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ROLE OF LABOUR IN INDIAN AGRICULTURE

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MANABENDU CHATTOPADHYAY

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in partial fulfilment of the requirement for the award
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PREFACE

In this study, we have analysed some aspects of labour conditions and relations in Indian agriculture on the basis of available secondary source data.

We have started our analysis by taking a look at the origin and growth of the class of agricultural labourers in the Indian society. Possible explanations for the origin and growth of the agricultural labour class have been reviewed in this context. We then proceed to examine the trends in employment and unemployment in both the rural and urban sectors of India. The trends are studied in terms of absolute numbers as well as percentages in the light of the different criteria of unemployment measurement that have been advanced during recent years. Next we analyse the nature and extent of employment and unemployment in different pockets of the country with the help of farm-level data. We take up in this connection the familiar debate on 'Surplus Labour' in agriculture.

After this we examine the relative economic position of agricultural labourers over time as it has evolved by comparing the trends in agricultural wage rates and those in the prices of major cereals entering into the consumption of workers. Following this we examine emerging employer-labour relations and their economic significance. Variations in wages received by different kinds of hired labourers in agriculture is the subject taken up next. Comparison is made of the

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wage rates received by : (a) male and female hired labourers, (b) casual labourers and annual farm servants, and (c) casual labourers, annual farm servants and tenant cultivators.

The next topic examined is the interrelationship between labour input and farm size. We take up the familiar debate on the 'inverse relation' between yield per acre and size of holding and examine the so called 'cheap labour' hypothesis referring family labour. We then take a close look at the relationship between farm size and the intensities with which different types of labour input are applied and output obtained under different types of tenure. We also discuss why the nature and extent of use of family labour and different kinds of hired labour in different agricultural operations as well as in different types of farm and non-farm work vary.

Finally, we discuss the transformations of labour use that are taking place under changing conditions of Indian agriculture. In this connection, we examine the effects of HYV technology and mechanisation upon farm employment on the basis of data of such regions where major break-through in agriculture in the recent decades is being observed.

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CHAPTER 1

Origin and Growth of Agricultural Labourers

Basic to any discussion of a group or of a social phenomenon, it is necessary to discuss its genesis and growth. This introductory chapter undertakes the task of tracing the formation of agricultural labourers as a definite class in the Indian agrarian society. The discussion has been organised into four sections. The first section deals with the origin of the present-day agricultural labourers in rural society; followed next by an account of the growth of agricultural labourers. The third and fourth sections provide possible explanations for the growth of the agricultural labour class in Indian society.

I

There seems to be very few studies dealing with the problems of the genesis of agricultural labourers. The Indian Council of Social Science Research (ICSSR) has recently published a survey of those few works which are specifically concerned with this problem (Vyas and Shivamaggi [1975]).

From this survey it appears that there are two distinct schools of thought with regard to the origin and growth of the class of agricultural labourers in the Indian society. According to one group of scholars (e.g., Patel [1952]; Malaviya [1955]; and Ghosh [1969]), the establishment of British rule was responsible for the emergence of a distinct class

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of agricultural labourers. According to the second view (e.g., Mukherjee [1957]; Joshi [1958]; and Kumar [1965]), the genesis of the agricultural labourers as a class could be traced back to the caste system and the influence it had on the nature of economic activities pursued by different social groups.

A close scrutiny of the literature on the genesis of agricultural labourers, however, does not warrant the distinction of two different views as suggested above. To take a view on this matter, it is necessary for us to briefly recapitulate these works.

Surendra J. Patel [1952], relying partly on census data, reported that the agricultural labourers in large numbers was essentially a 19th century phenomenon that emerged from the loss of land by small cultivators and the loss of occupation by artisans who faced the competition of the products of British industries or the modern industrial sector of British India. What he had to say regarding the origin of this occupational group is best said in his own words as follows :

"There is a consensus of opinion that, in pre-nineteenth century India, there was no noticeably large class of agricultural labourers. There were domestic and menial servants : but their numbers were small and they did not form a definite group of persons whose sole or major occupation was work on the land of others for compensation in kind or cash. The large scale of agricultural labourers represents a new form of social relationships that emerged during the late nineteenth and early twentieth centuries in India" (Patel [1952], Emphasis added).

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Thus according to the author in pre-nineteenth century India rural labourers did exist, but their number was exceedingly small. During the period of British rule in India, the numerical importance of agricultural labourers increased, and they came to represent a new form of social relationship.

H. D. Malaviya [1955] and K. K. Ghosh [1969] also point out that agricultural labourers did exist in ancient and medieval India, often in conditions of slavery or serfdom, but there are no data to enable the making of reliable estimates of the numbers involved. While there is early evidence about the existence of agrestic serfdom, landless labourers may be identified sharply only after the beginning of the British period.

Dharma Kumar's painstaking investigation of the size and occupations of different caste groups and also of the prevailing land tenures in the Madras Presidency of British India showed that at least in the area covered by her investigations, agricultural labour was likely to have been a quantitatively significant group already at the beginning of British rule (Kumar [1965]). She takes the view that small cultivators of the second half of the 19th century were not always descendants of better off ancestors whose craft had been destroyed by the machine or by foreign trade or whose holdings were divided and depleted; they were also, though far less frequently, former landless labourers turned tenants or petty landowners.

According to Mukherjee [1957] the origin of agricultural labourers as a class could be traced to the emergence of the caste system in the subcontinent, which was obviously a phenomenon inherited from ancient India. Relying partly on ancient source materials and partly on the evidence of

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village studies, he observes a close relationship between castes and occupations in ancient and medieval India on the same lines as it exists to-day. Thus, landowners belonged to the upper castes, tenants to the intermediate castes, and landless labourers to the lower castes. Since there was a sizeable group of lower caste population at the lowest rung of the village hierarchy, the existence of landless labourers appears to be quite plausible, argues the author. He points out that this should not be taken as a proof in support of the sociological theory of the origin of landless labourers. For it neglects the essential characteristics of the agrarian crisis in British India which had resulted in an increasing number of caste-Hindus, mainly belonging to intermediate and lower castes and Saiyad Muslims, joining the ranks of agricultural labourers. V. R. Joshi [1958] in his study of the growth of agricultural labourers in Uttar Pradesh states that they mostly belong to lower and untouchable castes like Lunia, Pasi and Chamar. Andre Beteille [1974] in a recent study of agrarian relations in Tanjore district observes a close relationship between caste and class. He notes that in the villageshe studied the landlords were mainly Brahmins, while a larger proportion of agricultural labourers were Harijans.

We find that quantitative information relating to agricultural labourers are available since the beginning of the British period only; and this information pertains more to the growth in the number of agricultural labourers than to their origin. We shall briefly examine this phenomenon of growth on the basis of available material in the following section.

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II

Some attempts have been made to compare population data of various census rounds beginning the year 1871 to study the trend of growth of agricultural labourers over decades. S. J. Patel [1952] and V. R. Joshi [1958] for example have attempted to provide estimates of the proportion of agricultural labourers for the years 1871 to 1931. Dharma Kumar [1965] has done the same for the early 19th century. H. D. Malaviya [1955] has presented census figures on the number of agricultural labourers for 1921 and 1931. It is seen from most of the analyses that during the last three decades of the 19th century, the agricultural labourers formed a small number of the total agricultural population and showed a declining trend. But from 1901 onwards, the number of agricultural labourers shows a rising tendency (Table 1.1).

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Table 1.1: Growth of agricultural labourers in India : 1871-1971

[According to the census data, presented by some authors]

Year(s)	Author(s)					
	Patel		Joshi		Vyas	
	No. of agrl. labourers (in million)	Proportion of agrl. labourers to total agrl. population	No. of agrl. labourers (in million)	Proportion of agrl. labourers to total agricultural population	No. of agrl. labourers (in million)	Proportion of agrl. labourers to total agricultural population
(1)	(2)*	(3)	(4)*	(5)	(6)	(7)
1871-72	18.2[a]	18.0[a]	18.2	18.0	-	-
1881	12.5[a]	15.0[a]	12.5	15.0	-	-
1891	25.5	13.0	18.7	10.9	-	-
1901	52.4[a]	25.1[a]	33.5	17.4	-	-
1911	50.6	22.0	41.2	18.2	-	-
1921	27.8	26.2	37.9	20.7	-	-
1931	42.2	38.0	33.5	30.5	-	-
1951	-	-	44.8	18.0	-	-
1961	-	-	-	-	26.2[b] (30.6)	7.3[b] (8.5)
1971	-	-	-	-	45.6	10.4

(i) Note of the authors :

a/ These figures are overestimates owing to the inclusion of some non-agricultural labourers. The 1901 figures seem to be inflated by a very large number of destitutes as a result of the preceding famines.

b/ 1961 figures are adjusted for 1971 definition. The 1971 census used 'labour-time disposition' criterion over the reference period (one year) to define as workers only those who spend the major part of their time in economic activities. Thus, the adjustment is made by excluding the workers who are engaged in the secondary activities in the 1961 concept. Figures in bracket indicate actual 1961 census figures.

(ii) Note : * The discrepancy between col.(2) (Patel [1952]) and col.(4) (Joshi [1958]) is presumably due to the fact that the former series includes 'unspecified labour' in the years 1891, 1901, 1911 and 1931. Joshi states that his figures have been standardised for all the years without including the category 'unspecified labour'.

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Very few of the writers cited above have subjected the results obtained by them to rigorous statistical tests, or discussed the reasons explaining the rise or fall in the number of agricultural labourers. According to S. J. Patel frequent changes with regard to the area covered, the manner of classifying various occupational groups and the way in which the number of persons following or depending on the particular occupation group are enumerated, have placed very serious limitations on the use of census data for inter-census comparisons of the number of agricultural labourers. The census enumerations relating to the occupational distribution of the population covered only adult male workers in 1871-72, all adult workers in 1881, the whole population classified according to means of subsistence in 1891, 1901 and 1911, and the working population in 1921 and 1951. He thus observes that it is not possible to take the number of agricultural labourers from one set of census returns and compare it with that from another. However, the census returns could be used for the purpose of relative comparison, i.e., for finding out the proportion which the agricultural labourers constitute of the total agricultural population at one census enumeration and then comparing it with similarly derived proportions from another census year.

Apart from the changes in the definitions of workers and classifications of the population, several other difficulties are encountered due to the changes in the system of tabulation and presentation of data. In the census of 1871, the 'agricultural sector' covers only 'cultivators' excluding the agricultural labourers. From 1881 onwards, it is possible to sub-divide agriculturists into three broad groups : landlords, tenants,

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and labourers. The 1901 census further sub-divides these groups into cultivating/non-cultivating landowners/tenants, and 'farm labourers', 'unspecified labourers' and 'plantation labourers'. While from the 1901 onwards separate figures are given for these latter three groups of labourers, in the 1951 census they are combined and renamed as 'cultivating labourers'. In the 1961 and 1971 censuses, all the previous terminologies are abondoned, and figures are given under the heading 'agricultural labourers'.

N. A. Khan [1963] has examined the concepts of labourer used in different censuses (1921-1961) and has come to the conclusion that the 1961 concept is similar to that of the 1920-21 censuses in which the 'usual status' criterion has been uniformly applied. Hence the data on agricultural labourers for these two census years are comparable.

Similar attempt has been made by some other students of the subject (e.g., Vyas [1976]; Bardhan, K. [1977]) to make comparable the data for 1961 and 1971 censuses. The 1971 census used 'labour-time disposition' criterion over the reference period (one year) to define as workers only those who spent the major part of their time in economic activities. All irregular/marginal/part-time workers, thus came to be enumerated as non-workers. According to the above mentioned authors, a measure of total rural working force in 1961 comparable with that of the 1971 census is possible by excluding the workers who are engaged in the secondary activities in the 1961 concept. However, the adjusted figures for 1961 have been reproduced in Table 1.1.

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Thus, we get at least three comparable sets of census data, 1921, 1961 and 1971 by standardizing them on the 'usual status' criterion from which a trend of growth in the size of agricultural labour category can broadly be examined. Data show that number of agricultural labourers has increased from 27,8 million to 45.6 million during the period 1921 to 1971, but the corresponding proportion of agricultural labourers has decreased from 26.2 per cent to 10.4 per cent. We may now discuss the reasons explaining the rise or fall in the number or proportion of agricultural labourers over the decades in the next two sections.

III

Various explanations have been put forward by different authors (e.g., Patel [1952]; Joshi [1958]; Ghosh [1969]) for the rise or fall in the proportion of agricultural labourers for the period 1871 to 1951. Most of the writers cited above take the view that the decline in the proportion of agricultural labourers from 18 per cent in 1871-72 to 10.9 per cent in 1891 is likely "to have been more apparent than real". But from 1891 onwards, the proportion of agricultural labourers has been continuously rising, though the rates vary from decade to decade for different economic and administrative factors.

For example, increase in the proportion for the period 1891-1901 was partly due to the fact that at the time of the 1901 census, agriculture was in bits and pieces because of famines and scarcities. But this proportion rose much less in 1911 owing to the average prosperity of agriculture being higher.

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The period from 1911 to 1921 was also a period of general agricultural prosperity, of rising agricultural prices and of rising wage rates mainly due to the Great War. As such the proportion of agricultural labourers did not increase considerably.

There was an abrupt rise in the proportion during 1921-31. It has been argued by Patel that this tremendous increase was mainly due to the transfer of land to the hands of non-agriculturists. As rise in the agricultural population was not followed by a corresponding increase in the proportion of the cultivators or tenants but by a large increase in the numbers of non-cultivating owners, it caused a spurt in the proportion of the agricultural labourers.

Coming now to the period 1931-51, Joshi observes that the proportion of agricultural labourers went down sharply whereas the proportion of cultivators showed an increase. According to the author the reason for this change was that the agricultural wages and prices continued to remain high during this period thus lessening demand for agricultural labourers. The change was further accelerated because of the impending land reform legislations and then Zamindari Abolition Bill.

According to the Agricultural Labour Enquiry (ALE) of 1950-51 the proportion of agricultural labour families to the total rural agricultural families was 38.1 per cent. This does not suggest any fall in the agricultural labour population since 1931. The census figure for 1951, on the contrary, indicates a declining proportion of agricultural labourers (18.1 per cent). Joshi has argued that the reasons for this divergence

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are the difference in the methods of enumeration, classification and the definitions adopted.

IV

While most of the researchers in this field have considered the proportion of agricultural labourers to total agricultural population, there are a few who have relied on the absolute numbers to study the growth of agricultural labourers over the last few decades (e.g., Visaria [1976]; Vyas [1976]; Bardhan, K. [1977]). These studies show an absolute rise of agricultural labourers during the recent decades.

Different authors have put forward different explanations regarding this phenomenon which can be grouped as follows :

1. Natural increase in the population of the labourers' households and lack of employment opportunities for them.

2. The eviction of tenant operators due to the enactment of tenancy legislations.

3. Workers do not get enough employment in their traditional occupations and therefore join the ranks of agricultural labourers.

4. The influx of surplus labourers from the small and marginal farmers' households.

These explanations are not mutually exclusive, but the relative importance attached to these explanatory factors is different with different research workers. Thus, some (e.g., Visaria [1976, 1977]; Vyas [1976]) have consistently argued that the natural increase in the population of

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the labourers' households as well as the disintegration of village and small scale industries have facilitated the swelling of the ranks of agricultural labourers.

Similarly, other research workers (e.g., Bandyopadhyay [1975]; Rudra and Newaj [1975]; Raj [1976]; Bardhan, P. [1976]) have argued that the decline of share-cropping partly due to land reform legislations and partly due to the technological innovations has led to a major decline in the proportion of the self-employed and a rise in the proportion of the wage-employed in the rural working force. This change indicates a polarisation within the agricultural sector : a fast-growing sub-sector of medium and large farms is generating much of the increased demand for wage employment that is being supplied by the previously more self-employed poor peasant households along with landless labour households.

Some of these factors may operate more than some others in different parts of the country in the overall growth in the number of agricultural labourers in India. For example, in the case of some states like Punjab, Haryana, and West Uttar Pradesh, which experienced much faster irrigation- induced growth and the use of machinery and modern inputs of farming, the sharp increase in the proportion of agricultural labourers among rural workers was mainly in response to the growth in demand for hired farm labour. (See for details, Singh [1968]; Billings and Singh [1969, 1970a].) This increased demand has not been met by evicting the small peasants, either owners or tenants, from self cultivation (Kahlon [1974]).

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A survey recently conducted on the terms and conditions of land, labour and credit contracts in Eastern region of India, however, shows that in most of the agriculturally advanced areas, share-cropping tenancy is on the decline and owner-cultivation with hired labour is rising (Bardhan and Rudra [1978]). Thus, eviction of tenants seems to be a major cause in swelling the numbers of agricultural labourers in this region.

An interesting thing that may be seen from Table 1.2 is that the proportion of agricultural labourers is higher in most of the southern States than in the other States of India. This phenomenon possibly arises not only from the economic factors described above but also from the institutional and historical differences like, land-ownership pattern or mode of labour contracts etc.

All our discussions and evidence amount to this : it would be wrong to treat the phenomenon of growth of agricultural labourers as indicating a process of proletarianisation of the rural poor. Various factors (e.g., eviction of tenants, new farm technology, natural increase in the population of agricultural households, disintegration of village industries and lack of employment opportunities to them etc.,) are operating differently in different regions of India leading to the swelling numbers of agricultural labourers.

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Table 1.2 : Proportion of agricultural labourers to total workers in different states of India : 1951-71

Zones	States	1951	1961	1971
(1)	(2)	(3)	(4)	(5)
East	Assam	3.3	3.5	9.6
	Bihar	23.9	23.0	38.9
	Orissa	18.5	17.0	28.3
	West Bengal	15.3	15.3	26.5
North	Punjab	11.4	7.6	20.1
	Uttar Pradesh	7.5	11.3	20.0
South	Andhra Pradesh	33.4	28.6	37.9
	Kerala	25.6	17.4	30.7
	Mysore	19.6	16.4	26.7
	Madras	22.2	18.4	30.5*
West	Gujarat	18.3	14.8	22.5
	Rajasthan	7.6	4.1	9.3
	Maharashtra	30.4	23.8	29.3
Central	Madhya Pradesh	14.0	16.6	26.6
All India		19.5	16.7	26.3

* Indicates Tamil Nadu.

Source : (a) Census of India, 1961, Paper No.1 of 1967, Subsidiary Tables B-I.6 and B-II.3.

(b) Census of India, 1971, General Economic Tables, Part II-B(I).

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CHAPTER 2

Trends in Employment and Unemployment

This chapter deals with the problem of employment and unemployment in both rural and urban sectors of India in time perspective. For the sake of analytical convenience, observations are presented in the following three sections. The first section analyses the trends in labour force. The second section examines the trends in employment and unemployment. In the last section, an overview of the different criteria of unemployment measurement that have been advanced during recent years is discussed.

I

Labour Force

The National Sample Survey (NSS) has been virtually the only source of data relating to labour force. It provides data over time points at shorter than 10 year intervals for both rural and urban India that relate to the economic activity rates per person. The decennial censuses also provide data on the total number of persons who engage in economic activity. But the differences both in concept and definition restrict the validity of comparisons between the census results and the NSS estimates.

The census attempts to provide an inventory of persons who engage in economic activity during some time of the year. In 1951, the census data are based on a "usual status" question pertaining to the principal and subsidiary occupations of the "earners" or "self-supporting persons" and the principal occupation of the "working" or the "earning dependents".[1/] The

1/ For details see definition of worker in Census of India, 1951, Vol. I, Part II, Economic Tables.

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1961 census was the first to introduce the working force approach with a specific reference period. The reference period — excepting trade, business, professions or services, for which it was specifically a fortnight prior to the date of enumeration — was broadly defined as "the greater part of the working season" during which any one gainfully employed for at least one hour a day was considered to be a worker[2/]. The total working force, according to the 1961 census, includes (a) all those who reported work as their "main activity" plus (b) persons whose main activity was other than work but who reported some economic activity as their secondary work.

The 1961 approach has been changed once again in the 1971 census in which the questions relating to the economic activities of the population distinguishes between (a) those whose "main activity" (i.e., the activity in which a person "engages himself mostly") was work (i.e., participation in any economically productive work by physical or mental activity, involving not only actual work but effective supervision and direction of work), or in other words, those who were full-time workers, and (b) those who were "not mainly working" or persons whose "main activity" was other than work. The instructions specifically laid down that persons engaged in household duties or studies, who participated in the "family economic activity" on a less than full-time basis, should not be classified as having work as their "main activity"[3/]. Under the circumstances the 1971 census data on the number of workers are certainly not comparable with those of the 1961 census.

2/ See definition of worker in Census of India, 1961, Vol. I, Part II-A(i), General Population Tables.

3/ For details see definitions of worker and non-worker in Census of India, 1971, Series I, Part II-A(i), General Population Tables.

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Moreover, in the 1971 census, the reference period for the enumeration of persons engaged in non-seasonal work such as "trade, profession, service or business" was prescribed as one week. For seasonal work such as cultivation, livestock keeping, plantation work, some types of household industry etc., the reference period was "the last one year" prior to enumeration. The reference period was shortened from a fortnight in 1961 to a week for persons engaged in seasonal work; and it was widened from "the last or current working season" to "the last one year" for persons engaged in non-seasonal activities. This change seems to be of much operational significance and hence these two sets of census data may not be regarded as comparable.

The NSS defined the labour force so as to include categories of persons "with gainful work" and "seeking work" thereby using concepts of employment and unemployment for the definition of the labour force. It will be seen in the next section that the NSS has followed the "time" criterion in defining employment and the "willingness" criterion in defining unemployment in all the rounds. The concept of labour force provided by the NSS is of course quite different from the concept of 'workers' used by the censuses.

Although the concepts of 'labour force' and 'workers' are not comparable, the concept of 'employed' used by the NSS is broadly comparable with that of the concept of 'worker' used by the censuses. The persons classified as 'economically active' or 'gainfully employed' do not seem to be of much difference because in both the cases there was an approximation to the usual status approach. Let us now turn to compare the trends in the number of employed persons and workers on the basis of both the Census and the NSS data.

Data covering the three post-Independent Censuses show that number of workers has increased during the period 1951-61, but has declined during the period 1961-71. According to the NSS data on employment, shown in Table 2.3 below, the number of employed persons has been increasing during the period 1955 to 1964-65. These two sets of opposite results certainly cause confusion. Since concepts of worker and employed used by the censuses

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and the NSS are more or less similar, the very different patterns of movement of the numbers of workers and employed persons cannot be explained by differences in definitions. One possible cause for this variation may be that the nuances of the definitions were lost while the data were collected. Admittedly this may not be the entire explanation.

While there were large increases both in the urban and rural areas in the number of workers over the decades preceding 1961, it can be seen that the number of workers decreased considerably in the rural areas during the period 1961-71. As a result, the participation rates declined during the same period (see Table 2.1). The decline was more drastic in the rural than in the urban areas, and among rural women in particular.

Table 2.1 : Worker participation rates (per cent) in rural and urban India : 1951-71.
[Based on Census estimates]

Year	Rural			Urban		
	Male	Female	Total	Male	Female	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1951	54.96	26.50	40.98	54.35	11.89	34.73
1961	58.15	31.33	44.99	52.34	11.08	33.46
1971	53.46	13.11	33.81	48.89	6.55	29.33

Note : Worker Participation Rates have been calculated by using the formula : Number of workers ÷ Total population.

Source : Census of India, 1951, 1961 and 1971, Vol. I, Economic Tables.

