharya 1961). But his study could not capture attention among the research workers because his concept of surplus labour in agriculture could not clearly specify its objective reality. Rudra in this connection has been able to identify clearly the distinction between 'surplus labour' and 'surplus labourer'.

However, according to Rudra's result: (i) per cent of surplus labour varies very little with size; (ii) the proportion of hired labour increases, but surplus labour does not vary with size. These findings of Rudra directly contradict Mehra's fundamental assumption of surplus labour estimation that the element of surplus labour should diminish as the proportion of hired labour increases.

Rudra estimated surplus labour only for West Bengal. It may be extended to other regions of India, in order to judge the merit of the findings as presented by Rudra. For this purpose, we have taken a follow-up study on this problem, using the same methodology put forward by Rudra in his 1973a paper, in the case of the Assam region, for the agricultural year 1968-69. In Section II we have put the results of our follow-up study.

Lastly, we should mention the latest work on surplus labour estimation that has been done by Kanta Ahuja (Ahuja 1975). As a matter of fact, Ahuja's work is not based on a particular criterion, it may be considered as an extended study based on all the criteria. Part of Raj Krishna's ideas on unemployment estimates has been translated into Ahuja's thesis. However, we have no hesitation in mentioning that Ahuja's thesis bears an intensive work, though the sample size is very small, for examining the different criteria and method of surplus labour estimation. From the whole analysis, an important point emerges which we have tried to point out once again — that each criterion or method has its own utility, relating to different policy questions, and in this perspective no criterion is superior to another.

## II

## 'Surplus Labour Model'

Under the productivity criterion, we should first clearly draw a distinction between the two concepts, viz. 'surplus labour' and 'surplus labourers'. The concerned research workers have not clearly made this distinction between the two. But the importance of this distinction has been proved by Rudra in the course of his analysis of a direct estimation of surplus labour (Rudra 1973a). Rudra has made a distinction between surplus labour and surplus labourers as follows: (i) If  $L(N)$  be the quantity of labour that would flow from the working force  $N$  when fully employed, then a measure of surplus labour would be  $L(N) - L$ ; and (ii) If by following a scheme of reallocation of labour among the labourers it should become possible to remove from the working force  $N$  as many as  $N_0$  without affecting either  $L$  (quantity of labour put in by the working force  $N$  into agriculture) and  $O$  (the resultant output) then  $N_0$  is an estimate of surplus labourers corresponding to that particular scheme. It is found, from his analysis, that 27 per cent of  $N$  is surplus labourer ( $N_0$ ). The exercise was carried out with data pertaining to 148 farms, drawn at random from the district Hooghly of West Bengal, during the agricultural year 1970-71 (Rudra 1973a).

Following the distinction between surplus labour and surplus labourers and following the same model of esti-

mation accounted by Rudra, this part of the article seeks to present some results of another empirical verification in direct observation and measurement of surplus labour in agriculture.

The present analysis is based on Farm Management data pertaining to 150 farms drawn at random from the district Nowsong of Assam during the agricultural year 1969-70.

For each farm, the nature and intensity of farm work done by family members as well as hired labourers of all categories has been counted in our exercise. Farm work is defined as manual labour on different farming operations, viz. ploughing, sowing, transplanting, weeding, harvesting and carrying, threshing, and miscellaneous operations, without counting any supervisory work, any business aspects of farming, etc.

Our analysis covers male adult labourers and children who have partly or fully entered into the working force. Female family labour has not been included in our analysis as we find that the role of female family labour in agricultural operations is very confused, i.e. it is very difficult to identify which women are to be included in actual farm work or in family work.

We have included the following entities in our analysis:

- (i) Total able-bodied adult male family labour (including labour of farm servants) on family farm,  $L_f$ .
- (ii) Total non-family labour (excluding labour of farm servants, and includ-

ing labour hired in casual, exchanged, etc) on family farm,  $L_w$ , and

(iii) Partly child labour.

In order to calculate 'surplus labourers' for any farm, the following measures have been taken.

- (i) number of male farm workers in the family:  $n$
- (ii) peak-period workload on male family farm workers in man hours:  $L$
- (iii) the minimum number of male family workers that can put in  $L$  amount of labour during the peak period:  $\bar{n}$

In order to calculate the volume of unemployment in farming families, the following measures have been taken:

- (i) total number of able-bodied adult male members of the family having occupations in agriculture, or outside agriculture, or having no occupation (i.e. they can be employed to any gainful occupations):  $N$
- (ii) total number of adult male members of family having occupation other than agriculture:  $N_0$
- (iii) estimated requirements of male family farm workers, considering the workload during the peak period:  $\bar{N}$

With the help of the above three attributes ( $N$ ,  $N_0$  and  $\bar{N}$ ), we could get the volume of unemployment of farming families, i.e.

$$N_u = [N - \bar{N} + N_0]$$

Table 1 will give the detailed picture of estimation procedures as well as results of estimation.

TABLE 1: DISTRIBUTION OF FARMS AND LABOURERS BY FARM SIZE GROUPS

Items	Farm Size Groups (hectares)					All Sizes
	0.01 - 2.50	2.51 - 5.00	5.01 - 7.50	7.51 & Above		
(1) Number of farms	$m = 66$	68	11	5	150	
(2) Number of able-bodied adult male members of family	$N^1 = \Sigma n^1 = 131$	178	45	19	373	
(3) Number of children who have entered the working force	$N_c = \Sigma n_c = 18$	19	5	3	45	
(4) Number of adult male members with occupation other than agriculture	$N_0 = \Sigma n_0 = 18$	7	5	1	21	
(5) Number of adult male workers and children actively engaged in agriculture or at best having no other occupations outside agriculture	$N = \Sigma n = 94$	122	30	13	259	
(6) Number of male workers and children that must be retained in the farms from peak period consideration	$\bar{N} = \Sigma \bar{n} = 62$	85	20	9	176	
(7) Surplus labourers in the agricultural work force	$N_u = N - \bar{N} = 32(34.04)$	37 (30.33)	10 (33.33)	4 (30.77)	83 (32.02)	
(8) Surplus able-bodied adult non-working male members in the farming families	$N^1 - N_u = 61(48.88)$	86 (48.31)	20 (44.44)	9 (47.37)	176 (47.11)	

Note: Figures in bracket in Row 7 indicate percentages of  $N$ , and in Row 8 indicate percentages of  $N^1$

It is found from Table 1 that our sample estimate of surplus labourer is very large: 32 per cent of the total working force in the family (without counting those who are too old and disabled, who have occupations other than agriculture and those children who have not yet entered the working force). If this 32 per cent labourers can be withdrawn from agriculture, production would in fact not fall.