Some scholars (e.g., Sinha [1971]; Mahajan [1975] and Visaria [1976]) have in this connection put forward the view that change in the labour force participation during the period 1961-71 arises due to the major change in the definition of worker in the 1971 Census. The 'usual status' criterion accepted by the 1961 Census, included all irregular/marginal/part-time workers in the labour force category. They, however, came to be enumerated as non-workers under the labour time disposition criterion

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followed by the 1971 Census. Given that the marginal/irregular workers are more likely to be concentrated among women, children, and the aged, the 1971 Census enumerating them as non-workers has resulted in female labour participation in particular to decrease during the period 1961-71. For a measure of total rural working force for 1971 to be comparable with the 1961 Census it would have to include not only the 'workers' according to the main activity criterion but also most of the 'non-workers' with secondary work participation.

Some attempts have been made to make comparable the figures of the 1961 and 1971 Censuses. Two alternative sets of adjustment factors have been used — one for adjusting the 1961 figures in terms of the 1971 concept and the other for the 1971 figures in terms of the 1961 concept (see for details, Bardhan, K. [1977]). It is shown that, whichever concept and set of adjustment factors are used, a comparison between 1961 and 1971 indicates a genuine decline in worker participation rates — a decline that has been more drastic in the rural than in the urban areas, and among rural women in particular.

What explains these rather striking changes in the labour force participation ? A demographic explanation for the decline in the overall participation rate derives from an increase in the proportion of children over the decades (Visaria [1976]). It has also been noted that rise in incomes and in the incidence of school enrolment that took place in the rural areas over the decade might have contributed to the decline in the worker participation rate for all ages combined.

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Regarding the decrease in female labour participation in the rural areas during the period 1961-71, different authors have provided different explanations. Leela Gulati [1975a, b] examined Census data at State levels and came to the conclusion that the cause of the drastic reduction in female labour participation in rural areas was due to the exclusion of house-wives who were helping in economic activity largely in household industry or cultivation. Kalpana Bardhan [1977] put forward the view that many of the productive work that the women of farm families do (like winnowing, preparation of dairy products, storage of seeds and produce etc.) are quite often not qualitatively different from some of the purely domestic chores and tend to be underreported. This sort of underreporting of female self-employment would naturally affect female participation rates. A very different argument is that as a consequence of technological changes taking place in agriculture female labour has been increasingly pushed out of farm labour into domestic activities (Billings and Singh [1969]).

II

Employment and Unemployment

The NSS, we have seen, provides a large mass of data on employment and unemployment for both rural and urban India at different points of time and these data may be used for analysing the trends of employment and unemployment. No other data sets are systematically and comprehensively available for this purpose. Some scholars, however, hold the view

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that trend analysis is not possible on the basis of the NSS data because of the different concepts of employment and unemployment used in its different rounds.

We, nevertheless, find that the terminology defining the 'employed' and the 'unemployed' has remained practically the same for all the NSS rounds. A person reporting industrial status "with gainful work" (i.e., working for direct or indirect remuneration or profit) as major activity during the period of reference has been treated as employed; a person with "seeking work" or "available for work" as his major activity has been treated as unemployed. These definitions are applicable both to rural and urban India and have remained the same for all the rounds. What has changed is the "period of reference". While the reference period was kept constant at one week in the earlier rounds (1955 to 1964-65) it came to be one year from the 27th round (1972-73) onwards.

For the earlier series of rounds (before the 25th round) a person was considered to be employed if he was at work on at least one day during the reference period of a week preceding the date of enumeration. If he was not gainfully employed even for a day and was seeking and/or available for work, he was considered as "unemployed". In some earlier rounds, the availability of work for even a small amount of time like a mere one hour in the week defined a person as "employed" [see NSS : 1958-59 (14th round), 1959-60 (15th round)]. From the 25th round onwards, data were collected regarding labour time disposition during <u>each</u> day of the reference week for <u>each</u> member of the household, as suggested by the Committee of Experts on Unemployment Estimates in 1970. These data make possible estimates of

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the flow (or person-day) rate of employment and unemployment for each individual (Planning Commission [1971]). Along with these, the annual 'usual status' of each person was also recorded in the 27th round which gives an annual stock rate of worker participation.

The NSS data on employment and unemployment for the earlier rounds (before 25th round) are thus seen to be broadly comparable in so far as the period of reference and the basic criteria are concerned. We can discuss the trends on the basis of this broadly comparable data-set of earlier NSS rounds. Data provided by the NSS in different rounds are on the ratios of employment, unemployment etc., to total population as may be seen from Table 2.2.

Data presented in Table 2.2 show no clear trends in employment and unemployment when computed in terms of the percentage to total population for both rural and urban India during the period 1955 to 1964-65. This is so because certain categories of pupulation other than the labour force (e.g., children, aged persons etc.,) are included in the total population. To arrive at a better understanding of this phenomenon estimates of employment and unemployment should be made in terms of their absolute numbers as well as in terms of percentage to the total labour force.

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Table 2.2 : Percentage of total population by labour force status : Rural and Urban India

[Based on NSS estimates]

Period of Survey	Round	Rural			Urban		
		Labour force	Empl-oyed	Unem-ployed	Labour force	Empl-oyed	Unem-ployed
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
April-Sept.'52	4	46.79	46.74	0.05	34.52	34.21	0.31
May-Nov.'55	9	43.50	43.21	0.29	34.54	32.55	1.99
Dec.'55-May'56	10	40.19	39.32	0.87	34.73	32.61	2.12
Aug.'56-Aug.'57	11 & 12	39.38	37.03	2.35	33.75	31.27	2.48
Sept.'57-May'58	13	-	-	-	33.87	31.38	2.49
July'58-June'59	14	41.86	39.52	2.34	32.95	31.77	1.18
July'59-June'60	15	41.45	39.54	1.91	33.96	32.20	1.76
July'60-June'61	16	41.88	40.26	1.62	34.01	33.19	0.82
Sept.'61-July'62	17	37.50	35.58	1.92	-	-	-
July'64-June'65	19	40.15	38.40	1.75	33.58	32.40	1.18
Oct.'72-March'73	27	51.40	50.93	0.47	39.60	37.61	1.99

Absolute numbers of the employed and the unemployed can be obtained by applying the percentages (presented in Table 2.2) to population estimates. For obtaining population estimates of each NSS year, we have used the method of interpolation by taking the actual 1951, 1961 and 1971 Census figures of total population. Ratios of employment and unemployment provided by the NSS have then been applied to the population to get the numbers of the employed and the unemployed. The results are presented in Table 2.3.

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Table 2.3 : Volume of employment and unemployment over time by rural and urban India

[Based on NSS estimates]

(in million)

Year	Rural			Urban		
	Persons in labour force	Employed persons	Unemployed persons	Persons in labour force	Employed persons	Unemployed persons
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1955	139.64	138.70 (99.33)	0.94 (0.67)	23.64	22.38 (94.67)	1.26 (5.33)
1955-56	131.82	128.97 (97.84)	2.85 (2.16)	24.40	23.01 (94.30)	1.39 (5.70)
1956-57	131.53	123.68 (94.03)	7.85 (5.97)	24.30	22.51 (92.63)	1.79 (7.37)
1958-59	145.25	137.13 (94.41)	8.12 (5.59)	25.04	24.15 (96.45)	0.89 (3.55)
1959-60	146.73	139.97 (95.39)	6.76 (4.61)	26.15	24.79 (94.80)	1.36 (5.20)
1960-61	150.77	144.94 (96.13)	5.83 (3.87)	26.87	26.22 (97.58)	0.65 (2.42)
1964-65	157.39	150.53 (95.64)	6.86 (4.36)	30.56	29.48 (96.47)	1.08 (3.53)
1972-73	233.87	231.73 (99.08)	2.14 (0.92)	45.54	43.25 (94.97)	2.29 (5.03)

[Figures in bracket indicate percentage of total labour force].

It is seen from Table 2.3 that the number of employed persons (that is, who worked at least one hour or one day in a week) both in the rural and urban areas has been increasing during the period 1955 to 1964-65. Number of unemployed persons (that is, those persons who were not

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gainfully employed even on a single day or a single hour in a week) both in the rural and urban areas, however, shows no particular trend of increasing or decreasing over the time period. It may, once again, be noted that the unemployment status of these persons was counted on the basis of only one week which represented the whole year. It is difficult to identify persons who are really seeking a work for a long time (say, one year) and getting none even for a single day during this period.

Further, an analysis of employment and unemployment figures in terms of percentage to total labour force do not reveal any pattern in either the rural or the urban sectors of India. Thus, there is no change from the observation made in Table 2.2.

We may now consider data collected in some rounds of the NSS about hours of working time in the reference week which give some idea about the nature and extent of underemployment among the working persons of rural and urban India. Data are presented for four groups, defined in terms of weekly hours at work : 28 hours and less, 29 to 42 hours, 43 to 56 hours, and 57 & above hours.

Defining severe underemployment as work less than 28 hours in a week, it is found to have declined in rural areas during the period 1955 to 1964-65. The corresponding rate for moderate underemployment (working 29-42 hours in a week), however, shows no particular trend. Defining near full employment as more than 42 hours but less than 57 hours of work per week, nearly full employed in rural areas seems to have decreased during the time period. The corresponding rate for full employment and/or above full employment (working 57 hours and more in a week) has increased. In

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the case of urban sector, it is seen that severe and moderate underemployment have been decreasing, but near full employment or full employment has been increasing with time.

The proportions of different kinds of underemployment and full employment presented in Table 2.4 can be applied to the population of working persons (estimated in Table 2.3) to get the absolute numbers of the underemployed of different degrees and the fully employed for the years 1955 to 1964-65.

Table 2.4 : Dimensions of underemployment : Rural-Urban comparison over time.
[Based on NSS estimates]

Period of reference	Round	Percentage of working persons by weekly hours at work							
		Rural				Urban			
		28 & less	29-42	43-56	57 & above	28 & less	29-42	43-56	57 & above
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
May-Nov.'55	9	28.97	17.33	32.66	21.04	21.47	18.06	39.90	20.57
Dec.'55-May'56	10	30.81	17.59	31.07	20.53	19.41	17.79	40.23	22.57
Aug.'56-Aug.'57	11 & 12	22.71	18.37	32.09	26.83	15.94	18.38	38.62	27.06
Sept.'57-May'58	13	-	-	-	-	15.12	18.49	38.19	27.74
July'58-June'59	14	26.19	22.11	27.84	23.72	15.44	19.33	41.57	23.25
July'59-June'60	15	23.73	21.28	29.72	25.36	17.65	18.72	38.12	24.83
July'60-June'61	16	17.69	20.59	33.48	27.44	-	-	-	-
Sept.'61-July'62	17	15.94	19.79	33.31	28.94	-	-	-	-
July'64-June'65	19	14.19	16.55	23.45	45.81	9.38	12.55	45.59	32.48

Note : In some cases sum of the percentages is not equal to 100 due to non-reporting.

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The results of this exercise are presented in Table 2.5 which reveal a decreasing tendency of both the severely and the moderately underemployed persons and an increasing tendency of both the nearly full employed and the fully or the above fully employed persons in both rural and urban India.

Table 2.5 : Numbers of severely underemployed, moderately underemployed and fully employed Persons : Rural and Urban India.

[Based on NSS estimates]

(in million)

Year	Rural				Urban			
	Weekly hours at work				Weekly hours at work			
	28 & less	29-42	43-56	57 & above	28 & less	29-42	43-56	57 & above
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1955	40.27	24.09	45.40	29.24	4.72	3.97	8.78	4.53
1955-56	39.74	22.69	40.08	26.49	4.46	4.09	9.25	5.20
1956-57	28.16	22.78	39.79	33.27	3.67	4.23	8.88	6.22
1958-59	35.88	30.29	38.14	32.50	3.71	4.64	9.98	5.58
1959-60	33.22	29.79	41.61	32.70	4.41	4.68	9.53	6.21
1960-61	25.65	29.86	48.55	39.79	-	-	-	-
1964-65	21.43	24.99	35.41	69.17 ?	2.72	3.64	15.22	9.42

Note : (i) Severely underemployed persons are defined to be persons with less than 28 hours of work in the reference week.

(ii) Moderately underemployed persons are defined to be persons with between 28 and 42 hours of work in the reference week.

(iii) Fully employed persons are defined to be persons with more than 43 hours of work in the reference week.

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We may now consider the data collected in the 27th round of the NSS. It may be noted that the 27th round makes a major departure in computation from the earlier NSS rounds by using 'one year' as reference period in place of one week. It may be argued that computation on the basis of one week as reference period is likely to project a higher estimate. However, we observe instead that the computation in the 27th round with one year reference period shows considerable increase in the category of employed persons and a consequent decrease in the number of the unemployed. Therefore, this indicates a clear improvement in the employment situation. However, in view of the large increase in the number of the employed we have to examine this new mode of computation with caution.

The composite picture suggested by the NSS data regarding the trends in employment and unemployment of both rural and urban India can now be summarised as follows :

(i) Employment in the rural sector has been increasing, particularly in the 1960s. A rise in the proportions of the nearly full employed or the full employed persons along with a decrease in the proportions of the severely underemployed persons indicates a significant increase in employment opportunities in the rural sector.

(ii) Employment in the urban sector has also been increasing more or less in the same fashion with that of the rural.

(iii) No particular trend in unemployment (in terms of percentage as well as absolute number) is revealed from the data based on 'seeking' criterion.

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Trends in employment and unemployment provided by the NSS data are consistent with evidences indicating a major break-through in agriculture during the sixties. In fact, some measures for land improvement, viz., expansion of irrigation, increased use of fertilizers and improved seeds, higher intensity of cropping etc., have taken place in the countryside in the 1960s. The immediate impact of these factors seems to have increased employment and output in the rural sector. This has also possibly eased the employment situation in the urban sector by reducing rural-urban migration of workers.

III

An Overall Assessment

In this section, we shall discuss the trends in employment and unemployment as indicated by the NSS data in the light of the four major criteria of unemployment measurement that have been advanced by some scholars namely, (a) time, (b) income, (c) willingness, and (d) productivity. These different criteria of unemployment estimates are not alternatives but are complementary and may be used for understanding different aspects of the problem unemployment. For example, the 'time' criterion (working time less than some norm) may be used to obtain estimates of worker participation rates in economic activities which measures indirectly the amount of idle manpower. The 'income' criterion (income or consumption less than some norm) likewise may be used to obtain ideas about the extent of poverty in the labour force. Employment is the means by which

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income is generated and distributed; unemployment therefore measures the degree to which a society has failed to provide opportunity to the population to earn income through work. The 'productivity' criterion (productivity of labour less than some norm) may be used to get the estimate of 'removable surplus labourers' in agriculture. Such a labourer may be removed from his present employment in agriculture in the sense that his removal would not reduce total output provided certain changes in technique and/or organisation of production are effected so as to make the contribution to production of other workers increase. By implication, it measures the amount of potential output outside agriculture that is lost in the absence of the above kind of reorganisation. Finally, for estimating the volume of persons who are seeking certain kinds of work but not getting any, the 'willingness' criterion may be used. It measures the degree to which a society has failed to provide employment opportunity of the kind sought to members of its working population.

Thus, there are several distinct purposes for which one may require estimates of unemployment in India, the estimates have to be different given the purposes. Each estimate relating to each criterion has its own utility concerning different policy questions. But often scholars are engaged in pedantic exercises in comparing different criteria irrespective of any purposes. Some examples are provided below.

Dandekar and Rath [1971] used the income criterion for estimating unemployment. They found that unemployment in terms of rupees was a good measure because the receipt of income was always conditional on work. They pointed out in this context that the Official Estimates of unemployment

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in rural India, based on time or willingness criterion, did not make any attempt to classify the unemployed or the underemployed on the basis of whether the people have a source of income which is dependent on work or not. As such there were chances that some time spent by some individuals would be enumerated as gainful work even while no income is earned during that time. Raj Krishna [1973] supported this approach as an alternative to the 'productivity criterion' in the words : "the income criterion may be deemed to be a good proxy for the production criterion".

K. N. Raj [1976], however, found no difficulties in estimating unemployment on the basis of the 'time' or 'willingness' criterion as used by the Official sources. According to him "the two major approaches to the identification and measurement of unemployment adopted from the early fifties still provide a fairly adequate basis for analysing the problem". A. K. Sen [1975] has put forward a fifth criterion namely the 'recognition' criterion according to which it is the degree of satisfaction in the work which qualifies a person as employed or not. He writes : "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".

To appreciate the usefulness of the approaches described above, S. K. Rao [1973] explored the common and separate components of the two concepts, namely 'production' and 'income'. He showed that "it is difficult to imagine someone who is income unemployed but is not production

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unemployed". Rao further argued for purposes of policy that it is useful to retain the separate identities of persons unemployed according to different criteria; the policies suitable to tackle the employment of one group may not be suitable for another.

It is our own view that while separate estimates according to the different criteria are necessary in the perspective of economic planning, no criterion can be regarded as superior to another. They in any case are compatible with each other. Thus the NSS estimates based on 'time' criterion of course directly give ideas about the amount of manpower remaining idle; but a view can also be taken from them about the extent of poverty in the labour force. These estimates may also provide some ideas about the volume of removable surplus labour in the sense that the contribution to output of these (time) unemployed workers may in most cases be very low.

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CHAPTER 3

Surplus Labour, Seasonality of Employment and Underemployment in Agriculture

An attempt has been made in this chapter to examine the nature and extent of employment and unemployment with the help of farm-level data. The chapter begins with a debate on 'Surplus Labour' in agriculture in its first section. The issues of 'Seasonality of Employment' and 'Underemployment' have been discussed in the next two sections.

I

Surplus Labour

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 such surplus have ranged from 20 to 50 per cent of the total agricultural population. It has further been argued that this surplus population could be removed without any significant reorganisation of agriculture and without reducing agricultural production (Lewis [1954]; Eckaus [1955]; Mellor and Stevens [1956]; Rosenstein Rodan [1957]; Leibenstein [1957]; Coale and Hoover [1958]; Ranis and Fei [1961]; Enke [1962]; Wonacott [1962]; Sen [1966]). Opposition to this view has been voiced from the very beginning by a smaller group of economists (Viner [1957]; Oshima [1958]; Sovani [1959]; Schultz [1964]; Paglin [1965]). It appears that this controversy has

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centred on the one hand around the definition and method of estimation of unemployment and on the other about the generalisation of the phenomena for the underdeveloped countries as a whole[1]. It is necessary, therefore, to make the concept clear and to examine the issue according to the multi-dimensional situation of each country.

There are two distinct concepts in the expression of 'surplus labour', a static and a dynamic concept. The static concept refers to that part of the population in agriculture which can be removed from it without leading to any reduction in output, without any changes in the organisation of cultivation. The dynamic concept refers to that part of the population in agriculture which can be removed from agriculture without its output falling, assuming certain suitable changes in the organisation of cultivation involving primarily reallocation of work among the workers engaged in agriculture[2].

The empirical literature on this subject does not often make this distinction clear. Also, empirical studies are mostly based on data from which generalisations are not warranted. Nevertheless many research workers have indulged in such generalisations[3].

Yet another distinction between two concepts is necessary namely, that between 'surplus labour' and 'surplus labourer'. Let N be the size of the working force in agriculture (measured in numbers), L the quantity of

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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 between these two concepts was first emphasised by Sen [1966].

3/ Such generalisations have been made by Schultz [1964], Hopper [1965], Paglin [1965] in the Indian context.

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labour put in by this working force into agriculture (measured in man hours) and O the resultant output. 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. This surplus is, however, locationally fixed, being pinned down to the respective farms, and subjected to seasonal fluctuations. 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_o labourers without affecting either L or O then N_o is an estimate of surplus labourers corresponding to that particular scheme. This distinction was originally clarified by Sen, later re-emphasised by Raj Krishna [1973] and Rudra [1973a].

With this definition of surplus labourers, Rudra [1973a] carried out an exercise with data pertaining to 148 farms drawn at random from the district Hooghly of West Bengal during the agricultural year 1970-71. He found that 27 per cent of the labourers in that sample could be treated as surplus labourers.

There are other two individual attempts at the estimation of surplus labour in agriculture (e.g., Mehra [1968]; Ahuja [1978]).

Shakuntala Mehra's approach recognised the distinction between labour and labourers. She examined the variation in the intensity of work per person in holdings of different size groups. It was presumed that the work intensity per person would be highest for the largest land holding size group. She calculated the number of the required work force to produce the existing volume of output in each size category keeping all factors of production unchanged including labour time, but reducing the number of labourers involved. She did this by assuming that the work intensity as measured by man days in all the smaller holding size groups would be the same as in

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the largest size group where the proportion of hired labour is the greatest. The required work force thus estimated was then deducted from the actual work force to obtain the size of surplus labour. For all India this was worked out as 29.1 per cent of the total agricultural work force by using the data of the 1961 Census and the Farm Management Studies of 1956-57.

Another attempt at the measurement of surplus labour has been made recently by Kanta Ahuja [1978]. She uses the coefficients of labour requirement per acre for each of the major crops calculated as averages on the basis of Farm Management data relating to a number of States. Applying these to the actual cropping pattern in Rajasthan, she works out the labour requirement for each of the two major crop seasons (Kharif and Rabi). The difference between the actual number of workers engaged in farm production multiplied by a 2400 hours a year work norm and the requirement is the stock of surplus labour days which is taken as the combination of disguised and open underemployment. According to Ahuja, there is only a marginal labour surplus in Rajasthan which is a little more than 3 per cent of the primary working force. But this surplus varies largely from district to district and from season to season.

It is possible to obtain different estimates of surplus labour depending upon the nature of the assumptions made. However, the validity of certain assumptions is now being questioned on the basis of certain empirical studies made in recent years. For example, Mehra's assumption that surplus labour should diminish as the proportion of hired labour increases is not substantiated in Rudra's study [1973a] where he finds that the proportion of surplus does not vary with size.

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Following the same method of estimation used by Rudra [1973a], we present below some results of another exercise in the empirical verification of the existence of surplus labourers in agriculture. Our analysis is based on Farm Management data pertaining to 150 farms drawn at random from the district Nowgong 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 have been observed. Farm work is defined as manual labour on different farming operations viz., ploughing, sowing, transplanting, weeding, harvesting and carrying, threshing etc., leaving aside any purely supervisory work and work on business aspects of farming. Our analysis includes male adults and such children who have partly or fully entered into the working force. Female family labour has not been included in our analysis to avoid the problems given rise to by their being doing domestic duties along with farm work.

The following model has been used for analysis :

(a) During the whole year as well as during the peak period, the following quantities remain unchanged for each family :

(i) total male family labour (including labour of farm servants) on family farm, l_{ff};

(ii) total non-family labour (excluding labour of farm servants, and including labour hired in casually, exchanged, etc.,) on family farm, l_{hf};

(iii) total male family labour employed outside family farm (hired out, exchanged, etc.,), l_{fh}.

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(b) Within category (i), a reallocation of labour is done in the following fashion. Within the period defined as the peak period, work is allocated to the first person until he is fully employed; then work is allocated to the second persons till he is fully employed. The persons who remain with no work allocated to them at the end of this process are considered 'surplus labourers' on that particular farm. Their number, for a particular farm, will be designated by n_o.

In order to calculate n_o for any farm, one requires first to take the following measures :

n : number of male farm workers in the family.

$\hat{I}$: peak period work load on male family farm workers in man hours.

$\hat{n}$: the minimum number of male family workers that can put in $\hat{I}$ amount of labour during the peak period.

Then $n_o = \hat{n} - n$.

Two measures of underemployment on the particular farm before and after the hypothetical re-organisation can also be made as follows where l_{ff}, it may be recalled, represents the quantity of work done by male family workers and l_{fh} represents the amount of labour hired out by family workers to other farms during a whole year (assuming a 300-day year).

Intensity of employment before reorganisation

$$\frac{l_{ff} + l_{fh}}{n \times 300}$$

Intensity of employment after reorganisation

$$\frac{l_{ff} + l_{fh}}{\hat{n} \times 300}$$

We have presented the results of our analysis in Tables 3.1 and 3.2.