It is also found from the Table that the volume of unemployment in the farming families is very large: 47 per cent of the total working and non-working adult male members of the family.

Pursuantly, we have tried to give a picture of average unemployment throughout the year before and after reorganisation of farm work. We have made use of the following definitions of intensity of employment before and after reorganisation, assuming a 300-day year:

(a) Intensity of employment before reorganisation

$$\frac{L_g}{300 \times n}$$

(b) Intensity of employment before reorganisation removing all non-farm labourers and imposing the workload to male family farm workers (N):

$$\frac{L_g + L_M}{300 \times N}$$

(c) Intensity of employment after reorganisation

(removing not only all non-farm labourers but surplus family labourers also and imposing the workload to retained family labourers (N))

$$\frac{L_g + L_M}{300 \times N}$$

It is found from Table 2 that the average number of hours of employment of male family workers on own farm is 3.31 per day — i.e., they are spending 4.69 idle hours.

It is also found in Table 2 (Rows 3 and 5) that, even after removal of employment given to non-farm labour, the average workload per male family worker is 4.5 hours per day. In this case, they are spending about 3.5 hours idle time per day. The improvement is from 58 per cent of the time unemployed (4.69 hours in an 8-hour work day) to 44 per cent of time (3.5 hours in an 8-hour work day) unemployed. But it is seen that the degree of underemployment after reorganisation, i.e., after removal of surplus labourers, will not be so high if the remaining family workers are supposed to do work more intensely on their farms by removing all hired casual labourers. In this situation, the family workers (N) will remain underemployed for 1.4 hours in a day, i.e., 18 per cent of total working hours, as may be seen from rows (4) and (6) of Table 2.

An interesting result seen in our Tables is the sharp dependence of the importance of hired casual labour according to farm size, although there is a not-so-sharp dependence of the importance of surplus labourers on farm size. The same feature was also found in Rudra's analysis (Rudra 1973a). Thus the pattern of labour utilisation in two different regions (West Bengal and Assam) is more or less same, but the degree of 'surplus' in the total agricultural work force is much higher (32 per cent) in Assam region than in West Bengal region (27 per cent).

### III

#### Seasonal Pattern of Employment

This section studies the seasonal variations in the demand for labour and its employment in agriculture. The study may be regarded as a follow-up study to the earlier work of Ashok Rudra (Rudra 1973b). This may also be regarded as a sequel to the work of estimation of surplus labour in agriculture, as presented in Section II of this article. Since Indian agriculture is seasonal in character, our attention should be given primarily to this aspect of employment in agriculture to understand the nature and extent of unemployment in a comprehensive manner. No doubt, many research workers have tried to concentrate their attention on this aspect of employment, but no intensive work is found which

TABLE 2: AVERAGE OF HOURS WORKED AND WORKLOAD BY FARM SIZE GROUPS

Items		Farm Size Groups (hectares)				
		0.01 - 2.50	2.51 - 5.00	5.01 - 7.50	7.51 & Above	All Sizes
(1) Average number of hours of employment of male family workers (per day of a 300-day year)	$\frac{L_N}{300 \times N}$	3.20	3.35	2.87	4.82	3.31
(2) Average number of hours of employment given to non-farm labour (per day of a 300-day year)	$\frac{L_M}{300 \times m}$	1.21	2.16	3.15	8.76	2.04
(3) Average workload per male family worker before reorganisation if the workload of non-family labour is to be performed by male family workers	$\frac{L_N + L_M}{300 \times N}$	4.05	4.55	4.12	8.14	4.50
(4) Average workload per male family worker after reorganisation if the workload of non-family labour is to be performed by retained male family worker	$\frac{L_N + L_M}{300 \times N}$	6.13	6.54	6.17	11.76	6.62
(5) Average number of idle hours per day per male family worker before reorganisation (8 hrs — Row (3))		3.75	3.45	3.88	-0.14	3.50
(6) Average number of idle hours per day per male family worker after reorganisation (8 hrs — Row (4))		1.87	1.46	1.83	-3.76	1.38

gives a comprehensive view of the policy formulation. We have tried to give a comprehensive view of the demand for, and supply of, labour for each season under agricultural operations. Pursuantly, we have tried in the next section of this article to estimate the volume of seasonal unemployment in agriculture which may be directly relevant for efficient policy formulation.

The demand for labour for each season has been calculated separately for each type of workers, viz. family labour, farm servant, and casual labour hired in — on the basis of workload in terms of hours per day. The supply of labour, for each type of worker, has been calculated assuming eight hours of work per worker per day as the full employment work. The difference between demand and supply of labourers for each farm, for each season, gives the surplus/deficit of labourers.

Our concept of 'season' is to restrict it to all the agricultural operations, beginning with preparatory tillage and ending with harvesting, carrying, and threshing. We have divided the whole year (300 working days) into five seasons: (i) preparatory tillage and ploughing, (ii) sowing, (iii) transplanting, (iv) weeding, and (v) harvesting, carrying, and threshing.

The results of this paper are based on the random sample of 150 farms belonging to the Nowgong district of Assam. We have presented the farms separately for five size-classes, defined in terms of hectares of cultivable area in each farm: 0.1 to 1.25 hectares, 1.26 to 2.50 hectares, 2.51 to 5.00 hectares, 5.01 to 7.50 hectares, and 7.51 and above hectares.