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Table 3.1: Distribution of farms and labourers 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)		(2)	(3)	(4)	(5)	(6)
1. No. of farms	: m	66	68	11	5	150
2. No. of able bodied adult male members of family	: $N' = \Sigma n'$	131	178	45	19	373
3. No. of children who have entered the working force	: $N_1 = \Sigma n_1$	18	19	5	3	45
4. No. of adult male members with occupation other than agriculture	: $N_2 = \Sigma n_2$	18	7	5	1	31
5. No. 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. No. of male workers and children that must be retained in the farms from Peak Period consideration	: $\hat{N} = \Sigma \hat{n}$	62	85	20	9	176
7. Surplus labourers in the agricultural work force	: $N_o = N - \hat{N}$	32 (34.04)	37 (30.33)	10 (33.33)	4 (30.77)	83 (32.05)
8. Surplus able bodied adult nonworking male members in the farming families	: $N_o' = N' - (\hat{N} + N_2)$	51 (38.93)	86 (48.31)	20 (44.44)	9 (47.37)	166 (44.50)

Note : Figures in bracket in Row 7 indicate percentages of N, and in Row 8 indicate percentages of N'.

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Table 3.8: 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)		(2)	(3)	(4)	(5)	(6)
1. Average no. of hours of employment of male family workers (per day of a 300-day year)	$\frac{l_{ff}}{300 \times N}$	3.20	3.35	2.87	4.82	3.31
2. Average no. of hours of employment given to non-farm labour (per day of a 300-day year)	$\frac{l_{hf}}{300 \times m}$	1.21	2.16	3.15	8.76	2.04
3. Average workload per male family worker before Reorganisation	$\frac{l_{ff} + l_{fh}}{300 \times N}$	4.25	4.55	4.12	8.14	4.50
4. Average workload per male family worker after Reorganisation	$\frac{l_{ff} + l_{fh}}{300 \times \hat{N}}$	6.13	6.54	6.17	11.76	6.62
5. Average no. 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 no. 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

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It is found from Table 3.1 that our sample estimate of surplus labourers 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). It is also found from the same table that volume of underemployment in the farming families is very large : 45 per cent of the total working and non-working adult male members in the family.

It is found from Table 3.2 that average underemployment throughout the year is so high that even after removal of the 32 per cent from the work force the average employment per day for the remaining workers does not go beyond 6.6 hours.

An interesting result seen in our table is that the per cent of surplus labour varies very little between the various sized holdings. It is clear that the Assam sample analysed here bears very close resembalance to the results of the West Bengal sample examined by Rudra. Hence, the explanations offered by Rudra [1973a] can be accepted as satisfactory explanations of the Assam situation as well.

II

Seasonal Pattern of Employment

This section studies the seasonal variations in the demand for labour and its employment in agriculture. This may also be regarded as a sequel to the work of estimation of surplus labour in agriculture, as presented in Section I of this chapter. Since Indian agriculture is

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seasonal in character, our attention cannot but be directed primarily to this aspect of employment in agriculture for understanding the nature and extent of unemployment in a comprehensive manner.

The demand for labour for each season has been calculated separately for each of the three types of workers, viz., family workers, farm servants and casual labourers in terms of hours per day. The results are based on the same random sample of 150 farming households belonging to the Nowgong district of Assam. They are presented separately for five size classes, defined in terms of the hectare 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 hectares and above. They are presented in Table 3.4 below. We have divided the whole year into five agricultural seasons corresponding to the following operations for the paddy crop : I - preparatory tillage and ploughing, II- sowing, III - transplanting, IV - weeding, and V - harvesting, carrying and threshing. It may be noted that the operations exclude all post threshing operations like pounding, dehusking, storing, carrying to the market, etc., which are considered actually as non-farm work.

For the purpose of deciding whether a person should be considered as belonging to the agricultural work force or not, we have used the same criteria as for our earlier calculations regarding surplus labour. Thus, we have considered only adult male members of the family, adults being defined as '14 and above'. We have excluded those who are very old or physically incapaciated, those who have got full time occupations outside

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agriculture, and those young persons who are still 'students'. The number of worker (so defined) per farm, in the five size categories are shown in Table 3.3.

Table 3.3 : No. of agricultural family workers per farm in different size groups.

Farm size groups (hectares)	No. of agricultural family workers per farm	Hours of work per day corresponding to full employment
(1)	(2)	(3)
0.01 - 1.25	1.17	9.36
1.26 - 2.50	1.70	13.60
2.51 - 5.00	2.19	17.52
5.01 - 7.50	3.27	26.16
7.51 & above	3.60	28.80

As farm size goes up, family size goes up too, and with that the number of actual and potential agricultural workers in the family. We have assumed eight hours of work in a day as full employment work.

We shall now discuss the pattern of employment of all human labour and family labour in particular with respect to the five agricultural operations. The nature of the seasonal fluctuations of human labour employment depend upon the cropping pattern in the region from which the sample is drawn. The effect of seasons is more marked in this region because the region has a one-crop economy based on paddy. Another crop namely, jute is cultivated here; but its contribution to total production is not significant. Employment of all human labour on farms and that of family labour on farms show more or less the same pattern of fluctuations. It has two humps : one in the ploughing season and the other in the harvesting season.

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Table 3.4 : Operationwise distribution of farm work per day by categories of agricultural workers and by size groups

(in hours)

Agricultural workers (on farm)	Preparatory tillage and ploughing	Sowing	Transplanting	Weeding	Harvesting, carrying and threshing	All operations
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(a) Size group : 0.01-1.25 hectares						
1. Family labour	4.43	0.16	0.85	1.90	3.07	2.08
2. Family labour and casual labour	4.88	0.16	1.31	2.78	4.32	2.69
3. Family labour and farm servant	4.54	0.16	0.89	1.90	3.13	2.12
4. Family labour, farm servant and casual labour	4.99	0.16	1.35	2.78	4.38	2.73
(b) Size group : 1.26-2.50 hectares						
1. Family labour	6.26	0.39	1.48	3.94	5.91	3.20
2. Family labour and casual labour	6.47	0.40	1.87	6.02	7.42	4.44
3. Family labour and farm servant	6.89	0.40	1.61	4.19	6.21	3.86
4. Family labour, farm servant and casual labour	7.10	0.40	2.00	6.27	7.72	5.10
(c) Size group : 2.51-5.00 hectares						
1. Family labour	6.20	0.29	2.64	3.60	8.25	4.20
2. Family labour and casual labour	6.43	0.29	3.36	5.49	10.73	5.26
3. Family labour and farm servant	8.01	0.31	3.05	4.29	9.15	4.96
4. Family labour, farm servant and casual labour	8.24	0.31	3.77	6.18	11.63	6.02
(d) Size group : 5.01-7.50 hectares						
1. Family labour	9.43	0.38	3.27	4.41	10.10	5.52
2. Family labour and casual labour	10.21	0.38	4.53	7.78	14.35	7.45
3. Family labour and farm servant	12.48	0.53	3.39	5.80	12.29	6.90
4. Family labour, farm servant and casual labour	13.26	0.53	4.65	9.17	16.54	8.83
(e) Size group : 7.51 and above hectares						
1. Family labour	10.53	0.78	5.12	6.98	16.22	7.93
2. Family labour and casual labour	12.50	0.78	7.18	13.14	29.31	12.58
3. Family labour and farm servant	27.50	0.88	6.80	11.31	23.35	13.97
4. Family labour, farm servant and casual labour	29.47	0.88	8.86	17.47	36.44	18.62

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One thing is very clear from our data : all the size classes are affected very largely by unemployment. With the exception of the farm size "7.51 hectares and above" in all the size groups only a fraction of the labour supply in the family is absorbed even during the peak periods. In the biggest size group (7.51 hectares and above) of farms, the peak period demand for labour shoots up very high, reaching 36.44 hours a day during harvesting season and 29.47 hours a day during ploughing season. The maximum supply of labour in such families being of the order of 28.80 hours a day, there is definitely the necessity for this size group 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.

An interesting aspect of the employment pattern on farms which emerges from our data is that casual labour (hired in) plays an important role in agricultural operations, not only in the case of biggest farm size group, but in the case of small and medium size groups also. This may provide an explanation as to why, in the smallest size group, a farmer would hire in labour. One possible explanation according to Rudra [1973b] is as follows : in order to get employment outside his own farm, a farm worker might enter into a contract that prevents him from doing all the work required on his own farm, thus obliging him to hire in labour when he himself is going for work outside his own farm. This explanation would not, however, hold for the next three higher size groups. The employment of casual labour in these farms may be caused by such factors as caste. As

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is well known, higher caste people will simply not do certain farming operations — sometimes they would do no more than what is called 'supervision' — however little work their farms call for and however many unemployed persons there might be in the family. Admittedly this is not the entire explanation. To think of more explanations for this phenomenon would call for detailed and minute examination of the circumstances attending each individual farm household which is beyond our scope here due to lack of such information.

The employment pattern of farm servants vis-a-vis casual labourers conforms to expectation. As farm size increases, the importance of farm servants also goes up. The fluctuation in farm servant labour employment over seasons is much less sharp than that in casual labour employment — as is to be expected.

III

Nature and Extent of Underemployment

Month-wise employment data relating to a farm family worker are available from the published reports of Farm Management Studies for some selected regions of India. These data may be used to examine the seasonal variations in employment of a family worker on farm work. Also, we may calculate from these data the number of surplus hours per family worker per day of each season, assuming the full employment norm as 8 hours a day. Thus, a view about the nature and extent of underemployment among the farm family workers can be taken from it.

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We have analysed and computed month-wise employment figure for each region under study and presented them in Table 3.5. The region and years for which the season-wise employment data are available are : 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.

An interesting thing that may be seen from Table 3.5 is that the employment of a family worker is distributed unevenly over months, so that employment in terms of standard eight hours a day is considerably less than the work done in terms of actual calendar days (except for some months in the case of Punjab). It is very clear that all the regions under study are affected very largely by underemployment of family workers.

Judging by the table, underemployment of a farm family worker shows more or less the same pattern over the years. There are mainly two humps in the seasonal pattern of intensity of employment : one in the ploughing and sowing season (May-July) and another in the harvesting season (November-January). This seasonal pattern of family labour employment is obviously determined to a large extent by the seasonality of the main crop in each region. Some examples are provided below.

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Table 3.5 : Monthwise distribution of labour hours put in by a farm family worker per day in different regions by different years.

Month	No. of hours engaged in farm work per day			No. of surplus hours		
	Years			Years		
	1967-68	1968-69	1969-70	1967-68	1968-69	1969-70
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Ferozepur (Punjab)				
July	5.94	5.16	5.16	2.06	2.84	2.84
August	5.42	4.13	5.42	2.58	3.87	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	5.42	1.81	3.35	2.58
January	6.19	4.90	4.65	1.81	3.10	3.35
February	5.32	4.86	4.86	2.48	3.14	3.14
March	6.97	5.42	4.65	1.03	2.58	3.35
April	8.80	6.93	6.40	-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
All months	6.67	5.22	5.40	1.33	2.78	2.60
		Cuttack (Orissa)				
June	-	3.73	3.13	-	4.27	4.87
July	-	2.65	3.03	-	5.35	4.97
August	-	3.13	4.23	-	4.87	3.77
September	-	2.27	4.07	-	5.73	3.93
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	4.49	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	5.68
March	4.97	4.68	2.10	3.03	3.32	5.90
April	4.20	1.93	1.70	3.80	6.07	6.30
May	3.94	0.77	1.35	4.06	7.23	6.65
All months	3.67	2.56	2.82	4.33	5.44	5.18

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Table 3.5 (contd.)

Month	No. of hours engaged in farm work per day Period : 1968-69	No. of surplus hours Period : 1968-69
(1)	(2)	(3)
	Nowgong (Assam)	
June	1.87	6.13
July	4.61	3.39
August	4.61	3.39
September	1.87	6.13
October	1.03	6.97
November	2.13	5.87
December	4.87	3.13
Junuary	1.55	6.45
February	2.29	5.71
March	2.32	5.68
April	2.67	5.33
May	2.84	5.16
All months	2.69	5.31
	Period : 1962-65	Period : 1962-65
	Alleppey & Quilon (Kerala)	
April	5.33	2.67
May	4.39	3.61
June	4.53	3.47
July	4.13	3.87
August	4.39	3.61
September	4.27	3.73
October	4.65	3.35
November	4.80	3.20
December	5.16	2.84
January	4.64	3.36
February	5.14	2.86
March	4.90	3.10
All months	4.62	3.38

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Table 3.5 (contd.)

Month	No. of hours engaged in farm work per day			No. of surplus hours		
	Years			Years		
	1962-63	1963-64	1964-65	1962-63	1963-64	1964-65
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Raipur (Madhya Pradesh)					
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	4.69	5.81	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	4.65	4.65	5.94
February	4.00	3.71	4.00	4.00	4.29	4.00
March	2.84	2.32	2.32	5.16	5.68	5.68
April	2.40	1.87	1.87	5.60	6.13	6.13
May	2.58	2.06	2.06	5.42	5.94	5.94
All months	3.73	3.18	3.20	4.27	4.82	4.80
	Years			Years		
	1966-67	1967-68	1968-69	1966-67	1967-68	1968-69
	Muzaffarnagar (Uttar Pradesh)					
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	4.39	3.87	4.13	3.61	4.13	3.87
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	5.14	4.86	4.57	2.86	3.14	3.43
March	4.90	4.90	4.65	3.10	3.10	3.35
April	4.80	5.07	4.80	3.20	2.93	3.20
May	4.13	4.39	4.39	3.87	3.61	3.61
All months	4.23	4.16	4.14	3.77	3.84	3.86

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The seasonality of employment is not deeply marked in those regions where multiple crops are in operation with different sowing and harvesting periods (e.g., Punjab, Kerala, Uttar Pradesh). In these regions, employment of family labour on farm mark four humps in the year — corresponding to the two sowing seasons and the two harvest seasons of the summer and winter paddy crops. The effects of seasons, on the other hand, are strongly marked in those regions which are primarily of one crop economy, viz., paddy (e.g., Orissa, Assam, Madhya Pradesh) where there are only one sowing season (June-July) and one harvesting season (December-January).

We now turn to results pertaining to average underemployment throughout the year of a family worker presented in the same table. The results show that on an average, a farm family labourer gets employment for about 4 to 5 hours a day in the multiple cropped regions such as Punjab, Kerala and Uttar Pradesh. On the other hand, he gets employment for about 3 hours a day in the single cropped regions such as Orissa, Assam and Madhya Pradesh. Assuming the full employment norm of 8 hours a day it is seen that a farm family labourer has unemployed hours of 3 to 4 hours per day in the case of the former regions and of 5 hours per day in the case of the latter regions. Thus, about 38 to 50 per cent of the total hours is unemployed for a family worker of the agriculturally advanced regions, and about 63 per cent of total hours is unemployed for a family worker of the agriculturally less developed regions.

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

1) The employment on a farm for a family worker is largely determined by the intensity of cultivation and the cropping pattern. In the agriculturally advanced regions like Punjab, Kerala and Uttar Pradesh, the volume of underemployment is not so high as in the less developed regions like Orissa, Assam and Madhya Pradesh. The seasonal fluctuations of employment are not so wide in the former regions as compared to the latter regions.

2) In spite of intensive cultivation and cropping pattern in the advanced regions there are considerable numbers of underemployed labourers. For example, both in Punjab and Kerala nearly 38 per cent of total labour hours of labourer families is unutilised in actual manual operations. Similarly, in the case of Uttar Pradesh nearly 50 per cent of the total labour hours is thus wasted.

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CHAPTER 4

Trends in Real Wages of Agricultural Labourers

This chapter examines the relative trends in agricultural wage rates and the prices of major cereals entering into the consumption of workers over years in different states of India with a view to finding out the relative economic position of agricultural labourers over time. The exercise is presented in four sections. Section I takes a view of the work of some other research workers in the field. Section II takes a close look at the nature of wage data used and the methods of analysis so far followed in this subject. Section III presents some fresh results on the basis of a method of our own. Section IV examines the determinants of rural wages in the light of the results obtained in our study.

I

Quite a good number of studies have been done on the temporal and spatial variations in wage rates for agricultural labourers (e.g., Rath and Joshi [1966]; Bardhan, P. [1970]; Krishnaji [1971]; Jose [1973]; Fonseca [1975]; Lal [1976]). The general conclusion arrived at by most of these studies is that while the money wage rate increased over time in most of the states in India, the real wage rate did not increase significantly. Agricultural development has thus not been significantly helpful in raising the agricultural wage rates in real terms. We briefly recapitulate these works.

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Nilakantha Rath and B. V. Joshi [1966] undertook an analysis of movements in wage rates of field labourers and prices of staple cereals in certain parts of India for the periods 1924-40 and 1954-57. Two different sets of data were examined : one, the official data relating to the wage rates of field labourers and the prices of jowar and bajra in the different divisions of the Bombay Presidency during the inter-war years; and two, the data on wage rates and cereal prices collected by the Farm Management Surveys in six states of India during the years 1954-55 and 1956-57. Examination of data showed that money wage rates changed less from year to year than the prices of cereals. The authors concluded that "wages appear to take time to adjust, and that too, only if the changed price level tends to persist over a longer period".

Pranab Bardhan [1970] studied wages of agricultural labourers for the period of 1960-61 to 1967-68 in Punjab, Haryana, Western Uttar Pradesh and IADP districts in various states. He used data from Agricultural Wages in India (AWI) for 1960-61 to 1967-68, from the National Sample Survey (NSS) for 1956-57 and 1964-65 and from various studies of the Intensive Agricultural Development Areas (IADP) for the period 1962-63 to 1967-68. Taking the daily wage rates for casual male field labourers and by weighting each district on the basis of their respective percentage of male agricultural labourers, he found that the weighted average daily wage rate at current prices for casual male agricultural labourers went up between 1960-61 and 1967-68. But taking the consumer retail price index (general) numbers for agricultural labourers, he found that prices went up more than the wage rates between 1960-61 and 1967-68. From this he concluded that "the so-called green revolution may not have helped in raising agricultural wage rates in real terms in north-west India; in fact there seem

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to be some indications of a fall in the real wage rates in many areas in this region".

A. V. Jose [1973] made a comparative study of wage rates between IADP and non-IADP districts of Kerala during the period 1957-58 and 1970-71. Data on money wage rates of agricultural labourers over years for different districts in Kerala are obtained from AWI. In order to obtain the real wage rates, the money wage rates are deflated by the Consumer Price Index Number for Agricultural Labourers in Kerala. The results of analysis suggested that "the rise in the real wage rate believed to have taken place in Kerala between 1960-61 and 1967-68 appears to have been far less in magnitude than indicated by earlier studies".

A few other studies utilised the published data on agricultural wages to discuss the conditions of agricultural labourers. In his study based on the NSS and the AWI, A. J. Fonseca [1975] observed that "while money wages have been rising, real wages, except in Punjab, have been stagnating, or even declining and then catching up with the level existing at the beginning of the first five year plan". N. Krishnaji [1971] in his study pointed out that "between 1960-61 and 1964-65 wages increased at a faster rate in those regions where they were relatively low and decreased where they were relatively high".

Another exercise carried out with data belonging to AWI and NSS is that of Deepak Lal [1976]. He used data of different states in India for the period 1956-57 to 1970-71. He computed indices of real wages over time by taking money wage rates and Consumer Price Index Numbers for Agricultural Labourers over years. Lal observed that there was no

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underlying trend of declining rural real wages. Moreover, he observed from the NSS data that the rural real wages rose over the period 1956-57 to 1970-71 in all the states for which NSS data are available.

Regarding the impact on agricultural wages of the green revolution, Lal put forward the view that "while the pessimistic conclusions of the impact of the Green Revolution on real rural wage rates are unwarranted, it would be equally unscientific to claim ..... that the Green Revolution has necessarily led to a rise in rural real wages; for, if, as our evidence shows, the Green Revolution had only taken root by 1968-69, it is not possible to make a definitive evaluation of its effects on real wages on the basis of only one year's data (1970-71). For the new technology could have various effects on the labour market which take time to work through".

II.

We should mention that the earlier research on this aspect of agricultural wages suffers from some limitations partly due to the nature of the data that have been used, and partly due to the methods followed in the calculation of wage rates in real terms. Most of the work for instance have been done either on the basis of AWI (Agricultural Wages in India) data or on the basis of the NSS (National Sample Survey) data. Both the sets suffer from various limitations some of which are discussed below.

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(a) "Agricultural Wages in India" (AWI) of the Ministry of Food and Agriculture, Government of India, provides data on daily wages of field labourers of the major states of India for each agricultural year. The data on cash wages for all the months in a year are taken from agricultural labour households of each sample village, and a single money wage rate is calculated by averaging all the labour households' figures for each village. Again, by taking a simple average of all the sample village wage rates a single money wage rate for agricultural labourers is arrived at for each state. This method of dealing with wage data is crude; the samples are too small to be adequate and the method cannot thus take into account variations of wage rates either between different groups of agricultural labourers or between different villages.

(b) As to wage data collected by the NSS : (i) the sampling procedure is such as to fail to catch in its net the richer villages and also the richer strata of the rural population in the selected villages; (ii) the seasonal variations in wage rates are not properly taken care of.

In the absence of any other wage data, we may choose any one of the two for our immediate purpose. Since most of the earlier researchers have used AWI data, we find it reasonable to use the same set of data in our study so as to be able to compare and arrive at a meaningful conclusion.

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It is seen that most writers consider the use of "Consumer Price Index Number" as a valid means for converting money wage rates to real terms. The Consumer Price Index Number includes the wholesale or retail prices of all the consumer goods of rural areas. Common experience, however, suggests that the impact of price changes on consumption pattern is different for different classes. For example, provision of two major meals a day is the main problem of agricultural labour households, and most of the time most of them are not able to provide for the same adequately. They seldom think of consuming goods other than rice, wheat, bajra, jowar etc., as available in the region where they live. Thus, an agricultural labourer would be least affected with the changes in prices of different kinds of food and other durable and non-durable goods. As such use of Consumer Price Index Numbers for agricultural labourers would seem to be fallacious. One can, of course, raise more fundamental objections against the use of index number for purposes of deflation as is done by Rudra [1976] in the following words : "Index numbering is an attempt at realizing an impossibility, like squaring a circle, like changing base metal into gold. While price movements of a number of commodities call for a vector representation, index numbering attempts a scalar representation. Such considerations as whether the use of national income deflator or that of wholesale price index number is a better way of correcting for price changes hardly fall within the purview of scientific discourse".

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In view of such difficulties with Index Numbers we would like to avoid their use and yet examine the real wages of agricultural labourers in some meaningful way. To achieve that we have compiled two types of data : (i) money wage rates of male field labourers since 1960-61[1/] ; and (ii) farm harvest prices of the two major agricultural commodities that agricultural labour households generally consume — rice and wheat — since 1960-61[2/]. We have tried to understand the movement of real wage rates by observing the relative movements of money wage rates and the prices of these two wage goods. We have chosen to work with farm harvest prices because they are more systematic and comprehensive compared to the other two sets viz., wholesale and retail prices. As a matter of fact, published sources provide wholesale and retail price index numbers, and not wholesale or retail prices as such. Agricultural Situation in India, however, provides farm harvest prices for major commodities for the different states in India. Generally the farm harvest prices are low compared to the retail prices of the commodities in different seasons.

1/ AWI (Agricultural Wages in India) data are available only upto 1971-72. Hence comparable data on agricultural wage rates for 1972-73 onwards have been collated from Agricultural Situation in India.

2/ Farm harvest prices of rice and wheat have been collected from Agricultural Situation in India, published by the Directorate of Economics and Statistics, Government of India.

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III

We are presenting a number of graphs showing the relative trends in daily wage rates (in Rs.) and the prices of major cereals, i.e., paddy and wheat (Rs. per quintal) over years for different states in India (see Diagrams 4.1 to 4.11). Data graphically presented refer to the percentage changes in daily wage rates of male agricultural labourers and the percentage changes in the prices of paddy and wheat for 11 states in India over years, taking 1960-61 as the base year. Thus, assuming wage rate for the base year 1960-61 to be w_o, the percentage change in wage rate in different years compared to w_o is calculated as $\frac{w_t - w_o}{w_o} \times 100$, where w_t is the wage rate for the tth year (t = 1961-62, ..., 1974-75). Similarly, percentage change in prices of each commodity has been computed as $\frac{p_t - p_o}{p_o} \times 100$, where p_o is the price of the commodity for the base year 1960-61 and p_t is the price of the commodity for the tth year (t = 1961-62, ..., 1974-75). That is, we have time series data on both wage rates and prices for the period 1960-61 to 1974-75. We have also wage data for the earlier time period (i.e., prior to 1960-61) but since no information about prices is available systematically for the period, we are forced to concentrate our attention only on the later period (i.e., 1960-75).

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For comparing the movements of money wage rates with the prices of paddy/ and/or wheat, we have followed the method of graphical analysis which we think is more advantageous even though simple compared to many sophisticated statistical methods for the kind of problem we are dealing with. The patterns revealed by the graphs may not, however, be taken of "statistically significant" in each case; but in this type of trend analysis, statistical significance is not perhaps of any vital importance; what is really important is to identify the areas of departure from general tendencies.

We now take up the results of our trend analysis. Attention may first be drawn to the graphs for Assam, Madhya Pradesh, Maharashtra, Uttar Pradesh, Bihar and Gujarat (see Diagrams 4.2, 4.3, 4.4, 4.11, 4.5 and 4.6 for the respective states). In all these cases, movement of prices of both the commodities is faster than the movement of money wage rates. Therefore, in all these cases, decline in real wages may be expected even though money wage rates have increased considerably over time. A very different and opposite pattern of the movement of money wage rates and prices of paddy is noticed in the case of Tamil Nadu (see Diagram 4.10). This pattern would confirm the hypothesis of real wage rates increasing in this region. In all other cases, there is no clear tendency operating for both the commodities, i.e., paddy and wheat, and for all the time points. Attention, in this connection, may first be paid to the patterns revealed by Andhra Pradesh and West Bengal (see Diagrams 4.1 and 4.7). In these cases, money wage rates reveal a tendency

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to increase in relation to paddy prices but not do so in relation to wheat prices. We would be justified in these cases to interpret the data as indicating increasing real wage rates, since paddy is the most important wage commodity in these two states.

Very different patterns of movement of money wage rates and prices of paddy and wheat over time are noticed in the cases of Punjab and Kerala respectively (see Diagrams 4.9 and 4.8). In the case of Punjab, real wage rates reveal a tendency to increase definitely during the period 1968-69 to 1970-71, the period of increase would extend upto 1973-74 if we assume wheat to be the major food commodity of this region. Further the real wage rate tends to decline over the period 1963-64 to 1968-69 and tends to increase over the period 1960-61 to 1963-64. Thus, assuming wheat as the major commodity of this region three distinct patterns of the real wage rates follow each other over the 15 year time period. A different pattern is seen if we consider the prices of paddy also as one of the major food commodities of this region. Thus, in terms of prices of paddy real wage rates increase during the period 1960-61 to 1970-71 and for the rest of the period the reverse is true.

Thus, in the case of Punjab, it is not an easy task to draw any simple conclusion regarding the behaviour of real wages of agricultural labourers. In this connection it may be mentioned that Pranab Bardhan [1970] studied wages of agricultural labourers in 15 districts of Punjab and Haryana for the period 1960-61 to 1967-68 and noticed a declining tendency in the real wage rates. Our analysis neither supports nor rejects this reading;the phenomenon may be regarded true if we make our analysis only

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in terms of the prices of wheat, but not true if paddy prices are also considered.

We may now turn our attention to Kerala. It is seen in the graph that there is no smooth trend of movement of paddy prices over the entire time period (see Diagram 4.8). The graph shows that the percentage change of paddy prices is higher than that of money wage rates for the period 1963-64 to 1968-69 and again for the period 1972-73 to 1974-75. During the rest of the period the reverse is true. It has not been possible to examine the behaviour of wheat prices in this region for lack of information. Hence, in the case of Kerala, no clear-cut conclusion can be drawn regarding the rise or fall of real wage rates of agricultural labourers over the entire time period. However, there is a tendency of declining real wage rates in the greater part of the time period if only paddy prices are considered. Thus, our analysis partly supports the phenomenon observed by Jose for the region of Kerala in his 1973 study on the real wage rates.

From the results of our analysis, we can now draw the following conclusions :

(1) The fall in the real wage rates believed to have taken place in most of the regions in India as suggested by certain earlier studies is not unambiguously true. There are some regions viz., Tamil Nadu, Andhra Pradesh, West Bengal, and Punjab where real wage rates have increased during the entire time period or at least during parts of the time period under study.

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(2) In spite of the significant increase in money wage rates over years, the real wage rates in some of the regions (viz., Assam, Kerala, Bihar, Gujarat, Madhya Pradesh, Maharashtra and Uttar Pradesh) have decreased due to the more rapid increase of the prices of major wage goods.

We may now ask : why is the movement of real wage rates not uniform in all the states in India ? It may be expected that the movement of real wage rates of agricultural labourers would differ in the different regions according to the characteristics of agricultural development of those regions. In the agriculturally better-endowed regions the real wage rates might be expected to increase due to better availability of foodgrains at lower prices, and in the less developed regions, the reverse picture might be expected. Also, in the more developed regions demand for labour might push wages up. Out data reveal no one pattern of rising real wage rates in all the agriculturally developed or the so-called Green Revolution areas. Also, there is no one pattern of declining real wage rates in all the agriculturally less developed regions.

IV

In the following we review a few authors who have attempted to examine the determinants of rural wages.

Kalpana Bardhan [1973] used the NSS data to explain inter-state variations in money wages in 1956-57 and 1970-71, in terms of

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a cross-sectional analysis within a supply and demand framework of rural labour markets. Irrigation (net sown area irrigated) was her demand variable and the proportionate size of agricultural labourers (in the rural labour force) her supply variable. She found that "..... irrigation or multiple cropping does generate a positive response not only in the wage income ..... but also the daily wage rate for agricultural labourers". Our foregoing discussion suggests that this cannot be accepted unambiguously. Money wage rates do not rise uniformly in all the better irrigated regions.

Some research workers (Bardhan, P. [1973]; Fonseca [1975]) have explained the differential movement in real wage rates in terms of relative strengths of organised labour movement in the regions. It has been suggested that change in real wage rate is positive in those regions where the bargaining capacity of the labourers is stronger. They refer in this connection to the regions of Kerala, Punjab, Tamil Nadu and West Bengal. But results of our analysis show that except Tamil Nadu no particular pattern of rising real wage rates hold for the other three regions.

Deepak Lal [1976] has undertaken an analysis to examine the inter-state variations in real wage rates. He has used real wage indices from the NSS for the two years 1956-57 and 1970-71 to run a cross-section regression with the percentage change in the real wage rate as the dependent variable, and with the percentage increase in cereal output representing a demand variable, and the percentage

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increase in the male agricultural labour force between 1961 and 1971 representing a supply variable, as the two independent variables. From this he has observed that "the demand inducing effects of agricultural growth do have a positive effect on real wage rates". He thus holds the view that the movements in wage rates should be explained within a framework of demand and supply.

Data presented by us are not adequate for taking a view about the evidences presented by Lal. But our analysis, in general, indicates that the real wage rates have not increased in all the regions where agricultural growth and demand for labour have simultaneously taken place (e.g., Punjab, Kerala, Uttar Pradesh etc.).

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Diagram 4.1 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Andhra Pradesh over years.

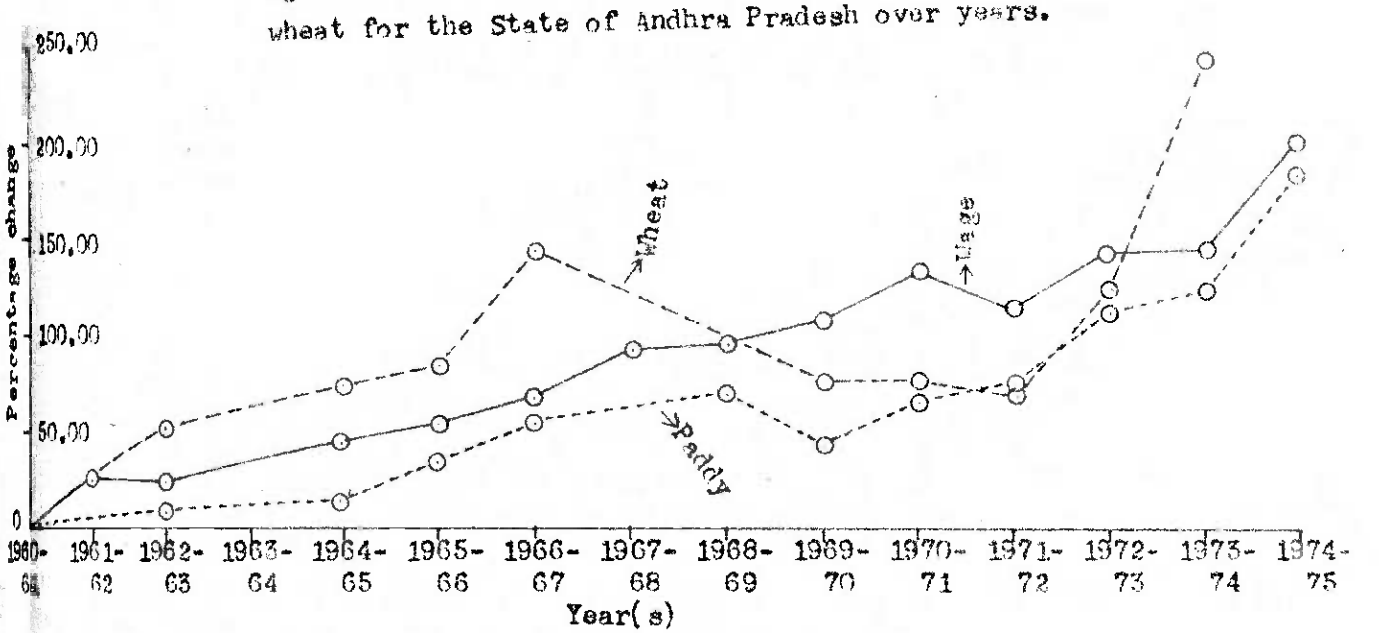

Diagram 4.2: Showing percentage changes of daily wage rate of male agricultural labourer and the price of paddy for the State of Assam over years.

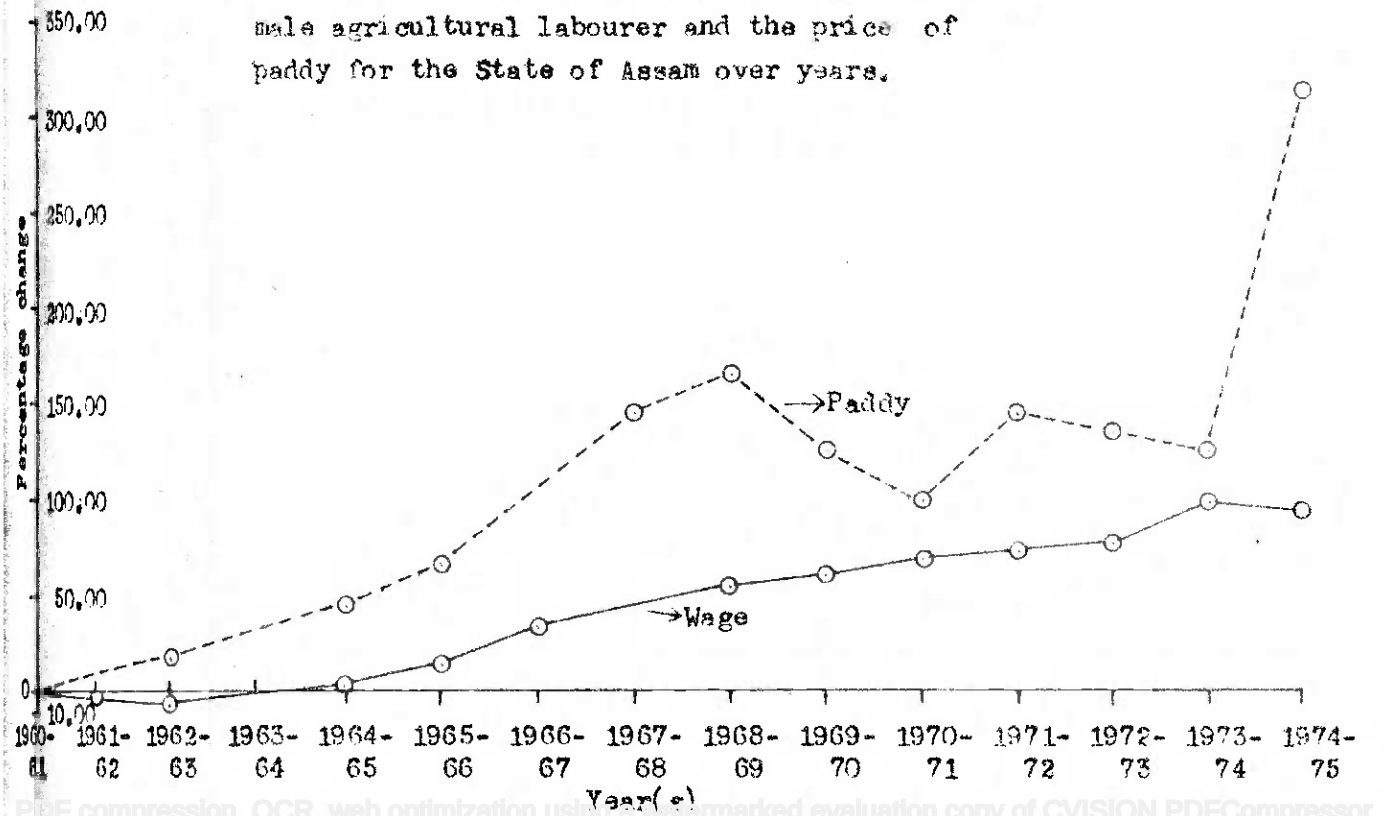

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Diagram 4.3 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Madhya Pradesh over years.

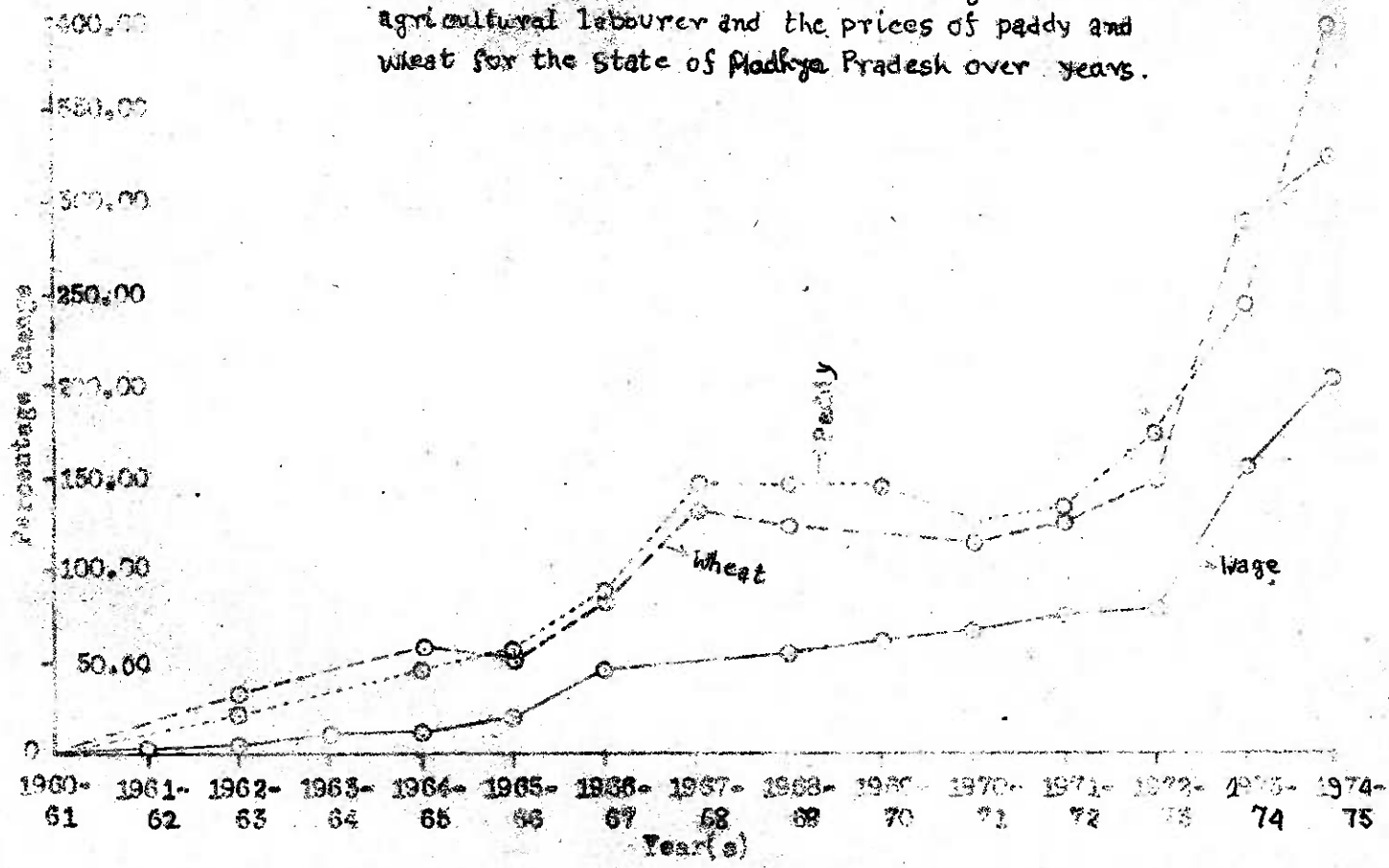

Diagram 4.4 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Maharashtra over years.

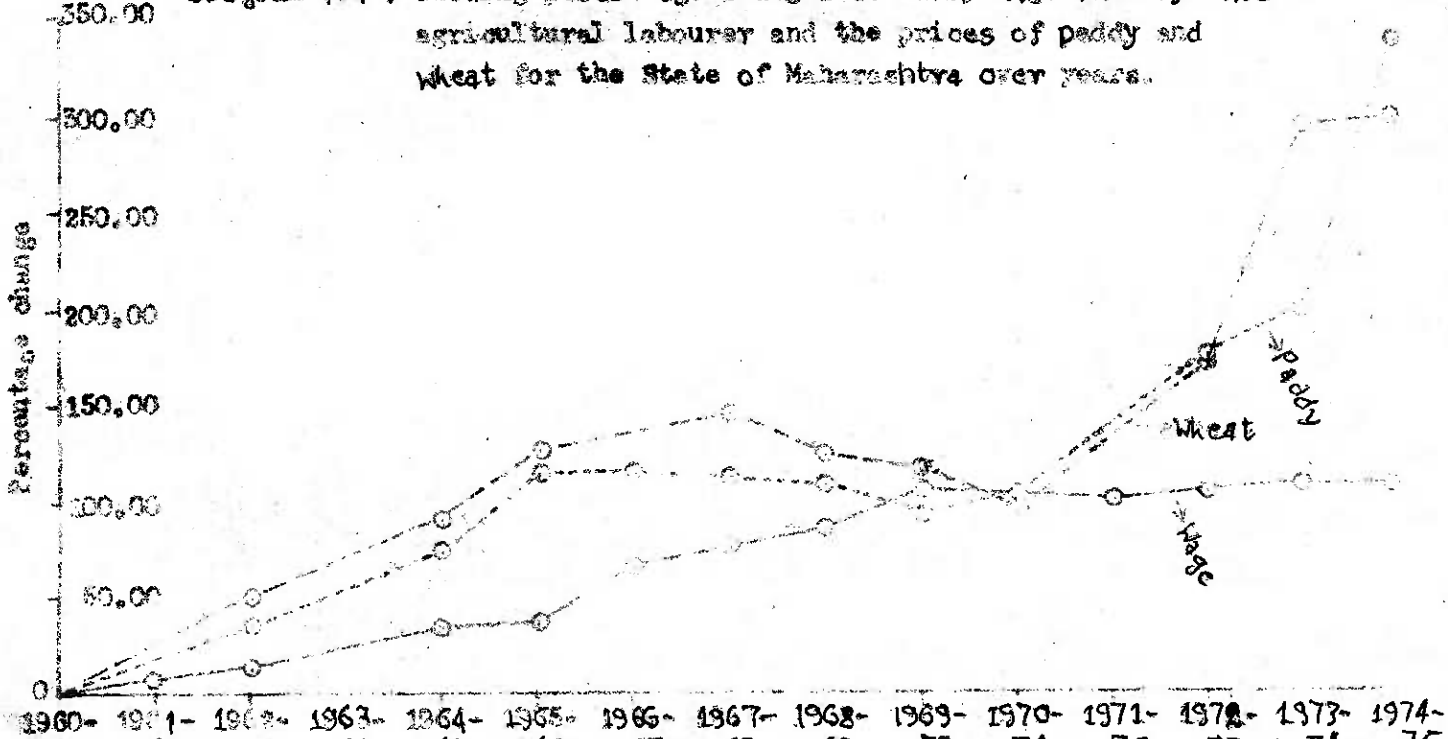

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Diagram 4.5 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Bihar over years.

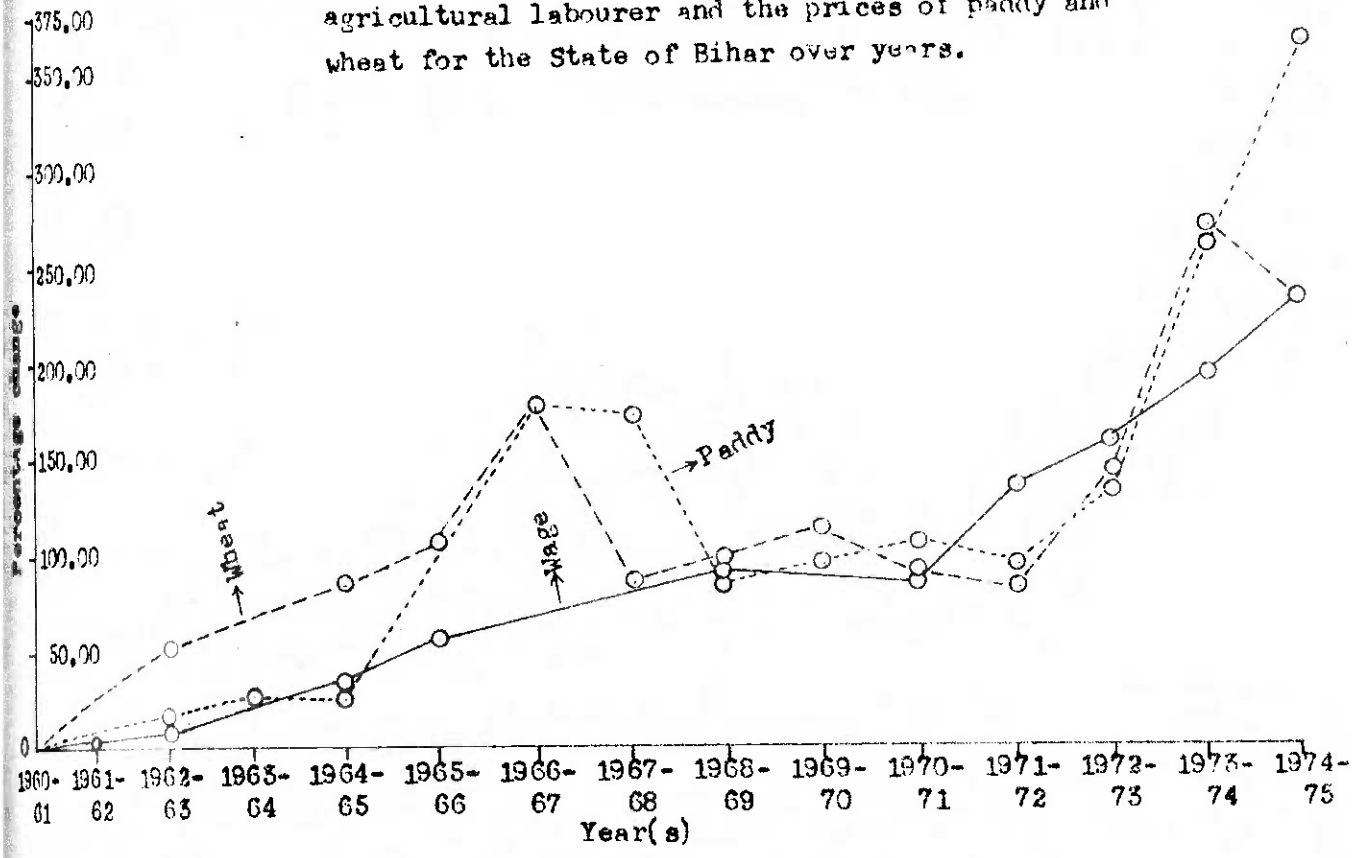

Diagram 4.6 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Gujarat over years.