Our concept of 'farm work' includes all operations I to V, and excludes all post-harvest operations with respect to the harvested crops — pounding, de-busking, storing, carrying to the market, etc.

We have considered only adult male members of the family as 'family worker', adults being defined as '14 and above'. We have excluded the very old and physically incapable persons. We have excluded all those who have got full-time occupations other than agriculture. We have excluded such young persons who call themselves 'students'. We have, however, included those who do not seem to have any whole-time occupation — the unemployed or the new entrants into the labour force. The number of persons, so defined as workers per farm, in the five

TABLE 3: DISTRIBUTION OF FARM WORK BY FARM SIZE AND TYPE OF LABOUR

Agricultural Workers (on Farm)	Operationwise Distribution of Farm Work Per Day in Hours (Size Group: 0.01-1.25 Hectares)				
	I	II	III	IV	V
	(A) Family labour	4.43	0.16	0.85	1.90
(B) Family labour and casual labour hired in	4.88	0.16	1.31	2.78	4.82
(C) Family labour and farm servant	4.54	0.16	0.89	1.90	3.13
(D) Family labour, farm servant, and casual labour hired in	4.50	0.16	1.35	2.78	4.38

  

Agricultural Workers (on Farm)	Operationwise Distribution of Farm Work Per Day in Hours (Size Group: 1.26-2.50 Hectares)				
	I	II	III	IV	V
	(A) Family labour	6.28	0.39	1.48	3.94
(B) Family labour and casual labour hired in	6.47	0.40	1.87	6.02	7.42
(C) Family labour and farm servant	6.80	0.40	1.81	4.19	6.21
(D) Family labour, farm servant, and casual labour hired in	7.00	0.40	2.00	6.27	7.71

  

Agricultural Workers (on Farm)	Operationwise Distribution of Farm Work Per Day in Hours (Size Group: 2.51-5.00 Hectares)				
	I	II	III	IV	V
	(A) Family labour	6.20	0.29	2.64	3.80
(B) Family labour and casual labour hired in	6.43	0.29	3.36	5.49	10.73
(C) Family labour and farm servant	6.01	0.31	3.05	4.29	9.15
(D) Family labour, farm servant, and casual labour hired in	6.24	0.31	3.77	6.83	11.63

  

Agricultural Workers (on Farm)	Operationwise Distribution of Farm Work Per Day in Hours (Size Group: 5.01-7.50 Hectares)				
	I	II	III	IV	V
	(A) Family labour	9.43	0.38	3.27	4.41
(B) Family labour and casual labour hired in	10.21	0.86	4.53	7.78	14.35
(C) Family labour and farm servant	12.46	0.53	3.09	5.80	12.29
(D) Family labour, farm servant, and casual labour hired in	13.26	0.53	4.65	9.17	16.54

  

Agricultural Workers (on Farm)	Operationwise Distribution of Farm Work Per Day in Hours (Size Group: 7.51 and above Hectares)				
	I	II	III	IV	V
	(A) Family labour	10.53	0.78	5.18	6.08
(B) Family labour and casual labour hired in	12.50	0.78	7.18	13.14	26.31
(C) Family labour and farm servant	17.68	0.88	6.90	11.81	23.35
(D) Family labour, farm servant, and casual labour hired in	29.47	0.88	8.86	17.48	36.44

categories are shown below.

Farm Size Groups (hectares)	Hours of Work Agricultural Per Day	
	Number of Family Workers Per Farm	Corresponding to Full Employment
0.01-1.25	1.17	19.80
1.26-2.50	1.70	13.60
2.51-5.00	2.19	17.62
5.01-7.50	3.27	26.16
7.51 and above	3.90	28.80

The interesting feature, as shown in the above Table, is that as farm size goes up, the number of actual and potential agricultural workers in the family go up too.

Now, we shall discuss the pattern of employment of all labour as well as family labour on farms corresponding to the five agricultural seasons. The seasonal fluctuations of human labour employment are generally associated with the nature of the crop in the season from which the sample is drawn. It is found that the effect of seasons has been more marked in this region because the region is primarily associated with a one-crop economy, i.e. paddy. Another crop, jute, is cultivated here; but it has no significant contribution to the total production. For this reason, it is found that employment of all human labour on farms as well as employment of family labour on farms shows more or less the same pattern of fluctuation—i.e., from operation I to operation II, it is retrogressive, and from operation II to operation V, it is developmental. Strictly speaking, the pattern of employment marks two humps: in one extreme, ploughing season and, in another, harvesting season. Between these two extremes, the other three operations show a similar trend for all the size-groups.

All the size classes are affected very largely by unemployment. Except the farm size, 7.51 and above hectares, all the size groups can absorb only a fraction of the labour supply in the families even during the peak periods.

It is found that, in the smallest size group (0.01-1.25 hectares), the demand for labour never goes beyond 4.50 hours a day—during most of the year, it ranges from 0.16 to 4.38 hours. As compared to the full employment line, i.e. 9.80 hours per day, the family workers spend little time of a maximum of 8.20 hours in the lean season, and above 4.80 hours in the peak season.

In the next size group (1.26-2.50 hectares), the supply is above 13.50 hours a day, whereas the peak and lean

period demand does not exceed 7.71 and 0.40 hours a day, respectively.

In the next size group (2.51-5.00 hectares), the supply of labour is above 17 hours a day; whereas the peak period demand does not exceed 11.83 hours a day. In this size group also, the family workers spend little time ranging from 10.71 hours to above 8.75 hours a day.

In the next higher group (5.01-7.50 hectares), the supply is above 26 hours a day; whereas the peak period demand does not exceed 16.54 hours a day; and during the non-peak periods the demand ranges from 0.53 to 8.28 hours a day.

However, in the biggest size group (7.51 and above hectares) of farms, peak period demand for labour shoots up very high, reaching 36.44 hours a day during harvesting season and 28.47 hours a day during ploughing season. The maximum supply of labour in such families being 28.80 hours a day. For this size group, there is definitely the necessity of hiring-in labour at least for these two operations, but for other three operations, there are vital gaps between demand and supply of labour.

From the above observations, some interesting aspects of the employment pattern emerge, which can be summarised as follows:

(i) Casual labour (hired in) plays an important role in the agricultural

operations, not only in the biggest farm size groups, but in the case of small and medium size groups also. This may provide an explanation of why the small and medium size groups hire casual labour, in spite of surplus time at their hand. This explanation needs detailed examinations of all possible socio-cultural factors behind it, which are beyond our scope here due to lack of proper information under reference.

(ii) The employment pattern of farm servants *ou-a-cir* casual labour conforms to expectation. As farm size increases, the importance of farm servants also goes up. The fluctuation in farm servant labour employment, over farm size groups, and over seasons, is much sharper than that in casual labour employment.

(iii) The pattern of labour utilisation can be clearly demonstrated according to the agricultural operations, but the labour utilisation pattern does not vary with the farm size. Table A shows the statistical relationship between labour utilisation and agricultural operations.

It is seen from Table A that the differences of labour utilisation between the agricultural operations are highly significant. But if we consider the family labour utilisation ratio according to farm size, it would be seen as the following that there is no relationship between these two, i.e. the utilisation of family workers does not

TABLE A

Source	df	SS	MS	F
Between operation	2	75778.82	37889.41	78.74**
Within operation	447	215098.93	481.18	
Total	449	290867.75		

Note: \*\* 1 per cent significant level.

GROUP 1: PLOUGHING, SOWING AND TRANSPLANTING

Source	df	SS	MS	F
Between farm	3	1046.21	348.07	0.85
Within farm	149	59840.31	409.91	
Total	149	60886.52		

GROUP 2: WEEDING

Source	df	SS	MS	F
Between farm	3	739.02	246.34	1.73
Within farm	146	20804.85	142.50	
Total	149	21545.87		

GROUP 3: HARVESTING, CARRYING AND THRESHING

Source	df	SS	MS	F
Between farm	3	3419.29	1139.84	1.38
Within farm	146	19213.61	131.53	
Total	149	22633.53		

vary with the variation in farm size.

It is found from the above analysis, that we have divided the five agricultural operations into three broad groups: Group I, Group II, Group III, for sake of simplicity in the analysis. The analysis of variance of each group reveals the lack of relationship between farm size and utilisation of family workers, as the values of F in each and every group is statistically insignificant. Following Rudra, the explanation of this may be provided that the large farms are usually burdened with larger family size, and though these family members are formally engaged in agriculture they do not in fact do full-time work even in the peak season but hire labourers. As a result, the proportion of family labour utilisation does not vary with the farm size, but the proportion of hired labour varies with farm size. This feature can be clearly ascertained from Table 4.

Table 4 reveals the feature mentioned above — viz, that as the farm size increases, labour hiring also increases; and it also varies with seasonality.

#### IV

##### Nature and Extent of Underemployment

In Section II of this article, we have estimated surplus labourers in agriculture on the basis of peak-period demand for workers. This method is sometimes criticised by the fact that: (i) the estimate of surplus, from peak period considerations, would be much less than the surplus estimated as an average for the whole year (Abuja 1975); (ii) a large number of women and children are drawn into work during the peak period, but they may not be available for work during the rest of the year (Planning Commission 1971).

It is our considered view that, even if we consider the highest demand for labour for a particular season (assuming the demand for labour for other seasons will be of the same order), the surplus labour for the whole year gives a significant figure. In other words, if the demand for labour for each

season of a year is at par with the demand for labour of the peak season, then the surplus labour in agriculture still remains considerable. Our assumption certainly gives a lower estimated figure as compared to the average estimated figure of the whole year. Also, it bears the limitation as raised by the Planning Commission. But it can be recalled that these are our basic assumptions to appraise whether traditional agriculture is efficient enough to make full use of resources or not. The purpose of this method is not at all to fix a figure of estimation applicable for all purposes.

However, in this context, the Expert Committee of the Planning Commission has recommended that, since both the supply and demand for labour changes from day to day, the employment picture should be obtained by aggregating days, rather than by aggregating persons, into categories such as worker, non-worker, employed and unemployed (Planning Commission, Chapter I). If we follow this criterion (called 'time criterion'), it can be shown that the agricultural workers who sometimes work in their own farms and sometimes work in others' farms, do not get full-time work (assuming eight hours is the full time work in a day) in a day. This feature also proves the debated phenomenon that traditional agriculture is not efficient enough to make full use of resources. We, in this part, have tried to examine the volume of underemployment in agriculture for some selected regions of India to appraise the reality of the phenomenon under study.

Our method for estimating underemployment in agriculture can be put in the following way: Let  $L(N)$  be the quantity of farm family labour engaged on farm work (own as well as others) for a particular season or month. Assuming the full employment figure of 8 hours a day per farm family labour, the total volume of work per day should be  $L(N) \times 8$  hrs. =  $L'(N)$  (say). Now let us assume that a farm family worker gets farm employment  $h$  hours a day. Thus the total observed employment figure is  $L(N) \times h =$

$L(N)$  (say). Then the surplus labour hours per day per family worker becomes  $L'(N) - L(N) = S(N)$  (say). Assuming 300 working days per farm family labour for a year, the volume of underemployment for the whole year would be:  $S(N) \times 300$ . If, in any case, a farm family labour works more than 8 hours a day, the volume of 'over-employment' may be calculated by the same procedure and, accordingly, it can be adjusted in the process of annual surplus figure computation.

Our concept of 'season' is to restrict it to all the months in a year beginning with June of the previous year and ending with May of the following year. 'Farm work' is defined as manual labour on different farming operations, viz, ploughing, sowing, transplanting, weeding, harvesting and carrying, threshing and miscellaneous operations, without counting any supervisory work, any business aspects of farming, etc. Farm family labour covers adult male and female labourers as well as children who have partly or fully entered into the work force.