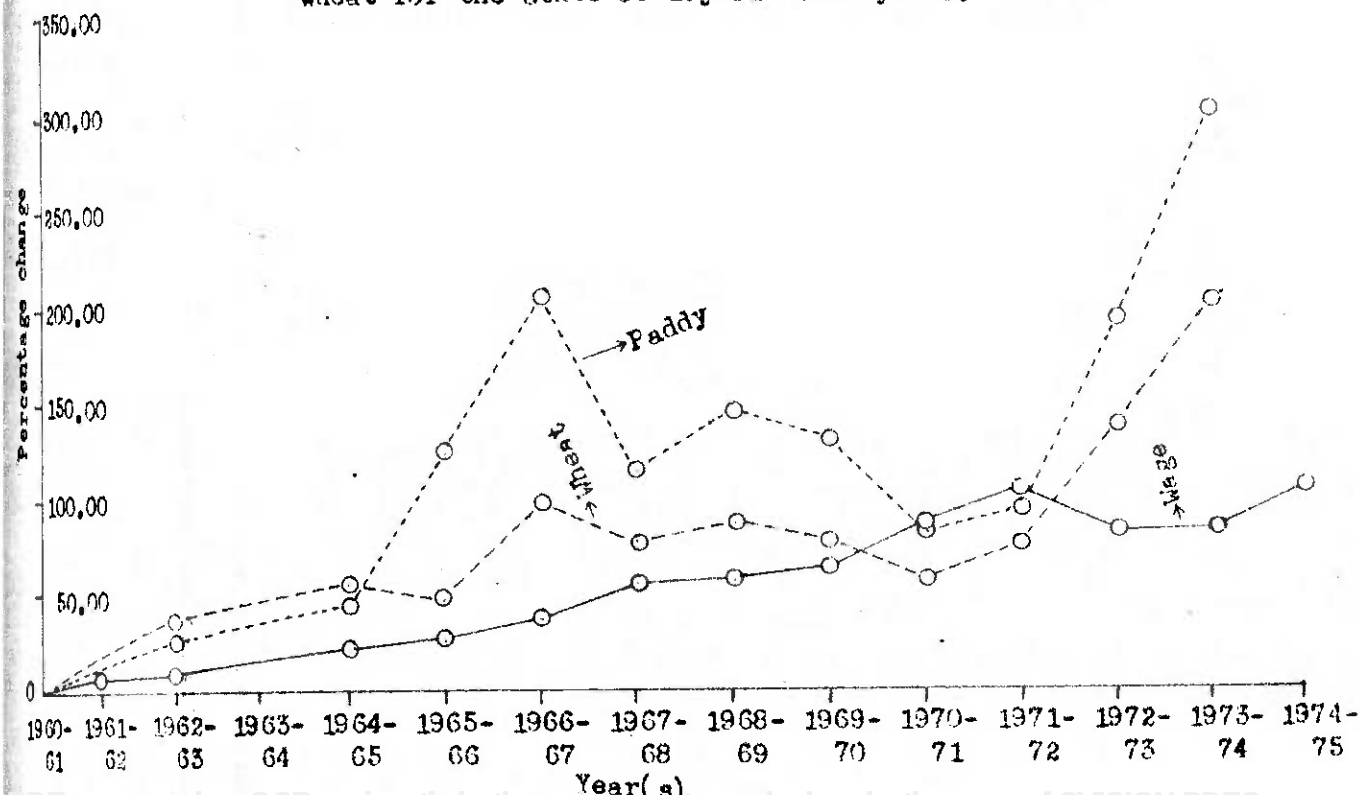

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Diagram 4.7 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of West Bengal over years.

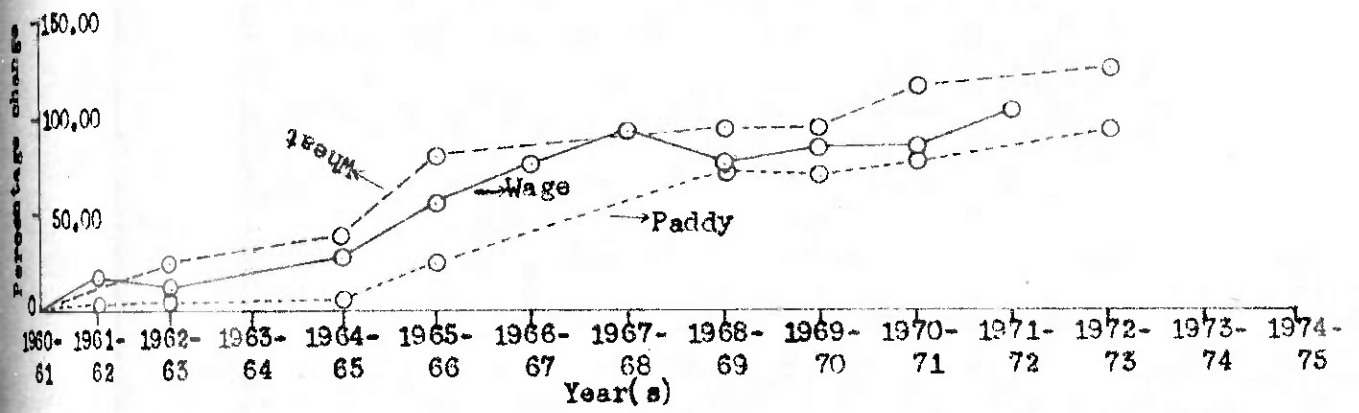

Diagram 4.8: Showing percentage changes of daily wage rate of male agricultural labourer and the price of paddy for the State of Kerala over years.

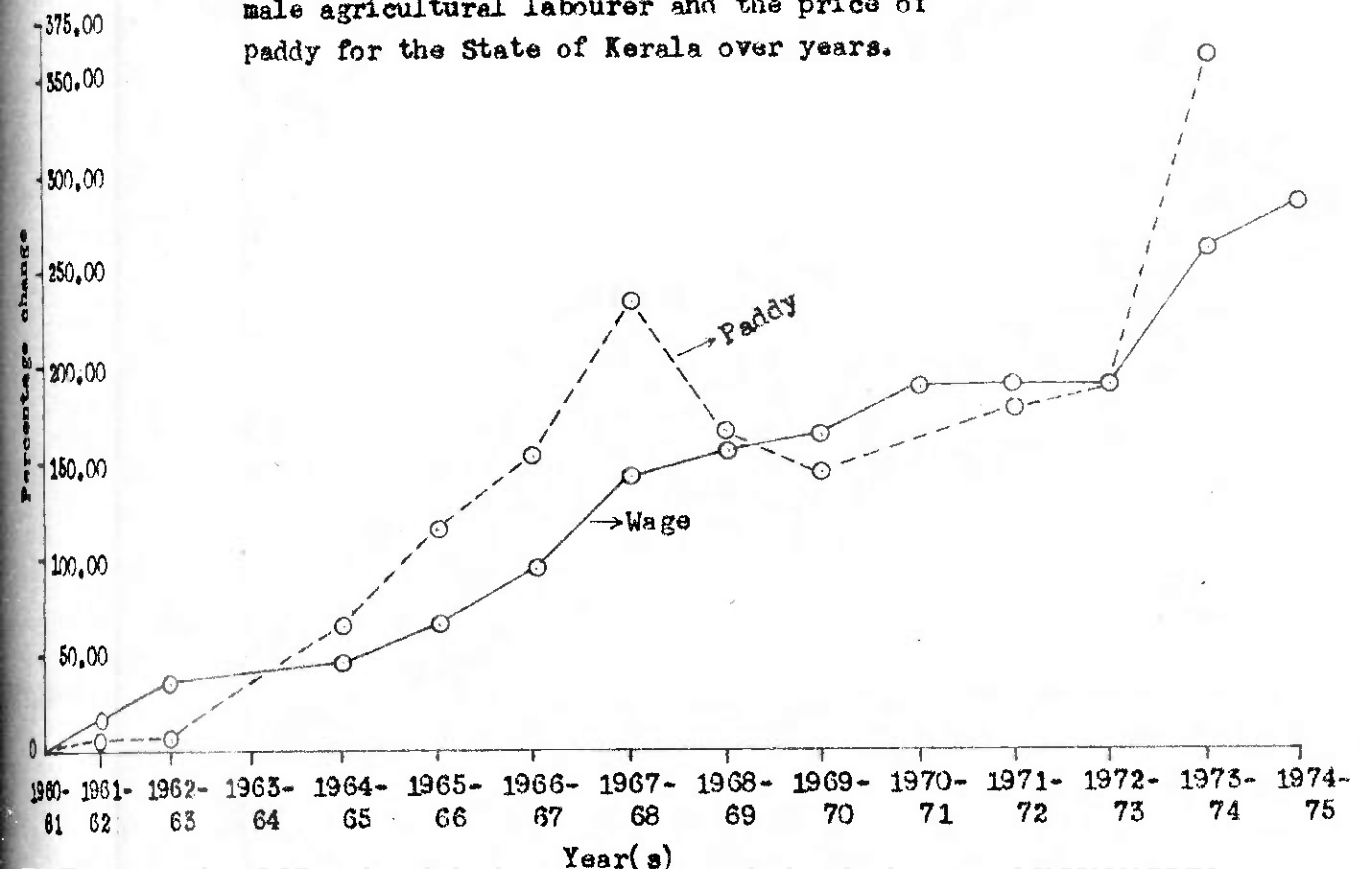

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Diagram 4.9 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Punjab over years.

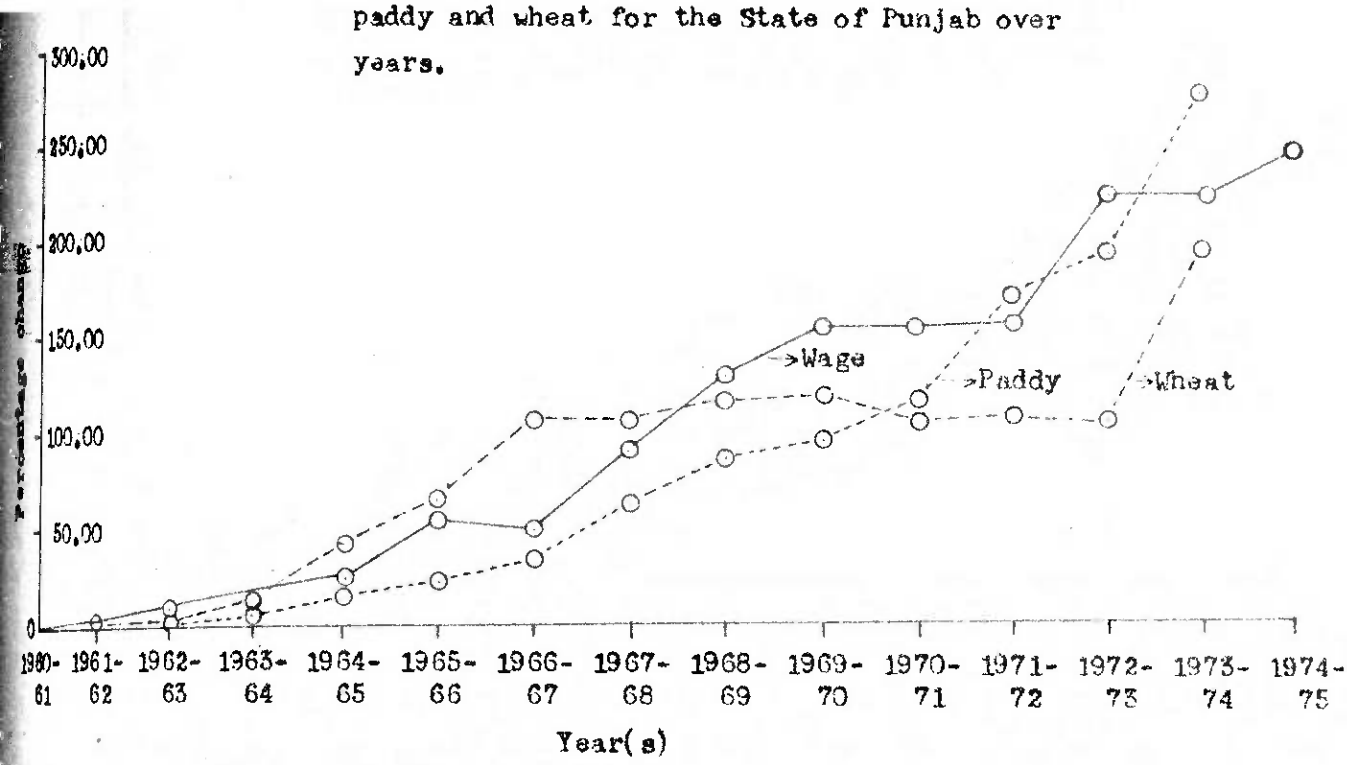

Diagram 4.10 : Showing percentage changes of daily wage rate of male agricultural labourer and the price of paddy for the State of Tamil Nadu over years.

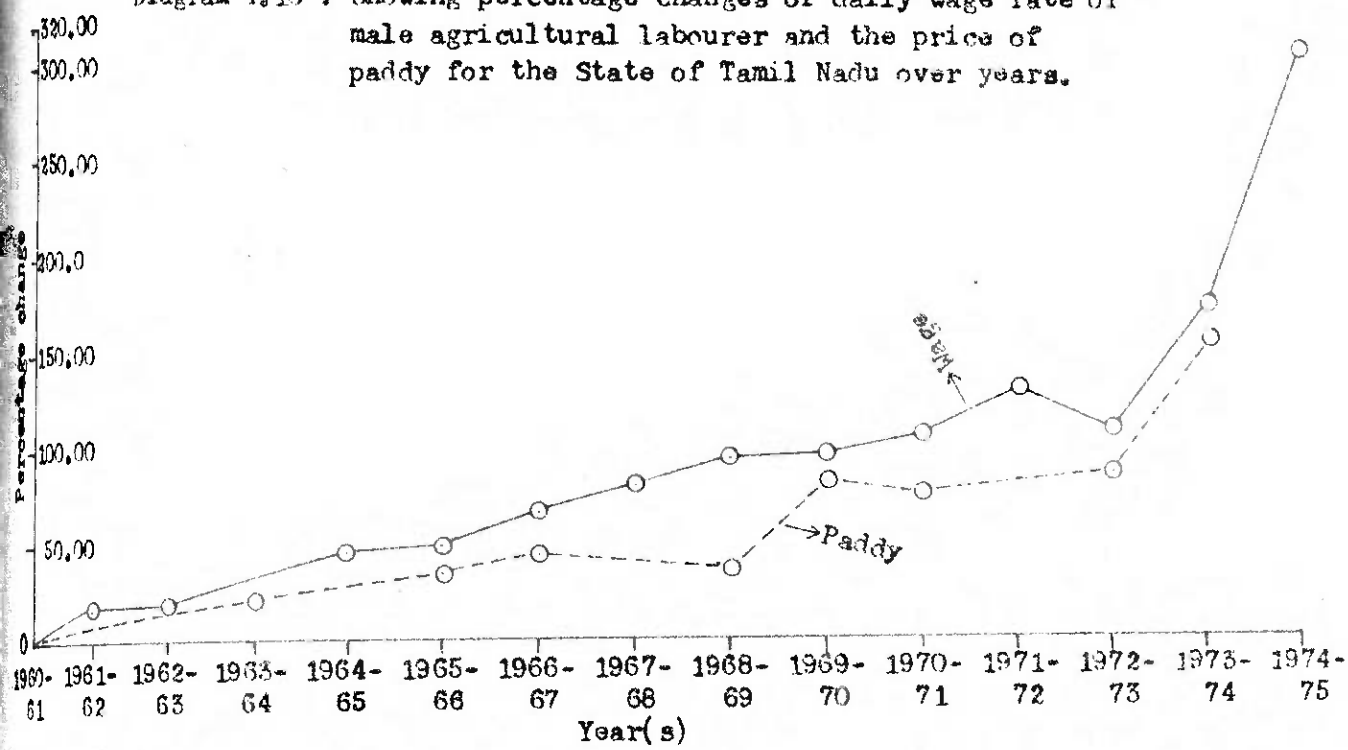

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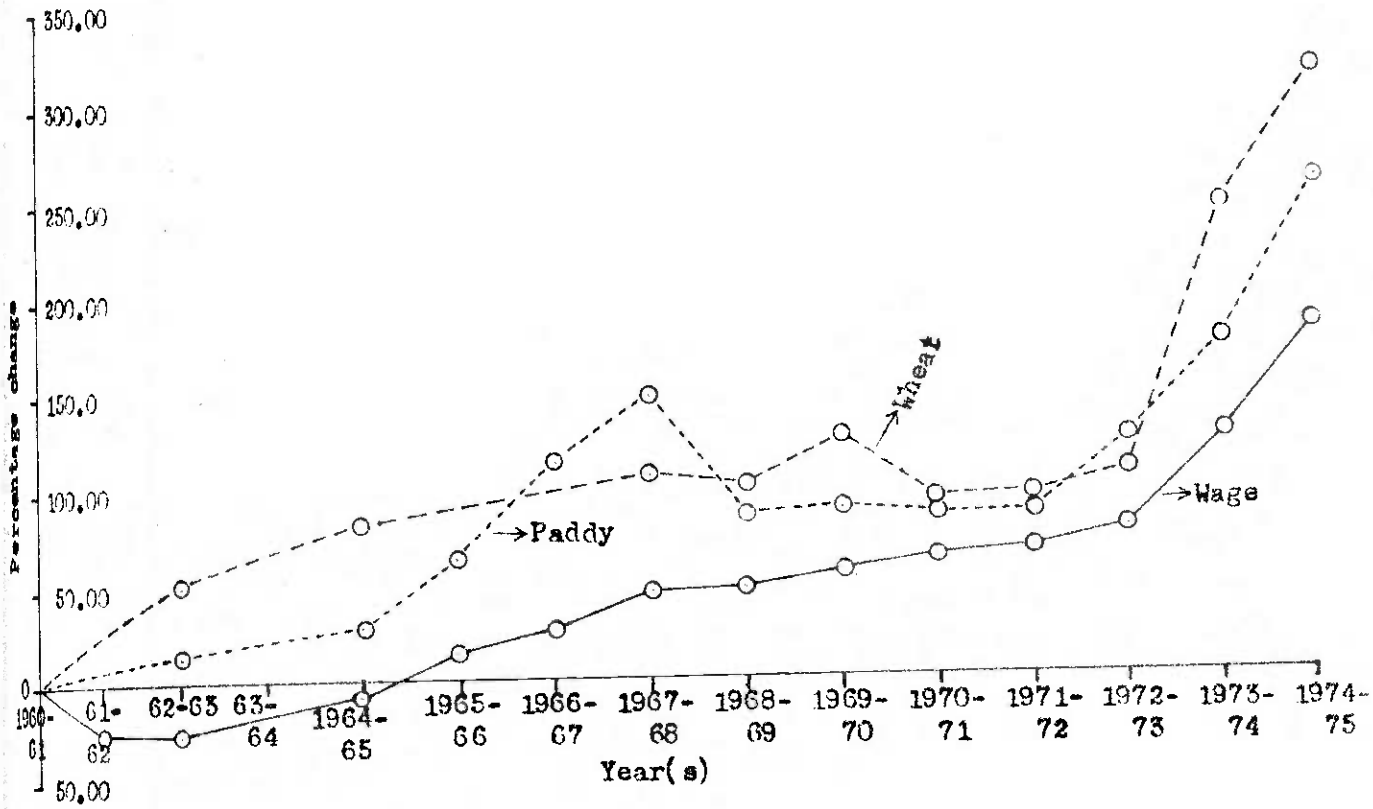
Diagram 4.11 : Showing percentage changes of daily wage rate of male agricultural labourer and the prices of paddy and wheat for the State of Uttar Pradesh over years.



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CHAPTER 5

Different Kinds of Labour Arrangements in Agriculture

This chapter examines the different kinds of labour arrangements in agriculture on the basis of terms and conditions of employment. The exercise is presented in four sections. Section I provides a theoretical frame for examining different kinds of labour contracts in agriculture. Section II deals with the economic significance of each kind of labour contract. Section III presents some empirical illustrations pertaining to labour arrangements. Section IV presents our understanding of different kinds of labour arrangements in agriculture.

I

It has been the general practice in this country to dichotomise hired labour in agriculture into two categories, namely : (a) casual labourers, and (b) attached labourers, on the basis of the time period of the labour contact. According to this classification, the term of appointment guarantees employment for a fixed period to an attached labourer, whereas the employment offered to a casual labourer is ad hoc. This classification is largely followed in our Official Statistics. However, a close scrutiny of the secondary source literature on agricultural labour reveals that there are several dimensions to the terms and conditions of employment of agricultural labour which calls for a more meaningful classification.

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Thus, there is the time basis of payment, that is, whether payment to the labourer is made daily, monthly, seasonally, annually or if no time is involved, payment being made on a 'piece rate' or 'share rate' basis. Then there is the duration of the contract for employment namely, whether it is valid for a day, a month, season, a year or for an indefinite period. The medium of payment is another piece of classificatory information : wage may be paid in cash or in kind or in a combination of the two or in a share of the crop. Then there are different aspects of dependence, namely, dependence through consumption loans, non-consumption loans, allotment of homestead or rent free land, engagement of other members of labourer's family by the same employer etc. In the matter of wages, one can distinguish wages that are paid according to some market rates from payments that do not correspond to any such market rates, and both from payments made merely to assure family subsistence. Nature of obligations done can also be taken into account : if the labourer does only certain specified jobs or if there are no such boundaries.

These different aspects of employment can be treated as so many co-ordinates to yield a framework which may be presented as follows :

Co-ordinates		Elements on the co-ordinates
(a) Basis of Payment	:	daily, monthly, seasonally, annually, piece-rate contract, share wage contract, etc.
(b) Duration of Contract	:	day, sequence of days, season, year, indefinite period, etc.
(c) Medium of Payment	:	cash, kind, meals, etc.
(d) Dependence/Attachment	:	consumption loans, non-consumption loans, homestead, rent-free allotted land, employment of worker's family members by the same employer, etc.

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(e) Nature of Obligation : different kinds of work specification, absence of any such specification, etc.

(f) Wages : uniform wage, non-uniform wage, family subsistence, etc.