We have used the data of Farm Management Studies — "Studies in the Economics of Farm Management" — published by the Directorate of Economics and Statistics, Ministry of Agriculture, for which data on seasonal employment is available.

We have analysed month-wise employment figure for each region under study and placed them separately into different computed tables. The region for which the season-wise employment data available are as follows: Punjab (Ferozepur) 1967-70, Orissa (Cuttack) 1967-70, Assam (Nowgong) 1968-69, Kerala (Alleppey and Quilon) 1962-65, Madhya Pradesh (Raipur) 1962-65, and Uttar Pradesh (Muzaffarnagar) 1966-69. Now with the above frame of reference and conceptual framework, we shall discuss the major findings of our study.

Employment on the farm of family labour is distributed unevenly over months, so that employment in terms of the standard eight hour day is considerably less than the employment in terms of calendar days (except for some months in the case of Punjab). The seasonal pattern of employment for each region under reference can be put separately to appraise the regional variations more sharply.

Punjab: The region is primarily associated with multiple cropped economy. Therefore, the effects of seasons have not been so widely imparted in this region. That is, the employment of a farm family labour shows more or less the same pattern of fluctuations over

TABLE 4: FARM SIZE AND PROPORTION OF HIRED LABOUR

Farm Size Groups (in Hectares)	Proportion of Labour Hired into Total Family Labour on Farm Work (operationwise)				
	I	II	III	IV	V
(A) 0.01-2.50	0.03	0.00	0.29	0.54	0.37
(B) 2.51-5.00	0.04	0.02	0.07	0.65	0.38
(C) 5.01-7.50	0.08	0.00	0.39	0.78	0.58
(D) 7.51 and above	0.19	0.00	0.40	0.88	1.08

TABLE 5: MONTHWISE DISTRIBUTION OF A FARM FAMILY LABOUR HOURS IN PUNJAB

Month	Number of Hours Engaged in Farm Work Per Day			Number of Surplus Hours Where Eight Hours in a Day Is Full Employment		
	1967-68	1968-69	1969-70	1967-68	1968-69	1969-70
	July	5.94	5.18	5.18	2.06	3.35
August	5.42	4.13	3.42	2.58	3.37	2.58
September	5.60	4.27	5.07	2.40	3.73	2.93
October	5.68	4.65	5.68	2.32	3.35	2.32
November	6.93	5.33	5.60	1.07	2.67	2.40
December	6.19	4.65	3.42	1.81	3.35	2.58
January	6.19	4.90	4.65	1.81	3.10	3.25
February	5.32	4.86	4.86	2.48	3.14	3.14
March	6.07	5.42	4.65	1.03	2.58	3.25
April	6.80	6.93	4.80	0.80	1.07	1.60
May	9.55	7.23	6.45	1.55	0.77	1.55
June	7.20	5.60	5.40	0.80	2.40	2.60
Total	6.67	5.22	5.40	1.53	2.78	2.90

TABLE 6: MONTHWISE DISTRIBUTION OF A FARM FAMILY LABOUR IN ORISSA

Month	Number of Hours Engaged in Farm Work Per Day			Number of Surplus Hours Where Eight Hours in a Day Is Full Employment		
	1967-68	1968-69	1969-70	1968-69	1966-67	1967-68
	June		3.73	3.13		3.27
July		2.65	3.03		5.25	4.97
August		3.13	4.23		4.87	3.77
September		2.67	4.07		5.73	3.68
October		1.10	2.26		6.90	5.74
November		1.13	2.50		6.87	5.50
December	3.51	4.39	4.39	4.10	3.61	3.61
January	2.23	2.35	2.71	5.77	5.65	5.29
February	3.32	2.61	2.32	4.68	5.39	5.88
March	4.97	4.68	2.10	3.13	3.32	5.90
April	4.20	1.93	1.70	3.80	6.07	6.30
May	3.94	0.77	1.35	4.00	7.23	6.85
Total	3.67	3.56	2.82	4.33	5.44	5.18

the years. Strictly speaking, the pattern of employment marks two humps: in one extreme ploughing season (May-June) and in another harvesting season (December-January). In the ploughing season, it shows that the pattern of employment exceeds the full employment figure (8 hours a day) — that is, labourers are getting more employment than they need. In between these two extremes, the other months/operations show a similar trend.

On an average, a farm family labour gets employment about five hours a day in comparison with the three years under reference. That is, a farm family labour spends idle time or surplus time of three hours per day. Assuming 300 working days in a year, for each family worker,  $300 \times 3 = 900$  hours represent his unemployed hours. That is, 30 per cent of the total hours — 2400 — is disguised for a family worker of Punjab.

Orissa: This region is primarily associated with one cropped economy, that is paddy. Therefore, the effects of the season have been widely marked in this region. The pattern of employ-

ment marks three humps in this region: one in May-June (ploughing season), another in November-December (harvesting season), and another in February-March (post-harvesting season). There is a sharp variation in the pattern of employment among the rest of the months/operations. This reveals that the demand for labour is strongly associated with the nature of the agricultural operations.

On an average, a farm family labour gets employment for about three hours a day, which is no doubt very low in comparison to the full employment figure. Following the same method of surplus hour estimation, as mentioned earlier, it is found that about 63 per cent of the total hours is disguised for a family worker of Orissa.

Assam: Assam is also primarily associated with a single cropped economy (paddy). The effects of season, therefore, have been widely marked in this region. The pattern of employment, however, marks two humps: in one extreme, the ploughing season (July-August) and in another, the harvesting season (December-January).

The average employment per farm worker per day is nearly five hours in these two peak periods. In the lean season, it ranges from one hour to three hours. On an average, a farm worker gets employment nearly 2.69 hours per day — i.e., 531 hours stands for surplus hours. According to our method of estimation, nearly 66 per cent of the total hours is disguised.

Kerala: The seasonality of employment is not rigidly marked with this region. This may be because, in terms of the cropping pattern and intensity of cropping, the region is much more progressive compared to Orissa, Assam, etc.

However, the average employment of a farm family worker is 4.62 hours per day. According to our method of estimation, the 38 per cent of the total labour hours is identified as 'disguised' or 'underemployed' for this region. Interestingly, it is noticed that the volume of underemployment in Punjab is more or less equal to that in Kerala.

Madhya Pradesh: The pattern of employment of this region is such that there are three humps in the employment pattern: one in August, another in November, and the third in February.

On an average, a farm family worker gets employment for three hours a day — that is rest of the five hours are surplus'. In this case, nearly 83 per cent of the total labour hours is 'disguised', which is also true in Orissa.

Uttar Pradesh: Since this region is engaged with the operations of multiple cropping, the seasonality of employment is not rigidly marked. In

TABLE 7: MONTHWISE DISTRIBUTION OF A FARM FAMILY LABOUR HOURS IN ASSAM, 1968-69

Month	Number of Hours Engaged in Farm Work Per Day	Number of Surplus Hours Where Eight Hours in a Day Is Full Employment
June	1.87	6.13
July	4.61	3.39
August	4.81	3.59
September	1.87	6.13
October	1.03	8.97
November	2.13	5.87
December	4.67	4.13
January	1.55	6.45
February	2.29	5.71
March	2.82	5.68
April	2.87	5.33
May	2.48	5.16
Total	2.69	5.31



TABLE 8: MONTHWISE DISTRIBUTION OF A FARM FAMILY LABOUR HOURS IN KERALA 1962-65

Month	Number of Hours Engaged in Farm Work Per Day	Number of Surplus Hours Where Eight Hours in a Day is Full Employment	
		Number of Hours Engaged in Farm Work Per Day	Number of Surplus Hours Where Eight Hours in a Day is Full Employment
April	5.53	3.47	3.47
May	4.59	3.61	3.61
June	4.53	3.47	3.47
July	4.13	3.87	3.87
August	4.58	5.61	5.61
September	4.27	3.73	3.73
October	4.65	3.35	3.35
November	4.80	3.20	3.20
December	5.10	2.54	2.54
January	4.64	3.38	3.38
February	5.14	2.66	2.66
March	4.90	3.10	3.10
Total	4.62	3.39	3.39

February, April, and August, a maximum number of hours (nearly five hours a day) is spent by a farm family worker on his farm work and in the remaining months, his employment on the farm deviates from it.

On an average, a farm family labourer performs farm duties for four hours a

day. The rest of the four hours they spend as 'idle' or 'surplus' time. Thus, according to our method of estimation, 50 per cent of the total labour hours are identified as 'disguised' or 'under-employed' for Uttar Pradesh.

From the above analysis, we may draw the following conclusions regarding the nature and volume of under-employment in agriculture:

(1) The employment on a farm for a family worker is largely associated with the intensity of cultivation and cropping pattern. In the agriculturally better-endowed regions (Punjab, Kerala and UP), in terms of its cropping pattern, intensity of cultivation, etc., the volume of underemployment is not so high compared to those regions (Orissa, Assam and MP), where the intensity of cultivation, cropping pattern are not so marked. The seasonal fluctuations of employment are not so wide in the former regions compared to the latter regions. Hence it can be argued that the seasonality of employment, or characteristics of underemployment, have an immediate influence

TABLE 9: MONTHWISE DISTRIBUTION OF A FARM FAMILY LABOUR HOURS IN MADHYA PRADESH

Month	Number of Hours Engaged in Farm Work			Number of Surplus Hours Where Eight Hours in a Day is Full Employment		
	1962-63	1963-64	1964-65	1962-63	1963-64	1964-65
June	3.47	2.93	2.93	4.53	5.07	5.07
July	4.65	3.35	3.10	3.35	4.65	4.90
August	4.90	4.63	3.81	3.10	3.31	2.19
September	4.00	3.20	4.27	4.00	4.80	3.73
October	3.35	3.10	3.36	4.65	4.90	4.64
November	5.33	4.53	4.27	2.67	3.47	3.73
December	3.87	3.61	3.61	4.13	4.39	4.39
January	3.35	3.35	2.06	4.85	5.94	5.94
February	4.00	3.71	4.00	4.00	4.00	4.00
March	2.84	2.32	2.32	5.19	5.68	5.68
April	2.40	1.87	1.87	5.90	6.13	6.13
May	2.58	2.06	2.06	5.42	5.94	5.94
Total	3.73	3.18	3.30	4.27	4.82	4.80

TABLE 10: MONTHWISE DISTRIBUTION OF A FARM FAMILY LABOUR HOURS IN UTTAR PRADESH

Month	Number of Hours Engaged in Farm Work			Number of Surplus Hours Where Eight Hours in a Day is Full Employment		
	1966-67	1967-68	1968-69	1966-67	1967-68	1968-69
June	4.27	4.00	4.27	3.73	4.00	3.73
July	3.87	3.87	3.87	4.13	4.13	4.13
August	4.89	3.87	4.13	3.81	4.13	4.87
September	3.73	3.73	3.73	4.27	4.27	4.27
October	3.87	3.61	3.61	4.13	4.39	4.39
November	3.73	3.73	3.73	4.27	4.27	4.27
December	3.87	3.87	3.87	4.13	4.13	4.13
January	4.13	4.13	4.13	3.87	3.87	3.87
February	4.85	4.85	4.57	2.86	3.14	3.43
March	4.90	4.90	4.85	3.10	3.10	3.35
April	4.80	5.07	4.80	3.20	2.93	3.20
May	4.59	4.59	4.39	3.87	3.81	3.61
Total	4.23	4.18	4.14	3.77	3.84	3.86

on the intensity of cultivation and cropping pattern.