Various combinations of the elements of the different co-ordinates can thus map the different labour arrangements in agriculture. Each co-ordinate and each element of the co-ordinates have their own economic significance individually and in their combinations with each other. We may now turn to discuss them.

II

We shall start our discussion with the co-ordinate, 'basis of payment'. There are empirical evidences that different types of payments viz., daily, monthly, seasonally, annually etc., are made by employers to labourers. In different farming operations beginning from manuring and levelling of field to harvesting and carrying of crops, farmers use different kinds of labour contracts in terms of different time basis of payments. No particular basis of payment is uniformly followed for any operation. The relative importances of different types of payments vary in different seasons and for different operations. For example, in the lean seasons when labourers are engaged not continuously but only from time to time according to the exigencies of work, employers may prefer to make daily payments for such types of work as levelling and manuring of fields, repairing cattlesheds and houses, marketing of products etc. Since employment opportunities in the lean seasons are comparatively low, labourers may also prefer daily payments.

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Employment opportunities and daily wage rates in the busy seasons (i.e., ploughing and harvesting seasons) are comparatively higher and work in these seasons has often to be finished speedily. It may, therefore, be economical for a farmer to engage labour on a piece rate basis i.e., to pay a lump sum of money or grains for the completion of an operation. Labourers also prefer these types of contracts in the busy seasons because of the fact that after completing a piece of work for a particular employer, they can search for fresh contracts.

The medium of payment may also vary according to the nature of agricultural operations. In the harvesting season wage is frequently paid in terms of a lump sum of grains or a portion of the crops harvested. The component of cash is often higher in other seasons of agricultural operations. It is economical for a farmer if wages are paid mostly in cash in the seasons such as for ploughing, weeding, transplanting etc., when the prices of crops are relatively higher than during the post-harvesting period. But cash wages are not economical for labourers in view of the fluctuating foodgrain prices. It is, therefore, not to be surprised at that wages are paid by employers in a mixture of cash and kind.

The following combinations of the elements of the two co-ordinates discussed so far may be taken as satisfying the interests of both employers and labourers : (a) 'Day' as the duration of employment contract for different kinds of 'farm and non-farm' work in the lean seasons of agricultural operations, payment to the labourer being made 'daily' in terms of both 'cash and kind' wages; (b) 'Month' or 'season' as the duration of

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employment contract in the busy seasons of agricultural operations, payment being made at piece rate or for the entire period to be paid together of crops harvested on a percentage basis.

We may now turn to other combinations by considering the labourer's need for job security and the employer's need for a dependable and readily available source of labour supply. The element 'annual' of the co-ordinate 'duration of contract' plays an important role to meet the interests of both employers and labourers. The yearly contract for employment ensures the labourer a fixed income and the employer a fixed source of labour supply for a whole year. Under this type of contract, labourers are expected to perform all the operations of farming throughout the year. Not infrequently such labourers are also made to attend to non-farm activities including household chores for the employer. This diversification in activities may affect the payments made by the employers to the labourers and give rise to diversification in the wage rates applicable to such workers. Monthly or annual payments are made by employers to such labourers who generally perform all the labour operations of farming throughout the year, indulge also in non-farm activities and who often get a part of their payment in terms of share of the produce. On the other hand, daily payment in terms of a mixture of cash and kind wages is more frequently paid to those labourers who perform only farm activities. It sometimes happens that the duration of the employment contract is valid for a year, but payment is made everyday. Thus, daily meals are provided and in addition, they are paid some daily wages in terms of cash or kind or both.

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Common sense suggests that the majority of labourers would prefer longer duration contracts to shorter duration ones. But the employment situation in the agricultural sector does not always offer labourers any choice in the matter. Size of holding is an important consideration in employing a labourer for a whole year. It is big and medium landlords who employ such labourers and the extent of their doing is hardly enough to absorb even a small portion of the total rural labour force. It is thus unavoidable that the larger part of the rural labour force will either be employed on daily or short duration contracts or be unemployed.

The overall employment situation in the countryside keeps labourers in general at a disadvantageous position in relation to landlords or employers. Landlords take full advantage of the economic difficulties of the labourers, and they frequently push annual labourers into unequal relationships of dependence. Thus the employer may provide consumption loans or wage advances to the labourer which are to be repaid by the latter during the harvest season in grains and in labour. Apart from consumption loans, temporarily allotted homestead land or cultivable land is also a means of making for such dependence. The labourer's dependence on the landlord is often re-inforced by other members of their families working for the same landlord.

Combination of annual duration of contract with such dependence provides for an arrangement in which the labourer's need for getting his minimum means of subsistence and the employer's need for secured

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labour supply are intertwined. This type of attachment of a labourer with an employer may continue over years. This can be explained by at least two reasons. One reason is that a labourer can earn the confidence of his employer by devoting sincere efforts to cultivation and domestic services for the employer. In the process, an informal family relationship develops between him and the employer which may last even after the death of both.

The other reason is that the all too frequent indebtedness of the labourer to his employer makes him remain in his employment till the debt is repaid. Relatively big debts are most often incurred by labourers in connection with marriages and other social functions. Employers provide loans to labourers on such occasions on the condition that the latter will serve as a farm servant for the former so long as the loan would remain unpaid. Exorbitant rates of interest are frequently charged on such loans so that the labourer can hardly repay. In this way, debts get accumulated over the years and the labourer gets compelled to bind himself to a particular employer for an indefinite period i.e., becomes a bonded labourer.

In this kind of situation, it is quite possible that the working conditions of the labourer are completely decided by the employer. For example, the labourer may be bound to do all sorts of farm and non-farm work of the employer and when necessary, his family members may also be engaged in such work for nominal wages. The very concept of wage payment may get submerged under a nebulous concept of assurance of family subsistence.

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We may now turn to describe some of the different types of labour arrangements actually observed by combining different elements of the different co-ordinates mentioned above.

III

The empirical cases presented here by way of illustration have been obtained from available secondary sources. A number of studies published in the Indian Journal of Agricultural Economics, 1948, Vol.3, No.1, may be considered as the key reference for our purpose. Other sources like, Agricultural Wages in India, published by the Government of India in 1952; Land and Labour in India, a study by Thorner made in 1962; some micro studies published in the Economic and Political Weekly during recent years — are also useful references for our purpose. The evidences presented here are of course fragmentary, but they are helpful for understanding the way combinations of the elements of the different co-ordinates take place in real life.

Thus, the common type of 'casual labourers' of our Official Statistics are employed by employers on a daily basis of payment in terms of both cash and kind. But there are other types who are employed for the period of completion of a particular agricultural operation and are paid a specified sum of cash and a specified quantity of foodgrains or are paid a specified share of crops harvested, particularly in the harvesting season.

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Terms and conditions of employment of the latter type of casual labourer are found to vary very largely from area to area. For example, in the tea growing regions comprising the districts of Lakhimpur and Sibsagar of Assam, some workers are engaged for a period of one to three months in the busy agricultural seasons and are paid monthly wages in cash. Some labourers called Munish in the Santal Parganas of Bihar are similarly employed for a period of two or three months in the busy seasons, but payment is made to them on a piece rate basis for specified pieces of farm work in terms of both cash and kind. Workers called Dina Coolie or Coolivadulu in the erstwhile Madras Presidency were reported as being engaged either on a time basis or a piece rate basis. Piece rates and share rates were reported to be common for harvesting and threshing; piece rates are current also to a small degree for transplanting and manuring. Payments were mostly made in cash for ploughing, embanking, harrowing, manuring and sowing but for other operations the workers are paid either in cash or in kind. In the Mayurbhanj district of Orissa, a system prevails of labourers being employed for a sequence of days in each season, but wages being paid on the same terms as day labourers[1/].

We may now turn to instances of combinations of terms and conditions involving 'a year' as the duration of the contract for employment. Labourers employed for a year are found in almost all the regions

1/ Examples of systems provided here are based on the data of the 1950s and some of them might no more be in practice. If the appropriate data particularly for the recent decades would have been available, more examples could have been provided to understand the phenomenon comprehensively.

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of India, but terms and conditions of contract may be found to vary from one group of labourer to another as also from place to place. Some examples are provided below.

In the district of Birbhum, West Bengal, labourers who are employed for a period of one year are called either Mahindar or Krishan, depending upon their other conditions of employment. The main distinction between the two categories lies in the co-ordinates 'basis of payment' and 'medium of payment'. Mahindars are paid monthly or annual fixed wages in cash and kind, whereas the Krishans are paid in terms of a share of the produce at the end of the agricultural operations and therefore exclusively in kind. Other conditions of employment relating to these two types of labourers are more or less similar. For example, consumption loans are usually given by the employers to both the types of labourers which are repaid during the harvest time. The Krishan usually performs labour operations of farming throughout the year and when necessary, he has also to attend to the domestic work of his employer. Similarly, the Mahindar performs both farm and non-farm work (including household chores) for his employer.

We have more examples from the regions of Tamil Nadu, Orissa, Punjab and Uttar Pradesh but referring to the fifties. In some parts of Tamil districts, labourers called Padiyal or Pannial are both employed for a year but they differ from each other in other conditions of employment, viz., basis of payment, medium of payment, nature of work, wages, and the nature of dependence. The Pannials were (reported to be)

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often paid monthly salary mostly in cash and provided with quarters in the farm close by the cattleshed as they have to look after the cattle and the kitchen garden. On the other hand, the Padiyals were reported to get a daily allowance and the medium of payment was both cash and kind. Besides, it was customary for a Padiyal to get for his own exclusive use a small piece of cultivable land from his employer. Usually the Padiyal's wife and sons would not go elsewhere for work if there should be work on the employer's field or house. The Padiyal would perform all sorts of farm work and when necessary also attend to the domestic work of his employer. For both Padiyals or Pannials taking of consumption loans from the employer was quite common.

In Orissa, it is interesting to note the terms and conditions of employment of two types of annual labourers : the Kothias or the Halias and the Chakirias. The Kothias and Halias are allowed a piece of rent-free land. The employer bears the entire cost of cultivation (except in the Puri district where the cost is borne by the labourer) and bears the tax on land or the land revenue. Kothias get four meals a day. In the initial four months of the contract, they are not permitted to serve any other employer but afterwards they may seek casual employment elsewhere if their regular employer does not have any work for them. Interest-free loans are also granted to these workers. In the case of the Chakirias an annual wage is paid in cash in some instalments. It is also customary to give them paddy of the equivalent value instead of paying the yearly wage in cash. In addition, they are allowed some perquisites in the form of daily meals, pair of dhotis a year etc.

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Similar conditions apply to the annual labourers locally known as Sajhis or Siris in almost all the districts of Punjab. These labourers often get a part of their payment in terms of a share of the produce, and the rest of the payment is received in terms of daily food. They are allowed consumption loans or wage advances repayable at the harvesting season (or earlier).

Annual labourers called Harwahas in Uttar Pradesh, Bhagelas in Hyderabad, Saldars in Maharashtra etc., are employed under more or less similar terms and conditions as described above. They are generally allotted a small piece of rent-free land the produce of which constitute their remuneration. Consumption loans are very common, which are repaid out of the produce of the allotted land. Homestead is sometimes provided to the labourer's family. In such a case the family members of the labourer are expected to do work for the employer either in his field or in his household.

We shall now take note of some instances with duration of indefinite periods of labour arrangements. The labourers known as Halis in South Gujarat, Kamias or Jans in Bihar, Pannaiyals in the Tanjore district of Tamil Nadu, Chanamalus in the Guntur district of Andhra Pradesh etc., can be treated as specimens of such arrangements. Empirical evidence relating to these types of labourers shows that indebtedness is the basis of such arrangements. For example, in Bihar, a Kamia or a Jan takes loans from a landlord for meeting the expenses of his own marriage or the marriage of a family member. In return he agrees to work for the landlord

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at a reduced wage till the debt is discharged. In fact, the debt grows from year to year necessitating his attachment to the same employer to continue over years. The Hali system of the Surat district of Gujarat represents another way of debt accumulation. In most cases, he takes a part of his wages in advance or borrows money from his employer on condition that he would repay it from his share of the crops at the harvest time. Not infrequently the harvest is poor and he is not able to pay back the advances. Thus, the worker is obliged to work for his employer over an indefinitely long period.

The Pannaiyal system of the Tanjore district of Tamil Nadu is another example of debt-bondage. In this system, the engagement starts with the grant of a loan by a landowner to a man who agrees to serve as a farm servant as long as he is indebted. He is paid practically no wages but is given only three meals a day. Thus, his only chance to escape his master is to borrow from another master on the same conditions to repay the former master.

A variant form of this relationship is that of the Chanamalus of Andhra Pradesh. Under this system, a farmer leases out a certain amount of land to his servant on certain conditions which are more favourable to the latter than are usual for ordinary tenants. In return the servant agrees to serve the employer year after year.

There are various other elements of attachment associated with the indefinite duration labour contract. One is the allotment of land to the labourer by the employer as in the cases of Halis and Pannaiyals. The labourer living in homestead provided by the employer

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is so important in these systems. Similarly important is the practice of labourer's family members working for the same employer. No fixed wages are paid to these types of labourers and payments are only made towards family subsistence. Also, there are no defined working hours and no specifications of work to be done by them.

A fairly large-scale survey in Eastern India conducted in 1975-76 provides data about different aspects of various types of labour contracts (see for details, Bardhan and Rudra [1978]). The study distinguishes the two principal types of labour contracts, viz., casual or daily contracts and annual contracts. The data show that the practice of taking consumption loans from the employer is quite common to both of them. Loans taken by the labourers are occasionally interest-free; sometimes interest is charged by way of wages paid being lower than the market rates.

Comparing these data with those prior to the periods 1960s, a trend of change in the terms and conditions of labour contracts can be located. The recent survey data indicate that loans taken by labourers do not in general lead to any long-term bondage relationship of the kind that was common in earlier periods[2].

IV

Our foregoing discussion suggests that labourers in agriculture cannot be divided into 'casual' and 'attached' or 'free' and 'bonded' labourer with much logical justification or with any analytical advantages. One can think of two poles of labour arrangements which may be treated

2/ For further details see Breman [1974], NICD [1975], Chattopadhyay [1979a]

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as "totally free" and "totally unfree". In between these two poles there are different kinds of labour arrangements involving different degrees of freedom or lack of freedom.

Totally free labourers have the following characteristics. Duration of the contract : a single day; payment is made daily in terms of both cash and kind. Wages are paid according to ruling market rates.

Totally unfree labourers have by contrasts the following characteristics. The employment extends over an indefinite period; payments do not correspond to any uniform time rates but are adjusted so as to assure family subsistence. Attachment is secured through consumption loans, non-consumption loans, rent-free land, homestead, employment of other members of labourer's family by the same employer etc. There are no specified boundaries to the kind of work to be done by the labourers.

Not only daily labourers but also seasonal labourers such as Munish of Bihar, Dina Coolie of Madras and migratory labourers of different regions may be placed under the "totally free" category. On the other hand, the perpetual debt bondage labourers known as Hali in South Gujarat, Kamia or Jan in Bihar, Pannaiyal in Tamil Nadu are obviously to be placed under the "totally unfree" category. There are labourers of various intermediate categories not belonging to the two pure extreme types. They are not totally free because of the fact that they are to a certain extent dependent upon their employers for consumption loans, homestead, rent-free land etc. But conditions of employment of these labourers are not such as to make them tied to a particular employer/creditor for an indefinite period.

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CHAPTER 6

Variations in Wage Rates of Different Kinds of Labourers in Agriculture

This chapter seeks to present some quantitative results regarding the variations in wages received by different kinds of hired labourers in agriculture. The results are presented in four sections. Section I compares the wage rates received by male and female hired labourers. Section II compares the wage rates received by casual labourers and annual farm servants. Section III compares the wages of purely wage earning labourers with the remunerations received by tenants. Section IV compares the standards of living of labourers and tenants.

I

Comparison of Wage Rates for Male and Female Labourers

A comparison of the data for 1956-57 and 1964-65 contained in the Rural Labour Enquiry Report (1964-65) shows a tendency of wage rates being lower for female hired labourers than for male hired labourers in different farming operations. In this context it is interesting to note that in many regions demand for female labour seems to be higher than the demand for male labour for certain specific agricultural operations such as transplanting, harvesting etc. (see, Farm Management Studies : Madhya Pradesh 1956-57; Maharashtra 1967-68; Assam 1968-71). Male labour is not considered as a substitute for female labour for these agricultural operations at least

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in the regions cited above. It might have been expected that the wage rates of female labour in these seasons would be higher than that of male labour. But such differences are not reported in the Official Statistics like, Agricultural Labour Enquiry/ the Agricultural Wages in India.

With a view to appraising the situation more clearly we have taken up analysis of wage rates of male and female casual labourers on the basis of the disaggregated data of the Farm Management Survey for the region of Nowgong (Assam) for the agricultural year 1968-69. The results of our analysis are presented below.

These data show that employment of casual female labour is relatively high during the harvesting, transplanting and weeding seasons whereas employment of casual male labour is relatively high during the seasons of ploughing, weeding, harvesting and carrying operations. Payments made to these two types of labourers are also higher in these respective seasons. The rates at which payment is made to these two categories of labourers by farmers of different size groups are presented in Table 6.1.

It is seen that the average wage rate shows substantial variation as between different operations. Wage rates are generally high in the two peak seasons, namely the season for transplanting on the one hand and that for harvesting, carrying, threshing on the other. It is further seen that the female wage rate is higher than the male wage rate in the peak seasons, whereas the reverse is noticed in the other seasons. In fact, employment of female labour in the other seasons is almost negligible. Thus the overall wage rate for female labour turns out to be higher than that for male labour.

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Table 6.1 : Operationwise distribution of wage rate per day for casual labourers by farm size groups

(in Rs.)

Operations	Casual labourer by sex	Farm size groups (hectares)				
		0.01-1.25	1.26-2.50	2.51-5.00	5.01-7.50	7.51 & above
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Preparatory tillage and ploughing	Male	3.10	3.66	3.96	3.54	3.51
	Female	-	-	-	-	-
Sowing	Male	-	-	2.00	-	-
	Female	-	-	-	-	-
Transplanting	Male	5.07	3.91	4.36	3.95	3.31
	Female	5.42	4.44	4.48	4.13	3.86
Weeding	Male	2.80	2.09	2.25	2.03	2.24
	Female	-	2.68	2.75	-	-
Harvesting, carrying and threshing	Male	3.70	3.45	3.84	3.21	3.71
	Female	4.22	4.08	4.12	4.30	-
All operations	Male	3.67	3.28	3.28	3.78	3.19
	Female	4.82	3.73	4.12	4.21	3.86

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The operation-wise wage differences indicate that different kinds of non-substitutable labour are involved. The labour that one may hire for purposes of ploughing may be a different commodity altogether than the labour one hires for transplantation work. For purposes of ploughing one prefers the labour of male workers, for transplantation of paddy the female labour. The point at issue is that a male labourer will not be employed in the place of a female labourer and vice versa. These two kinds of labourers differ in their supply responses, and as a result their seasonal as well as operation-wise employment patterns (will be discussed at length in Chapter 9) are different. Their annual wage earnings are also different.

Now the question why the wage rate for female labour is higher than that for male labour, at least in the busy seasons, may be explained as follows. There are some operations e.g., transplanting, harvesting etc., for which landholders prefer female labour. But since the availability of female labour is rather limited because of their involvement in domestic works, employers cannot help paying them a higher wage rate.

We further see from Table 6.1 that as farm size increases, the wage rate per day of agricultural casual labourer (male or female) decreases. That is, farmers of higher size groups pay lower average wages to labourers. A possible explanation for the phenomenon may be as follows. Smaller the farm size, greater the concentration of the use of hired labourers during the peak seasons. The wage rate in the peak season being higher than in the other seasons, the average wage rate for the smaller size groups has to be higher than the average for all size groups.

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II

Comparison of Wage Rates for Casual Labourers and Annual Farm Servants

We now turn to compare the wage rates received by casual labourers and annual farm servants. We have, for this purpose, taken the Farm Management Survey data from seven states in India both for the fifties and the sixties. We have not been able to use the data for some states because of lack of complete information especially on farm servants.

There are two types of data on wages in the Farm Management Survey Reports : daily wage rate for hired casual labourers (generally male) for each and every sampled village under study and their average, and total annual payment per farm servant. The latter includes both the payments made in cash and in kind along with perquisites. The value of payment made in kind is taken as equivalent to that reported by the cultivators themselves. Also, we have from these reports employment data, i.e., total number of days worked on the farm per farm servant per year. With the help of the data relating to payment and employment, the daily wage rate of an annual farm servant can be worked out and a comparison with the average daily wage rate of casual labourers can be made. This method has been used for all the states under study except for Assam (1968-71) and Punjab (1967-70). The disaggregated holding-wise data have been used to calculate directly the daily wage rate of two types of labourers for these two states. This would however be an overestimate for the annual farm servant given that he is supposed to do work for all the 365 days in a year both

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on the farm and outside the farm. Thus, a better estimate of the daily wage rate of farm servants is obtained by dividing the total payment by 365 days.

Comparison I

Presented in Tables 6.2 and 6.3 are the results of our analysis (with the total number of days of farm work alone considered as days of employment) dealing with two time periods, a later (1962-70) and an earlier (1954-60). It is observed from Tables 6.2 and 6.3 that the daily wage rate thus calculated of an annual farm servant is higher than that of a casual labourer in the regions of Punjab, Kerala, Uttar Pradesh and Andhra Pradesh. In the regions of Orissa, Tamil Nadu and Assam, the daily wage rate of an annual farm servant is lower than that of a casual labourer. West Bengal, however, does not show any significant difference in the wage rates of these two groups of labourers.

The data permits us to draw the following conclusion. The average daily wage rate of an annual farm servant is higher than that of a casual labourer in the agriculturally advanced regions (in terms of intensive cultivation, cropping pattern, use of farm machineries etc.). The regions of Punjab, Kerala, Uttar Pradesh and Andhra Pradesh come under this category. Tamil Nadu however is not unambiguously so. In the regions which are less developed in terms of cropping pattern, intensive cultivation, use of farm technology etc., the average daily wage rate of an annual farm servant is lower than that of a casual labourer. The states of Orissa, Assam and to some extent West Bengal represent this category. A possible explanation for this pattern is the following.

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Table 6.2 : Wage rate per day for casual labourers(male) and annual farm servants for farm operations only.

(in Rs.)

States (regions)	Agricultural year	Wage rate per day for	
		Casual labourers	Farm servants
(1)	(2)	(3)	(4)
1. Kerala (Alleppey & Quilon)	1962-63 to 1964-65	2.43	3.22
2. Uttar Pradesh (Muzaffarnagar)	1966-67	2.66	3.32
	1967-68	2.89	3.56
	1968-69	2.93	3.91
3. Tamil Nadu (Thanjavur)	1967-68	2.72	2.31
	1968-69	3.02	N.A.*
	1969-70	3.05	2.38
4. Punjab (Ferozepur)	1967-68	4.64	5.76
	1968-69	4.80	5.68
	1969-70	5.68	6.16
5. Andhra Pradesh (Cuddapah)	1967-68	2.04	3.19
	1968-69	2.00	3.02
	1969-70	2.01	2.79
6. Orissa (Cuttack)	1967-68	2.44	2.30
	1968-69	2.59	2.02
	1969-70	2.72	2.08
7. Assam (Nowgong)	1968-69	3.69	3.59
	1969-70	3.70	3.83
	1970-71	4.05	3.97

*N. A. = not available.

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Table 6.3 : Wage rate per day for casual labourers (male) and annual farm servants for farm operations only.

(in Rs.)

States (regions)	Agricultural year	Wage rate per day for		
		Casual labourers	Farm servants	All labourers
(1)	(2)	(3)	(4)	(5)
1. Punjab (Amritsar and Ferozepur)	1954-55	2.46	3.55	-
	1955-56	2.56	3.89	-
	1956-57	2.79	5.25	-
2. Uttar Pradesh (Meerut and Muzaffarnagar)	1954-55 to 1956-57	1.44	1.82	-
3. West Bengal (Hooghly and 24 Parganas)	1954-55 to 1956-57	1.52	-	1.56*
4. Andhra Pradesh (West Godavari)	1957-58	0.42	-	0.98*
	1958-59	0.41	-	1.28*
5. Orissa (Sambalpur)	1958-59	0.92	-	0.69*
	1959-60	0.92	-	0.81*

* This represents the wage rate both for casual labourers and farm servants. If this value is greater than the value under col. (3), then it can be said that the wage rate of an annual farm servant is higher than that of a casual labourer and vice-versa.

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In the agriculturally advanced regions, farmers can utilise the services of farm servants all over the year for different types of operations connected with cultivation. They also press these farm servants into the more specialised farm jobs (which may be called semi-skilled work), e.g., tractor operation, mechanised irrigation, mechanised threshing etc. These functions may not be entrusted to a casual labourer. But in the regions where intensity of cropping, cropping pattern, mechanisation etc., are not so pronounced, farmers cannot utilise farm servants in productive agricultural work throughout the year and in the lean seasons, they are made to attend to the household chores of their employers. As a result, such farm servants get payment at a lower rate than the casual labourers who are employed for very specific farm assignments.

Comparison II

Presented in Tables 6.4 and 6.5 are the results of our analysis (taking 365 days as period of employment of an annual farm servant) relating to the market wage rates of the two types of pure wage earners. Table 6.4 presents data for the period 1962-70, and Table 6.5 presents data for the period 1954-57. It is observed from both the tables that the daily wage rate of an annual farm servant is in most cases lower than that of a casual labourer.

The following suggestive explanations are offered for the phenomenon. The annual farm servant is appointed by the farmer for a whole agricultural year. The term of appointment guarantees employment to a farm servant for a fixed period, whereas the employment to a casual labourer is ad hoc. The appointment of an annual farm servant ensures him a fixed cash income and daily food — the availability of which is highly uncertain in the case of a casual labourer. It may be deduced that as the security of employment of an wage labourer increases, the wage rate per day decreases.

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Table 6.4: Wage rate per day for casual labourers (male) and annual farm servants for both farm and non-farm work.

(in Rs.)

States (regions)	Agricultural year	Wage rate per day for	
		Casual labourers	Farm servants
(1)	(2)	(3)	(4)
1. Kerala (Alleppey and Quilon)	1962-63 to 1964-65	2.43	1.77
2. Uttar Pradesh (Muzaffarnagar)	1966-67	2.66	2.57
	1967-68	2.89	2.59
	1968-69	2.93	2.96
3. Tamil Nadu (Thanjavur)	1967-68	2.72	1.02
	1968-69	3.02	N.A.*
	1969-70	3.05	1.09
4. Punjab (Ferozepur)	1967-68	4.64	4.16
	1968-69	4.80	4.41
	1969-70	5.68	5.14
5. Andhra Pradesh (Cuddapah)	1967-68	2.04	1.00
	1968-69	2.00	0.96
	1969-70	2.01	1.36
6. Orissa (Cuttack)	1967-68	2.44	0.84
	1968-69	2.59	0.95
	1969-70	2.72	1.08
7. Assam (Nowgong)	1968-69	3.69	2.84
	1969-70	3.70	3.24
	1970-71	4.05	3.43

* N. A. = not available.

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Table 6.5 : Wage rate per day for casual labourers (male) and annual farm servants for both farm and non-farm work.

(in Rs.)

States (regions)	Agricultural year	Wage rate per day for	
		Casual labourers	Farm servants
(1)	(2)	(3)	(4)
1. Punjab (Amritsar and Ferozepur)	1954-55	2.46	2.90
	1955-56	2.56	3.06
	1956-57	2.79	4.11
2. Uttar Pradesh (Meerut and Muzaffarnagar)	1954-55 to 1956-57	1.44	1.02

III

Comparison of Average Daily Incomes of Casual Labourers, Annual Farm Servants and Share-Croppers

A small tenant or a share-cropper is also a part of the agricultural labour force. He can be regarded as a sort of field labourer getting a share of the produce as his remuneration rather than a time wage or piece wage. He performs all the labour-operations of farming and is appointed for an agricultural year. Thus, it may be of our interest to compare the net income (per day) of this group of labourers with the daily income of purely wage earning groups.

We have, for this purpose, chosen the Farm Management Survey data for four states in India. We have not been able to use the data for the

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remaining states for which Farm Management data are available because of their not providing the kind of information on share-cropping that is needed by our comparison. We have already discussed our method of computing wage rates for the two groups of agricultural labourers from the Farm Management Survey Reports. We propose now to discuss the method of computing the net income of share-croppers from the Farm Management Survey Reports.

For the states mentioned in Table 6.6, the data on 'output per hectare' and different cost items for cultivation (Cost A_1, Cost A_2, Cost B, and Cost C as defined by Farm Management Survey Reports) are available for three types tenure holders — pure owners, pure tenants, and owner-cum-tenants. Net income for pure tenants and owner-cum-tenants have been calculated by using the formula :

$$\text{Net income} = \text{Total output} - \text{Cost } A_2$$

$$\text{where, Cost } A_2 = \text{Cost } A_1 + \text{Rent paid for leased in land}$$

$$\text{and Cost } A_1 = \text{Total hired labour charges} + \text{Total material costs.}$$

In obtaining the net income per day of pure tenants or owner-cum-tenants, we have used 365 days (total working days) as divisor for the annual income. Presented in Table 6.6 are the results of our study.

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Table 6.6 : Comparison of income per day of share-croppers and wage labourers.

(in Rs.)

States (regions)	Years	Net income per day of		Wage rate per day for		
		Pure tenants	Owner-cum-tenants	Casual labourers	Farm servants Case I	Farm servants Case II
(1)	(2)	(3)	(4)	(5)	(6.1)	(6.2)
1. Uttar Pradesh (Muzaffarnagar)	1967-68	N.A.*	5.41	2.89	3.56	2.59
	1968-69	N.A.	4.38	2.93	3.91	2.96
2. Tamil Nadu (Thanjavur)	1967-68	N.A.	2.80	2.72	2.31	1.02
	1968-69	N.A.	6.03	3.02	N.A.	N.A.
	1969-70	N.A.	5.48	3.05	2.38	1.09
3. Orissa (Cuttack)	1968-69	N.A.	3.80	2.59	2.02	0.95
	1969-70	N.A.	3.17	2.72	2.08	1.08
4. Assam (Nowgong)	1968-69	5.15	7.38	3.69	3.59	2.84
	1969-70	3.89	6.45	3.70	3.83	3.24

* N.A. = not available.

It is seen that data on pure tenants is available only for Assam. Hence our comparisons for the remaining states are limited to the three groups, i.e., owner-cum-tenants, casual labourers and farm servants.

The salient findings of the above table are :

(a) Net income per day of owner-cum-tenants is always higher than pure wage earners of both categories, irrespective of regions and time points.

(b) There is a sharp variation of earnings of owner-cum-tenants between the regions as well as between time points.

(c) Net income per day of owner-cum-tenants is higher for those regions for those time points where the daily wage rates of casual labourers and farm servants are higher.

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The variation as between regions is understandable. Among the factors that cause this variation are the size of holding under tenant cultivation, quality of land, irrigation facilities, cropping pattern, quality of management etc. These factors occur in different combinations in different parts of the country causing the regional variation.

Now to the question of why the earnings of a share-cropper are higher than those of a wage labourer. In this context Marx's observation is both perceptive and serves as an explanation : "On the one hand, the sharecropper, whether he employs his own or another's labour, is to lay claim to a portion of the product not in his capacity as labourer, but as possessor of part of the instruments of labour, as his own capitalist. On the other hand, the landlord claims his share not exclusively on the basis of his land-ownership, but also as lender of capital" (Marx-Engels [1979]).

IV

Standards of Living of Agricultural Labourers

In this section we have computed annual and monthly incomes for each of the two categories of agricultural labourers and for share-croppers by using the simple formula of multiplying the per day income presented in the preceding sections by the number of days worked in a year. The monthly income is obtained by using 12 as a divisor to divide the annual income figures. It may be noted in this connection that our

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figures do not represent per capita income of agricultural labour households. They represent per worker earnings.

The results presented in Table 6.7 show the following :

(a) In the majority of the cases (10 out of 18), the annual or monthly income of an annual farm servant is higher than that of a casual labourer. This is true of all the states other than Orissa and Tamil Nadu. Thus, the higher daily wage rate of a casual labourer does not necessarily mean higher annual income.

(b) The disparities in income between casual labourers and farm servants are more pronounced in the regions of Orissa, Uttar Pradesh, Tamil Nadu, and Kerala than in other regions. In the cases of Orissa and Tamil Nadu, the average income of a casual labourer is higher than that of a farm servant, and in the cases of Uttar Pradesh and Kerala the picture is reversed.

(c) Annual or monthly income of a share-cropper is higher than the income of a casual labourer or of a farm servant for all the regions for which data are available. Income of a share-cropper seems to be higher in the regions of Assam and Tamil Nadu compared to the other regions.

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Table 6.7: Comparison of standards of living of casual labourers, annual farm servants and share-croppers.

(in Rs.)

States (regions)	Years	Casual labourers			Farm servants			Share-croppers		
		Daily wage rate	Annual income	Monthly income	Daily wage rate	Annual income	Monthly income	Daily wage rate	Annual income	Monthly income
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Kerala (Alleppey & Quilon)	1962-65	2.43	454.41	37.87	1.77	647.22	53.94	-	-	-
2. Uttar Pradesh (Muzaffarnagar)	1966-67	2.66	598.50	49.08	2.57	936.24	78.02	-	-	-
	1967-68	2.89	650.25	54.19	2.59	946.96	78.91	5.41	1973.55	164.46
	1968-69	2.93	659.25	54.94	2.96	1079.16	89.93	4.38	1597.32	133.11
3. Punjab (Ferozepur)	1967-68	4.64	1415.20	117.93	4.16	1520.00	126.67	-	-	-
	1968-69	4.80	1464.00	122.00	4.41	1608.00	134.00	-	-	-
	1969-70	5.68	1732.40	144.37	5.14	1877.00	156.42	-	-	-
4. Andhra Pradesh (Cuddapah)	1967-68	2.04	471.24	39.27	1.00	364.81	30.40	-	-	-
	1968-69	2.00	462.00	38.50	0.96	350.32	29.19	-	-	-
	1969-70	2.01	464.31	38.69	1.36	496.03	41.34	-	-	-
5. Orissa (Cuttack)	1967-68	2.44	624.64	52.05	0.84	305.10	25.43	-	-	-
	1968-69	2.59	663.04	55.25	0.95	347.38	28.95	3.80	1388.33	115.69
	1969-70	2.72	696.32	58.03	1.08	394.43	32.87	3.17	1155.31	96.28
6. Tamil Nadu (Thanjavur)	1967-68	2.72	565.76	47.15	1.02	372.83	31.07	2.80	1023.23	85.27
	1968-69	3.02	628.16	52.35	N.A.*	-	-	6.03	2199.68	183.31
	1969-70	3.05	634.40	52.87	1.09	398.51	33.21	5.48	2001.54	166.80
7. Assam (Nowgong)	1968-69	3.69	1095.93	91.33	2.84	1036.54	86.38	7.38	2692.80	224.40
	1969-70	3.70	1098.90	91.58	3.24	1181.21	98.43	6.45	2355.58	196.30
	1970-71	4.05	1202.85	100.24	3.43	1250.55	104.21	-	-	-

* N.A. = not available.

Note: (1) Annual income has been calculated by multiplying daily wage rate with the number of days worked in a year by a labourer. In the cases of Farm Servants and Share-croppers it is 365 days.

(2) Number of days worked by a casual labourer has been taken from Rural Labour Enquiry Report : 1963-65, p. 18.

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CHAPTER 7

Labour Input and Farm Size

One of the most interesting findings of the Farm Management Surveys in different parts of India is that total input per hectare decreases as the size of farms (measured in hectares per holding) increases. Associated with this decrease in input, there is a decrease in labour input per hectare. A number of explanations have been offered to explain this phenomenon (Mellor and Stevens [1956]; Sen [1962], [1964]; Mazumdar [1965]; Desai and Mazumdar [1970]; Bharadwaj [1974b]). The common view is that a higher intensity of cultivation involves a higher degree of labour use on small farms, and a higher degree of labour use on small farms is explained by the greater availability of family labour relative to land size. This greater amount of family labour results in higher production. This explanation originally put forward by A. K. Sen has been called 'the Cheap Labour Based Explanation' for the alleged inverse relation between farm size and productivity.

Thus, a number of issues are involved in the discussion of labour use in relation to farm size. One has to satisfy oneself about the statistical validity of the alleged relationship between farm size and productivity as well as between farm size and labour input per hectare. One has to examine the possible reasons for and the possible consequences of the phenomemon and in particular examine the extent to which the 'Cheap Labour Based Explanation' is indeed an explanation for the alleged relationship. This chapter seeks to discuss these questions with the help of fresh statistical exercises.

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I

A number of attempts have been made since the early 1960s to examine the relationship between size of holding on the one hand and gross value of output and labour input (in terms of hour or day) on the other. In this connection, the following two hypotheses have received wide acceptance (e.g., Sen [1962]; Mazumdar [1963], [1965]; Hanumantha Rao [1963], [1966]; Khusro [1968]) namely : (a) yield or output per acre decreases as farm size increases, (b) labour input per acre decreases as farm size increases. Doubts were expressed about the validity of the inverse relationship between size and productivity for the first time by A. P. Rao [1967]. This doubt was further strengthened by Rudra's analysis of individual holdings in 20 villages (Rudra [1968a]). In a follow up study, Rudra examined this relationship with the help of some aggregate data and challenged the validity of generalising the inverse relation to the whole of India (Rudra [1968b]). Sweeping generalisations regarding this relationship were indeed made by several authors in the earlier stage of the debate. Some examples are provided below.

Thus, Khusro [1968] writes : "Of particular interest are some generalisations about the relations between farm size and farm efficiency which are based upon a remarkable repetitiveness of some phenomena almost everywhere among the areas studied .....". Later he mentions as one of the generalisations : "As farm size (acreage) expands, gross output per acre declines". Similarly, A. K. Sen [1962] listed three results "found to be broadly valid in Indian agriculture", one of which was, "by and large, productivity per acre decreases with the size of holding". Dipak Mazumdar [1963] in his turn wrote, "The data presented by the Farm

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Management Survey in India have added another example to a phenomenon observed in many parts of the underdeveloped world, viz., that in peasant agriculture, as the size of farms decreases the output per acre increases". Saini [1971] wrote, "Thus, by and large, the inverse relationship between farm size and productivity is a confirmed phenomenon in Indian agriculture and its statistical validity is adequately established by an analysis of the disaggregated data" (italics added). Hanumantha Rao [1966] made such generalisation not only for yield per acre but also about some of the factors associated with it. Thus, "in all the districts studied the percentage of cultivated to uncultivated area as well as the percentage of cultivated area cropped more than once decrease sharply with increase in the size of holding. This is because among the factors, the percentage of holdings irrigated invariably declines with increase in the size of holding" (italics added). Sen [1964] who was cautious enough in the earlier stage to write : "The statistical basis of the observations around which all this controversy is centred is not really something that has been proved beyond the legitimate doubts of exacting statisticians", seems to lose that caution when he tries to summarise the position as late as in 1975 (Sen [1975]) in the following words, "Perhaps the only clear finding is that the size-productivity inverse relationship based on size-class average data is vindicated also by disaggregated inter-farm data from different villages in the same region considered together. But the picture is less clear for data within a village".

It is indeed surprising that Sen holds that disaggregated inter-farm data from different villages in the same region vindicate conclusions based

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on size-class average data. To take a view on this matter it is necessary for us to briefly recapitulate the statistical work that has been done with aggregated and disaggregated data and the conclusions drawn from them by the concerned research workers.

(1) The Farm Management reports themselves present grouped data which are not subjected to any statistical tests and the conclusions drawn by the authorities presenting the results were quite cautious : it was the economic theorists who were prone to make generalisations. Thus, the following kinds of statements occur in the study "Farm Management in India", (Directorate of Economics and Statistics [1966]): "In some of the regions like Punjab, U. P., Mharashtra, Madras, Andhra Pradesh, and Orissa, output per hectare decreases with increase in farm size" and " ..... yields per hectare and, therefore, gross income per hectare of paddy generally decrease as farm size increases in all the regions (except West Bengal and Andhra Pradesh where no definite trend is discernible)".

(2) Khusro did carry out same t-tests on straight line fits to grouped data and obtained non-significant results; all the same be permitted himself the generalisation cited earlier.

(3) The latest result released of tests carried out on grouped data are those by Krishna Bharadwaj [1974a, 1974b] who fitted logarithmic straight lines to such data pertaining to the earlier rounds of Farm Management Surveys. But her conclusions by no means lend much support to any generalisations. Her cautious conclusions are :

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(a) "Thus the inverse relation while not supported invariably, is not rejected either".

(b) "Taking the per acre yields (in physical units) of individual crops we carried out regression exercises to test the inverse relation between yield per acre and size of holding. We found that in the majority of cases there is no significant or systematic relation between the two".

(4) Rudra's [1968b] line of analysis of grouped data has been freshly applied by us, data referring to much later periods and presented in Table 7.2 in Section II of this chapter. Rudra's reservations about the universal validity of the alleged inverse relationship, based on earlier results, are strengthened by the fresh results presented in this chapter. To the best of our knowledge, nobody has till now challenged the tests based on the use of the rank correlation coefficient.

We may now turn to the exercises that have been carried out with disaggregated data.

(1) A. P. Rao [1967] fitted a logarithmic linear function to farm-level data all belonging to the same village to study the alleged relationship between farm size and productivity. His conclusion was "contrary to the findings of the Farm Management Studies, according to the present study productivity remained constant over all holding sizes in all the villages, which indicates that holding size has no effect on productivity".

(2) Rao's conclusions were confirmed by Rudra [1968b] who also used disaggregated data referring to farms within the same village. The author tested a larger number of observations and used statistical methods, which he thinks, are superior to the regression method made use of by all the others.

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(3) C. H. H. Rao [1966], Saini [1971] and Usha Rani [1971] undertook analyses of farm-level observations taken from Farm Management Survey reports. It may be noted that these observations were not confined to single villages but were drawn from a number of villages in each case. While C. H. H. Rao and Saini permitted themselves the conclusions that have been quoted earlier, Usha Rani was more cautious and her conclusions are conditional as exemplified by the following statements :

(a) "Hence one can even conclude that yield per acre remains constant over different size groups of farms".

(b) "Hence no firm generalisation can be made about the variation of intensity of cropping over different size groups".

(c) "Hence it can be said that there are no significant variations in the inputs per acre over different size groups of farms".

It may be mentioned here that Usha Rani selected only IADP districts with a view to finding out if there were any differences in this matter in the more technologically advanced areas.

(4) The most voluminous work that has been undertaken on this problem is that by Bhattacharya and Saini [1972]. In order to eliminate the effects given rise to by inter-village variations, they took Farm Management data for different villages and treated them separately and tackled them in all possible manners. Some students of the subject have formed the opinion that Bhattacharya and Saini have definitively established the validity of inverse relation obtained between farm size and productivity. This is quite wrong. The concerned authors considered only two districts namely Muzaffarnagar and Ferozepur; and about them too what they have to say is best said in their own words as follows :

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"The negative correlation between farm size and productivity is therefore clear for this region (Muzaffarnagar) in the sense that such correlation is observed within most of the sample villages and could not have arisen due to the aggregation over villages". "But, on the whole, the size productivity correlation is not at all clear for this region (Ferozepur)" (parenthesis added).

This presumably forms the basis of Sen's contention about the picture being not clear within a village. Krishna Bharadwaj, however, writes erroneously that "Saini and Bhattacharya [1972] using data on individual holdings reported statistically significant inverse relation in the majority of cases they studied".

Yet another testing exercise carried out is that of Nirmal Chandra [1974]. He carried out tests for the hypothesis that value of output per acre and labour input per acre depend on three factors namely farm size, hired labour, and tenancy. He carried out two different exercises. One was a three way analysis of variance where the three factors were (1) different farm sizes; (2) farms having more than half share of family labour in total human labour and those having less than half of family labour in total human labour; and (3) farms having more than half of land leased in and those having less than half of land leased in. He also carried out regression analyses with these three factors treated as variables. His results from these two lines of analysis are not quite consistent with each other and are not very clear. On the basis of his analysis of variance, he writes :"The results are really striking; none of the main factors are significant at all and there is no exception to this proposition". This, however, is not brone out by his regression analysis, for he indicates quite a few of his regression coefficients to be significant. We now turn to a discussion of our results.

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II

Presented in Tables 7.1 and 7.2 are the results of the application of rank-correlation tests to hypotheses regarding the declining tendency with regard to size of output per hectare of all crops, a few selected individual crops as well as certain other factors which have been suggested as explaining the behaviour of output per hectare. The tests have been carried out on exactly the same line as those carried out by Rudra in his 1968(b) paper.

Table 7.1 : Rank correlation coefficient between farm size and two indicators of farm economics (for individual crops).

Crop(s)	States (regions)	Agricultural year	Yield per hectare (quintal)	Labour days per hectare
(1)	(2)	(3)	(4)	(5)
Paddy	Uttar Pradesh (Muzaffarnagar)	1966-67	- 0.10	- 0.10
		1967-68	- 0.20	+ 0.30
		1968-69	- 0.60	- 0.30
	Punjab (Ferozepur)	1967-68	+ 0.00	- 0.20
		1968-69	+ 0.30	- 0.10
		1969-70	+ 0.60	- 0.80**
	Orissa (Cuttack)	1967-68	- 0.90*	- 0.90*
		1968-69	- 1.00*	- 1.00*
		1969-70	- 0.80**	- 0.70
	Madhya Pradesh (Raipur)	1962-63	- 0.90*	
		1963-64	+ 0.30	+ 0.10
		1964-65	- 0.10	
	Andhra Pradesh (Cuddapah)	1967-68	+ 0.50	- 0.90*
		1968-69	- 0.30	N.A.
		1969-70	- 0.80**	- 0.70
	Kerala (Alleppey and Quilon)	1962-63	- 0.07	N.A.
		1963-64	+ 0.89^{t}	N.A.
		1964-65	+ 0.00	N.A.
	West Bengal (Hooghly)	1970-71	+ 0.28	N.A.
		1971-72	+ 0.67^{tt}	N.A.
		1972-73	- 0.76**	N.A.
	Gujarat (Surat and Bulsar)	1966-67	- 0.50	N.A.

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Table 7.1 (contd.)

(1)	(2)	(3)	(4)	(5)
Paddy (improved)	Punjab (Ferozepur)	1969-70	- 0.40	N.A.
	West Bengal (Hooghly)	1970-71	+ 0.43	N.A.
		1971-72	+ 0.38	N.A.
		1972-73	- 0.57	N.A.
Paddy (different varieties) : Sali	Assam (Nowgong)	1968-69	+ 0.00	- 0.30
		1969-70	- 0.80**	N.A.
Bao	"	1968-69	- 0.90*	- 1.00*
		1969-70	- 0.90*	N.A.
Ahu	"	1968-69	- 0.50	- 0.80**
		1969-70	- 0.30	N.A.
Kuruvai	Tamil Nadu (Thanjavur)	1967-68	- 0.60	N.A.
		1968-69	+ 0.60	N.A.
		1969-70	- 0.70	N.A.
Samba CC-25	"	1967-68	- 0.10	N.A.
		1968-69	+ 0.00	N.A.
		1969-70	- 0.10	N.A.
Thaladi CC-23	"	1967-68	+ 0.00	N.A.
		1968-69	+ 0.40	N.A.
		1969-70	+ 0.90t	N.A.
Virippu	Kerala (Alleppey and Quilon)	1962-65	N.A.	- 0.30
Mundakan	"	1962-65	N.A.	- 0.10
Punja	"	1962-65	N.A.	- 0.60

contd..../-

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Table 7.1 (contd.)