(2) In spite of intensive cultivation and cropping pattern, the regions under these characteristics have considerable numbers of surplus or underemployed labourers. As for example, in Punjab and Kerala, nearly 38 per cent of the total labour-hours is under no employment. Similarly, in the case of Uttar Pradesh, nearly 50 per cent of the total labour-hours are under no employment. These findings certainly prove that it is not possible for Indian agriculture to make full use of its agricultural labour force, even by improving the method of cultivation including additional use of both fixed and variable capital.

## V

### Policy Implications

On the basis of the analysis of surplus labour, seasonality of employment, and volume of underemployment in agriculture, we may come to the following conclusions which may be relevant for policy implications.

(1) It is found that surplus labour constitutes about 27 per cent in West Bengal and about 32 per cent in Assam, of the total male labour engaged in agriculture. It is also found for both the states that the proportion of surplus labour does not vary with size. This surprising feature has been explained by Rudra in the following way: (a) the large farms are usually burdened with larger family size, and though these families are formally engaged in agriculture they in fact do not do full-time work, even in the peak season, but hire labourers; (b) the smaller farms require proportionately more family workers for the peak period, because of the indivisibility of the worker unit. Our follow-up study strengthens these explanations of the surplus labour hypothesis.

This feature of surplus labour in agriculture suggests that this percentage of unproductive labour should be removed to the non-agricultural sector, into different non-agricultural occupations. It would not be possible to provide this surplus population with work in the agricultural sector only even with any type of reorganisation in agriculture. The family workers in the larger farm size group, who are formally engaged in agriculture, but do not do full time work, should be identified and should be placed into other non-agricultural occupations. But the removal of surplus labour from the agricultural sector is not a simple task.

During the plan periods, a number of programmes were started on an ad hoc basis to relieve rural unemployment and poverty. But what are the achievements so far? Several studies, in this connection, have tried to examine the impact of governmental rural work programmes and have arrived at the conclusion that they do not in fact have the impact they were meant to have (C Gupta 1971; Mithras 1972; Rogers 1973 etc).

In this connection, two types of viewpoints have come up as to the basic premise on which rural work programmes should be based: (i) the premise should be related to the socio-economic institutional structure in which disguised unemployment is absent and can not be removed without a change in the basic institutional framework of agrarian societies (Bagchi 1973); (ii) the rural work programmes should be designed to fit the requirements of the factors such as caste, worker preferences for specific types of manual work, location of the project, wages offered etc. of surplus labour force (Visaria and Visaria 1973; Dantwala and Visaria 1974 etc).

It is our considered view that the two viewpoints mentioned above, are mutually exclusive. Without knowing the requirements mentioned under (ii) the institutional framework of agrarian societies can not be changed. Therefore, both viewpoints should get priority for removing surplus labour in agriculture. But these basic premises have been ignored by the policymakers, and policy has been geared towards programmes of subsidy to the wily sections of rural society.

(3) On the basis of the exercise of seasonality of employment and volume underemployment in agriculture, it would be meaningful to conclude that due to the seasonal factor, a farm worker does not get employment throughout the year. This is very evident in those regions where intensive cultivation, cropping pattern, etc. are not so pronounced. In the agriculturally lesser-endowed regions also, a farm worker does not get full-time employment. It ranges from two hours to five hours per day, according to the peak and lean seasons, respectively. These features of underemployment in agriculture suggest the following policy prescriptions:

The rural developmental programmes should be prescribed in such a way that they would help to engage these workers eight hours per day throughout the year. This would be possible if the programmes are framed season

wise, on an ad hoc basis. The nature and type of programmes will be fixed according to the nature and potentiality of the regions. As for example, in the agriculturally less developed regions, the objectives of the programmes should be two-fold: (a) to mobilise the agricultural workers through better irrigation, better cropping, intensive cultivation, etc; so that the agricultural workers may come at par with the employment of farm workers of better-endowed regions; and (b) to prescribe such type of works other than agricultural according to the potentiality of other resources of the regions, in which the idle time of agricultural workers may be utilised with a considerable wage rate. The recommendation under (b) is applicable for both types of regions, i.e., better-endowed and less-developed regions.

Thus, regional planning for employment is necessary to control the unemployment and underemployment problem in India. This planning should be framed in such a way that the need for, and the required priorities in, social overheads in specific local situations are to be clearly established and the beneficiaries are to be clearly identified. Unless we do this work, any small-scale, ad hoc, and large-scale developmental programmes would not be successful. But this task, once again, is associated with the question of whether the present institutional framework is favourable for such developmental programmes.

#### Notes

- 1 In this context, Raj Krishna (1973) writes: "Most of the controversy about definitions of unemployment has arisen because of a strong urge to seek, defend, or use, a single criterion which may be useful for all purposes. But this urge is evidently irrational and unnecessary."
- 2 The distinction of these two concepts and its empirical application have been done only by Ashok Mukherjee (1973a).
- 3 Regarding the generalisation of the phenomenon, the works of Schultz (1965A), Hopper (1965), Paglin (1965) etc. may be referred. Schultz's work of historical data has tried for believing that the phenomenon is true for today. But there are no grounds for believing that, Hopper (1965) generalised the phenomenon with the basis of the data of only one village (Senapur of UP). Paglin (1965) have presented many facts and figures from the various Farm Management Survey reports and have tried to generalise the phenomenon with the help of the questionable method.
- 4 In this connection, S K Rao (1973) writes: "The tremendous labour-

state variation in surplus labour in Mehra (see Table 8) is rather surprising. Assam had apparently a high ratio of surplus labour (57 per cent) whereas Andhra Pradesh and Maharashtra were short of labour (-12 per cent). This poses an interesting question: how were these shortages actually met? One can not say that the shortage were met by increasing output because the whole exercise is carried out by asking how much labour force is required to produce the same output. One could, assume, of course, that the workers on the lower-sized holdings worked for longer hours than the workers on higher-sized holdings. If this is so, one of Mehra's premises gets a bit knocked down — that the highest-sized holdings which cultivate with hired labour, can not be having surplus labour". Kanta Ahuja (1975). In this context, also writes: "Since it is a well-established fact that the intensity of farming in the smaller farms is higher than the intensity on the larger farms, the assumption made by Mehra would result in relatively lower estimates of the surplus".

- 5 In this context, see the discussions of Planning Commission in the report entitled: "Third Five-Year Plan", Government of India, 1960-61. During the Fourth Plan period, a number of important projects started on an ad hoc basis. These include the Crash Scheme for Rural Employment (CSRE), the Plead Initiative Rural Employment Project (PIREP), the Small Farmer's Development Agency (SFDA), the Drought Prone Area Programme (DPAP), the Agency for Marginal Farmers and Agricultural Labourers (AMFAL) etc. See the discussions of B S Mithras (1972), in the monograph entitled: "Rural Development for Weaker Sections: Experience and Lessons", presented in the Seminar on Rural Development for Weaker Sections, Indian Institute of Management, Ahmedabad, October 1972 (mimeo).

#### References

- Ahuja, Kanta 1975, "Measurement of Rural Labour Surplus". Thesis submitted to the University of Rajasthan, Jaipur, for the degree of Doctor of Philosophy (unpublished).
- Bagchi, A K 1973, "Some Implications of Unemployment in Rural Areas", *Economic and Political Weekly*, Special Number.
- Bhattacharyya, J P 1961, "Underemployment among Indian Farmers: Analysis of Its Nature and Extent Based on Data for Bihar", *Artha Visaya*, Volume 3.
- Cook, A J and Hoover, E 1958 "Population Growth and Economic Development in Low Income Countries: A Case Study of India's Prospects", Princeton.
- Dantwala, M L and Visaria, P 1974, "Rural Labour Force Employment Policy" in Ashok Mitra (ed), "Economic Theory and Planning": Essays in honour of A K Das

- gupta, Oxford.
- Dandekar, V M and Rath, N 1971 'Poverty in India', *Economic and Political Weekly*, January 2 and January 9.
- Enke, S 1962, 'Economic Development with Unlimited and Limited Supplies of Labour', *Oxford Economic Papers*, June.
- Eckaus, R S 1955, 'Factor Proportions in Underdeveloped Countries', *American Economic Review*, September.
- Gupta, Ranjit 1971, 'Rural Works Programme: Where It Has Gone Astray', *Economic and Political Weekly*, May 15.
- Hopper, W D 1955, 'Allocation Efficiency in Traditional Indian Agriculture', *Journal of Farm Economics*, August.
- Krishna, Raj 1973 'Unemployment in India', *Economic and Political Weekly*, March 3.
- Lilienthal, H 1957, 'The Theory of Underemployment in Backward Economies', *Journal of Political Economy*, April.
- Lewis, W A 1954, 'Economic Development with Unlimited Supplies of Labour', The Manchester School.
- Mathur, Ashok 1964, 'The Anatomy of Disguised Unemployment', *Oxford Economic Papers*.
- Melhor, J W 1966, 'The Economics of Agricultural Development', Cornell.
- Mellor, J W and Stevens, R D 1950, 'The Average and Marginal Product of Farm Labour in Underdeveloped Countries', *Journal of Farm Economics*, August.
- Mehra, S 1968, 'Surplus Labour in Indian Agriculture', *Indian Economic Review*, August.
- Minhas, B S 1972, 'Rural Development for Weaker Sections: Experience and Lessons', paper presented in the Seminar on Rural Development for Weaker Sections, Indian Institute of Management, October (mimeo).
- Oshima, H T 1958, 'Underemployment in Backward Economies — An Empirical Comment', *Journal of Political Economy*, June.
- Paglin, M 1965, 'Surplus Agricultural Labour and Development', *American Economic Review*.
- Planning Commission 1971, Report of the Committee of Experts on Unemployment, Government of India.
- Rao, S K 1973, 'Measurement of Unemployment in Rural India', *Economic and Political Weekly*, Review of Agriculture, September.
- Ranis, G and Fei, J C H 1961, 'A Theory of Economic Development', *American Economic Review*, September.
- Rodgers, G B 1973, 'Effects of Public Works on Rural Poverty', *Economic and Political Weekly*, Annual Number.
- Roda, Rosenstein 1957, 'Disguised Unemployment and Underemployment in Agriculture', *Monthly Bulletin of Agricultural Economics and Statistics*, (FAO Rome), Volume 9, July-August.
- Rudra, Ashok 1973(a), 'Direct Estimation of Surplus Labour in Agriculture', *Economic and Political Weekly*, Annual Number, February.
- 1973(b), 'Marginalist Explanation for More Intense Labour Input in Smaller Farms: Empirical Verification', *Economic and Political Weekly*, June 2.
- (with Randeep Biswas) 1973(c), 'Seasonality of Employment in Agriculture', *Economic and Political Weekly*, September 29.
- Sarkar, N K 1957, 'A Method of Estimating Surplus Labour in Peasant Agriculture in Overpopulated Underdeveloped Countries', *Journal of the Royal Statistical Society, Series A*.
- Schultz, T W 1964, 'Transforming Traditional Agriculture', Yale University Press.
- Sen, A K 1966, 'Peasants and Dualism with and without Surplus Labour', *Journal of Political Economy*, Volume 74, October.
- 1975, 'Employment Technology and Development', Oxford University Press.
- Sovani, N V 1959, 'Underemployment: Removable Surplus and Saving Fund', *Artha Vinayak*, March.
- Viner, J 1957, 'Some Reflections of the Concept of Disguised Unemployment', *Indian Journal of Economics*, July.
- Visaria, P and Visaria, L 1973, 'Employment Planning for the Weaker Section of Society', *Economic and Political Weekly*, Annual Number.
- Wonnacott, P 1962, 'Disguised and Overt Unemployment in Underdeveloped Economies', *Quarterly Journal of Economics*, May.