(1)	(2)	(3)	(4)	(5)
Wheat (desi) : Irrigated	Uttar Pradesh (Muzaffarnagar)	1966-67	- 0.50	- 1.00*
		1967-68	+ 0.10	- 0.60
		1968-69	- 0.70	- 0.60
Unirrigated	"	1966-67	N.A.	- 0.90*
Irrigated & Unirrigated	Punjab (Ferozepur)	1967-68	+ 0.20	- 1.00*
		1968-69	+ 0.90[t]	- 0.30
		1969-70	- 0.10	- 0.10
	West Bengal (Hooghly)	1970-71	- 0.14	N.A.
		1971-72	- 0.24	N.A.
		1972-73	+ 0.05	N.A.
Wheat (Mexican)	Uttar Pradesh (Muzaffarnagar)	1966-67	- 1.00*	- 1.00*
		1967-68	- 0.10	- 0.30
		1968-69	- 0.70	- 0.50
	Punjab (Ferozepur)	1967-68	+ 0.30	- 0.90*
		1968-69	+ 1.00[t]	- 0.90*
		1969-70	+ 0.90[t]	- 0.90*
Sugarcane : Planted	Uttar Pradesh (Muzaffarnagar)	1966-67	- 0.10	+ 0.00
		1967-68	- 0.90*	- 1.00*
		1968-69	+ 0.90[t]	- 0.70
Ratoon	"	1966-67	+ 0.50	- 0.50
		1967-68	- 0.70	- 1.00*
		1968-69	- 0.10	- 0.50
Jute	West Bengal (Hooghly)	1970-71	+ 0.07	N.A.
		1971-72	- 0.07	N.A.
		1972-73	- 0.10	N.A.
	Assam (Nowgong)	1968-69	- 0.80**	- 0.80**
		1969-70	- 0.70	N.A.
Cotton (desi)	Punjab (Ferozepur)	1967-68	+ 0.60	- 0.10
		1968-69	+ 0.00	+ 0.50
		1969-70	- 0.20	- 0.50
	Gujarat (Surat & Bulsar)	1966-67	- 0.70	N.A.
Cotton (American)	Punjab (Ferozepur)	1967-68	+ 0.40	- 0.70
		1968-69	+ 0.10	- 0.60
		1969-70	+ 0.80[tt]	- 0.80**

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Table 7.1 (contd.)

(1)	(2)	(3)	(4)	(5)
Maize	Uttar Pradesh (Muzaffarnagar)	1966-67	+ 0.00	- 0.90*
		1967-68	+ 0.70	- 1.00*
		1968-69	- 0.50	- 0.90*
Maize (desi)	Punjab (Ferozepur)	1967-68	- 0.40	- 0.90*
		1968-69	+ 0.30	- 0.50
		1969-70	- 0.80**	- 0.70
Gram	Uttar Pradesh (Muzaffarnagar)	1966-67	+ 0.70	- 0.30
		1967-68	+ 0.70	- 0.90*
		1968-69	- 0.60	- 0.20
	Orissa (Cuttack)	1968-69	+ 0.50	- 0.30
		1969-70	+ 0.30	+ 0.30
Potato	West Bengal (Hooghly)	1970-71	+ 0.48	N.A.
		1971-72	+ 0.83^{t}	N.A.
		1972-73	- 0.33	N.A.
	Orissa (Cuttack)	1968-69	- 0.90*	N.A.
		1969-70	- 0.90*	N.A.
Jowar : Unirrigated	Andhra Pradesh (Cuddapah)	1967-68	+ 1.00^{t}	+ 0.90^{t}
		1968-69	+ 0.90^{t}	N.A.
		1969-70	N.A.	- 0.80**
Bajra : Irrigated	Andhra Pradesh (Cuddapah)	1967-68	- 0.90*	- 0.50
		1968-69	- 0.40	N.A.
		1969-70	+ 0.10	- 0.60

* 1 per cent significant in the negative tail area.

** 5 per cent significant in the negative tail area.

t 1 per cent significant in the positive tail area.

tt 5 per cent significant in the positive tail area.

N.A. Not available.

Note : In obtaining yield per hectare, we have used net cultivated area as divisor.

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Table 7.2 : Rank correlation coefficient between farm size and some indicators of farm economics (Farm Business as a whole).

States (regions)	Year	Total output per hectare (Rs.)	Total input per hectare (Rs.)	Labour input per hectare (days)	Average productivity of labour (Rs.)	Percentage of irrigated to total cultivated area	Intensity of of cropping	Material input per hectare (Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Kerala	1962-63	-0.25	-0.93*	-0.61	+0.14	+0.86^{t}	N.A.	
(Alleppey	1963-64	-0.25	-0.93*	-0.96*	-0.93*	+0.96^{t}	N.A.	-0.64
& Quilon)	1964-65	-0.43	-0.96*	-0.93*	+0.93^{t}	+0.96^{t}	N.A.	
2. Madhya	1962-63	-0.90*	-1.00*	-0.90*	+0.90^{t}	-0.60	-1.00*	
Pradesh	1963-64	-0.50	-0.90*	-0.60	-0.30	-0.10	-0.20	-0.80**
(Raipur)	1964-65	-0.80**	-0.60	-0.60	-0.70	-0.80**	-0.90*	
3. Gujarat (Surat & Bulsar)	1966-67	+0.00	-0.90*	-0.90*	+0.90^{t}	+0.60	N.A.	N.A.
4. Uttar	1966-67	-0.70	-1.00*	-1.00*	+0.60	+0.30	-0.70	
Pradesh	1967-68	-1.00*	-1.00*	-0.80**	+0.80^{tt}	+0.30	-0.90*	-1.00*
(Muzaffar-	1968-69	-0.70	-1.00*	-0.90*	+0.80^{tt}	+0.30	-0.90*	
nagar								
5. Tamil	1967-68	-0.90*	-0.90*	-0.90*	-0.50$_{t}$	-0.90*	-1.00*	
Nadu	1968-69	-0.70	-1.00*	-1.00*	+0.90^{t}	-0.60	-0.20	N.A.
(Than-	1969-70	-0.70	-1.00*	-0.70	+0.90^{t}	-0.60	-0.70	
javur)								
6. Andhra	1967-68	-0.90*	-0.90*	-1.00*	+0.90^{t}	-0.90*	-0.90*	
Pradesh	1968-69	-0.30	-0.90*	-0.90*	+0.80^{tt}	-0.90*	-1.00*	-1.00*
(Cuddapah)	1969-70	-0.30	-0.90*	-0.90*	+1.00^{t}	-0.80**	-0.60	
7. Punjab	1967-68	+0.90^{t}	-1.00*	-0.90*	-0.10	-0.30	-0.90*	
(Feroze-	1968-69	+0.10	-0.80**	-0.90*	+0.70$_{t}$	-0.80**	-1.00*	+0.90^{t}
pur)	1969-70	-0.30	-1.00*	-1.00*	+1.00^{t}	+0.60	-0.90*	
8. Orissa	1967-68	-0.90*	-1.00*	-1.00*	+1.00^{t}	-0.50	-0.90*	
(Cuttack)	1968-69	-1.00*	-0.80**	-0.90*	+0.80^{tt}	-0.10	-0.90*	-0.90*
	1969-70	-1.00*	-1.00*	-0.90*	-0.20	N.A.	-0.70	
9. Assam	1968-69	-1.00*	-0.90*	-0.90*	+0.20	N.A.	-1.00*	-1.00*
(Nowgong)	1969-70	-1.00*	-1.00*	+0.30	-0.90*	N.A.	-1.00*	
10. West	1970-71	+0.14	-0.24	-0.81**	+0.74^{tt}	-0.83**	-0.71**	
Bengal	1971-72	+0.62	+0.26	-0.79**	+0.93^{t}	-0.69	-0.67	-0.22
(Hooghly)	1972-73	-0.52	-0.52	-0.83**	+0.43	-0.69	-0.81**	

* 1 per cent significant in the negative tail area;
** 5 per cent significant in the negative tail area;
^{t} 1 per cent significant in the positive tail area;
^{tt} 5 per cent significant in the positive tail area;
N.A. Not available.

[Note : In obtaining output per hectare, we have used net cultivated area as divisor].

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We shall start by taking a look at the results presented in Table 7.1 regarding yield per hectare and labour input per hectare for individual crops. It is seen that one cannot discover any tendency of yield per hectare decreasing with farm size on the basis of this data. The rank correlation coefficients are mostly non-significant and they are also not preponderantly of any one sign. For most of the crops there are about as many negative signs as positive ones. The rank correlations that are significant are also frequently positive. Thus for paddy, out of 41 rank correlation coefficients as many as 17 are positive of which 3 are significantly so. Of the negative rank correlation coefficients, a larger number, namely 9 are significant. For wheat, 8 coefficients are negative with only one significant, as against 7 positive coefficients of which 3 are significant. For cotton, there are 5 positive coefficients as against 2 negative ones. Only one positive coefficient is significant and whereas there is no significant negative coefficient. The same pattern may be discerned for the different individual crops and we need not paraphrase the table any further. We have no hesitation in drawing the conclusion that there is no law of output per hectare decreasing with farm size operating for individual crops. There may be cases where a decreasing tendency holds, in others an increasing tendency holds and in the rest there are no discernible systematic patterns. In any case, there is no scope for propounding any general law .

It is, however, interesting to note from the same table that even for individual crops, smaller farms by and large apply labour

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with a greater intensity. There is a preponderance of negative signs among the rank correlation coefficients and quite a good proportion of them are statistically significant. Taking these two results together we have to draw the following conclusions. Smaller farms in almost all areas seem to devote a greater amount of labour per hectare of land not only for cultivating more crops on the same land but even for looking after a single crop. However, this greater amount of labour does not necessarily result in higher production. Presumably the larger farms while devoting less labour apply capital and other non-labour inputs at a higher rate so as to obtain the same amount of production or more than the smaller farms.

We now turn to results pertaining to all crops presented in Table 7.2.

(a) The output per hectare for all crops is negatively associated with size in all states considered other than Gujarat, Punjab and West Bengal. We would like to emphasize that it would be quite wrong to think that any decreasing tendency operates also in Gujarat, West Bengal and Punjab on the basis of any pooling of tests. It may be noted here that this indicates an important change in the agriculture of West Bengal and Punjab between the mid-fifties and the late sixties and early seventies; for as was noted in Rudra's paper [1968b] the association between output per acre for all crops and size of farm was significantly negative in these two states in the mid-fifties.

(b) However, among the states indicating negative association only in the cases of Tamil Nadu, Uttar Pradesh, Madhya Pradesh, Orissa and Assam can one talk of the tendency (for output per hectare to diminish with farm

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size) to operate all over the size range? In the case of Andhra Pradesh it seems to operate only among the smallest sizes; in the case of Kerala the tendency operates only beyond 20 hectares; in the case of Madhya Pradesh indications are that the tendency becomes reversed from 5 hectares onwards. (See Diagrams 7.1A and 7.1B).

(c) Labour input per hectare is seen to be negatively associated with farm size in all the states and, with the exception of Madhya Pradesh and Assam, seems to operate over the entire size range. In these two latter cases the tendency becomes dampened for large size groups. (See Diagrams 7.2A and 7.2B).

(d) Intensity of cropping is negatively associated with size in all the states for which information is available. An important case for which information is not available on this point is Kerala.

(e) With some important exceptions the incidence of irrigation is negatively associated with size in many a state. Most important exception is Kerala : the association was significantly positive in the mid-fifties and it has remained so in the early sixties. The proportion of land irrigated is negatively associated also in Maharashtra, Rajasthan and Gujarat. In Uttar Pradesh, the negative association was highly significant in the mid-fifties but association became moderately positive by mid-sixties.

(f) Total input per hectare is negatively associated with farm size in all the states. This was so in the mid-fifties and it has not changed after the so-called green revolution. We have on our part considered the total value of material inputs and it may be seen that the

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intensity of application declines with size in many a case but not everywhere or always. A notable exception is Punjab where in the post green revolution period application of material inputs per hectare goes up with farm size.

III

This section seeks to present some results with the help of which one may test the validity of the explanation that has generated a great deal of discussions on the 'Cheap Labour Based Explanation' advanced by A. K. Sen [1962, 1964] for the alleged inverse relationship. The results presented in this section may be treated as a follow up of the results that were presented by Rudra in an earlier work (Rudra [1973c]). The explanation is a composite one involving a number of hypotheses. Thus, we suppose that the explanation can be broken up into the following component parts:

Hypothesis :

H_1 : Farms employing exclusively family labour use labour more intensely than farms based exclusively on hired labour.

H_2 : Higher input per acre of human labour in the farms based exclusively on family labour results in higher output per acre on such farms.

H_3 : Larger the farm size higher the proportion of farms based exclusively on hired labour.

It is quite clear that if farms were either exclusively based on family labour (farms of type F) or exclusively based on hired labour (farms

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of type H) and if the three hypotheses formulated above hold true then indeed output per acre would decrease with farm size increasing. So one way of testing the validity of the cheap labour hypothesis would be to test separately for the three hypotheses. In this connection two important points of theory require to be stated even at the cost of repeating some earlier writers.

(1) Hypothesis H_2 has been so formulated as to imply the marginal productivity of labour in farms of type F to be the same for a given volume of input of labour as that in a farm of type H. Thus, as is by now very familiar, the argument is presented in terms of a marginal productivity curve which is assumed to be the same for H farms and F farms. Assuming that H farms employ labour upto the point of intersection of the line representing wage rate with the marginal productivity curve, and that F farms employ labour beyond that point, it is concluded that (a) F farms employ labour more intensely than H farms; (b) hence they produce more output per acre; and (c) this is done at the cost of a lower average labour productivity. However, there is no justification for assuming the same marginal productivity curve for F farms and H farms. If any one of these two types of farms use more of capital or other non-labour inputs or enjoy any other benefits, one of the curves would be above the other. In case the curve for H farms is above that of F farms, the latter may not give rise to higher output per acre even while employing more labour per acre. On the other hand, if the curve for F farms is higher than that for H farms by virtue of better management, better soil quality, etc., as have been suggested by many participants in the

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discussion, higher output per acre in F farms would result even if there be no higher use of labour in F farms.

(2) The second point is : it is not true that farms are exclusively either of the type F or of the type H. As a matter of fact, most farms in India — even very small ones — employ a combination of family labour and hired labour (we shall call then FH farms). Some of the critics of the cheap labour based explanation (e.g., Dipak Mazumdar [1965]; C. H. H. Rao [1966]; Bhagwati and Chakravarty [1971]) have referred to this and argued that the opportunity cost of family labour must be the same as hired labour in farms which employ such a combination. Sen, replying to Dipak Mazumdar's argument wrote : "This argument overlooks the fact that the data presented by the Farm Management Surveys are size-classes averages and do not state the position of any individual holding. Just because in the average data it is found that in each class a certain amount of hired labour is used, it does not follow that all or even the bulk of the farms in the smaller size groups use hired labour at the margin" (Sen [1964]).

It would appear from Sen's reply that he proposes to rely on the fact of smaller size groups having a higher proportion of farms of type F. Even if farms that employ a mixture of family labour and hired labour — i. e., FH farms — were to price the mixed human labour employed by them in the same way as farms of type H, Sen's argument would hold all the same as long as the proportion of F farm would decline with farm size increasing. However, the proportion of the farms of the type F is negligible in the higher size groups and not very high even in the smallest size groups so that their labour utilisation pattern cannot provide a firm basis for an explanation for the alleged inverse relation between size and productivity over the entire range of size classes. (Tables 7.3, 7.4 and 7.5).

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Table 7.3 : Proportion of H farms and F farms over size classes for Punjab : 1967-68 to 1969-70.

Size classes (hectare)	H farms	F farms	FH farms
(1)	(2)	(3)	(4)
0 - 6	0.0000	0.2673	0.7327
6 - 9	0.0227	0.0682	0.9091
9 - 14	0.1273	0.0455	0.8272
14 - 24	0.1504	0.0354	0.8142
24 & above	0.3947	0.0000	0.6053
All	0.1067	0.0933	0.8000

Table 7.4 : Proportion of H farms and F farms over size classes for Assam : 1968-69 to 1970-71.

Size classes (hectare)	H farms	F farms	FH farms
(1)	(2)	(3)	(4)
0.01 - 1.25	0.0000	0.5294	0.4706
1.26 - 2.50	0.0000	0.4752	0.5248
2.51 - 5.00	0.0372	0.2977	0.6651
5.01 - 7.50	0.0233	0.3023	0.6744
7.51 & above	0.1176	0.2941	0.5883
All	0.0244	0.3711	0.6045

Table 7.5: Proportion of H farms and F farms over size classes for West Bengal : 1971-72 & 1972-73.

Size classes (hectare)	H farms	F farms	FH farms
(1)	(2)	(3)	(4)
0.01 - 0.50	0.1982	0.1982	0.6036
0.51 - 1.00	0.2353	0.2206	0.5441
1.01 - 1.50	0.1111	0.1944	0.6945
1.51 - 2.00	0.2727	0.0909	0.6364
2.01 - 3.00	0.1905	0.1905	0.6190
3.01 - 4.00	0.4286	0.0000	0.5714
4.01 - 6.00	0.0000	0.0000	1.0000
6.01 & above	0.3333	0.0000	0.6667
All	0.2133	0.1800	0.6067

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However, we do not think that even for a mixed farms employing family labour as well as hired labour the market wage rate can be treated as the opportunity cost of family labour. Family labour and hired labour under Indian conditions are not substitutes. Human labour as a whole cannot be treated as a homogeneous commodity for which a single marginal productivity curve can be drawn. On the other hand, it is difficult to think in terms of drawing for the same farm two or more separate marginal productivity curves for hired labour and family labour of different kinds because of the operation specific nature of the different kinds of human labour and the fixed complementary relations that hold between them.

However, it appears to us that if farms of type FH would value family labour at a lower price than hired labour, then the cheap labour based explanation would require to be restated for such farms in terms of the following component hypotheses.

Hypothesis :

H_4 : Higher the farm size (of type FH), higher the proportion of hired labour to family labour.

H_5 : Higher the proportion of family labour to hired labour, higher the intensity of application of human labour as a whole.

H_6 : Higher the input of human labour (whatever its composition in terms of hired labour and family labour), higher the output per acre.

H_7 : Higher the proportion of family labour to hired labour, higher the productivity of land.

Corrolaries to the above hypotheses – given rise to by the assumption of declining marginal productivity of labour implicit all through in this line of discussion — would be as follows :

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Hypothesis:

H_8 : Higher the proportion of family labour to hired labour, lower the productivity of labour.

H_9 : Higher the farm size, higher the productivity of labour.

We shall now present some results of subjecting the above hypotheses to some statistical examinations, carried out with the help of farm level observations. As they refer to certain selected areas and certain selected time points. As such our results do not claim any definitive refutation or confirmation of the hypotheses for the country as a whole. (It has to be borne in mind, however, that practically no evidence has been put forward by anybody in support of the more crucial component parts of the cheap labour based explanation.) The data that we have used for this purpose are the disaggregated farm level observations collected by the Farm Management Surveys of Punjab, Assam, and West Bengal. Hypothesis H_9 is tested on the basis of aggregated data, collected from the different reports of Farm Management Surveys.

Table 7.6

States (regions)	Years	Hypothesis H_1 : Labour intensity higher for F farms	Hypothesis H_2: Output per hectare higher for F farms	Hypothesis H_3: Proportion of H farms higher for larger farm size groups
(1)	(2)	(3)	(4)	(5)
Punjab (Ferozepur)	1967-68 to 1969-70	Rejected (no distinct pattern)	Rejected (O/A higher for H farms)	Confirmed
Assam (Nowgong)	1968-69 to 1970-71	Undecided (no distinct pattern)	Undecided (no distinct pattern)	Confirmed
West Bengal (Hooghly)	1971-72 to 1972-73	Confirmed for large farm sizes, rejected for small farm sizes	Confirmed for large farm sizes, rejected for small farm sizes	Confirmed

Note : (1) O/A : Value of output per net area;
L/A : Input of labour per net area.

(2) Comparison of O/A and L/A as betwen F farms and H farms has been carried out graphically (see Diagrams 7.3, 7.4, 7.5 & 7.6); we have noted 'confirmed' when the graph for H farms lies below that for F farms for almost all values of A; and 'rejected' when it does not do so. The second case can be of two kinds; either the curves for H farms lie above that of those for F farms, or they do not reveal any clear pattern.

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Table 7.7

States (regions)	Years	Hypothesis H_5 : Higher the proportion of family labour to hired labour, higher the intensity of application of human labour as a whole (L/A increases with L_f/L)	Hypothesis H_7 : Higher the proportion of family labour to hired labour, higher the productivity of land (O/A increases with L_f/L)	Hypothesis H_8: Higher the proportion of family labour to hired labour, lower the productivity of labour (O/L decreases with L_f/L)
(1)	(2)	(3)	(4)	(5)
Punjab (Ferozepur)	1967-68 to 1969-70	Confirmed	Rejected (O/A goes down slightly with L_f/L)	Confirmed
Assam (Nowgong)	1968-69 to 1970-71	Confirmed	Confirmed (O/A goes up slightly with L_f/L)	Rejected
West Bengal (Hooghly)	1971-72 to 1972-73	Rejected	Rejected (no distinct pattern)	Confirmed

Table 7.8

States (regions)	Years	Hypothesis H_9 : Higher the farm size, higher the productivity of labour
(1)	(2)	(3)
Tamil Nadu (Thanjavur)	1967-68 to 1969-70	Rejected
Andhra Pradesh (Cuddapah)	1967-68 to 1969-70	Confirmed
Kerala (Alleppey & Quilon)	1962-63 to 1964-65	Confirmed
Uttar Pradesh (Muzaffarnagar)	1966-67 to 1968-69	Confirmed
Punjab (Ferozepur)	1967-68 to 1969-70	Confirmed
Madhya Pradesh (Raipur)	1962-63 to 1964-65	Rejected
Orissa (Cuttack)	1967-68 to 1969-70	Confirmed
West Bengal (Hooghly)	1970-71 to 1972-73	Confirmed
Assam (Nowgong)	1968-69 to 1969-70	Rejected*
Gujarat (Surat & Bulsar)	1966-67	Confirmed

* Labour productivity strongly decreases with farm size.

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The conclusions with respect to H_1, H_2 and H_3 are presented in a tabular form in Table 7.6. Similarly the conclusions with regard to H_5, H_7, H_8 and H_9 are presented in Tables 7.7 and 7.8. The hypotheses H_4 and H_6 seem to be confirmed for all the cases. In each table against each body of data the different hypotheses have been indicated as confirmed, refuted or undecided (i.e., neither refuted nor confirmed). The inferences have been drawn without taking resort to any statistical tests but by merely resorting to graphical analysis.

It may be noted here that for statistical purposes we have treated as F farms those for which L_f/L is greater than 0.90 and as H farms those for which L_h/L is greater than 0.90 where L_f represents family labour and L_h hired labour working on the family farm ($L_f + L_h = L$).

We may now put together our findings with regard to the different hypotheses for the three different regions as follows :

Punjab (Ferozepur):

(1) Both hypotheses H_1 and H_2 are rejected. As a matter of fact, purely hired labour based farms put in about the same amount of human labour as purely family labour based farms, whereas output per hectare on purely hired labour based farms is higher than that on purely family labour based farms (see Diagrams 7.3 and 7.4). This would imply that the purely hired labour based farms use capital and other non-labour inputs at a higher intensity than purely family labour based farms.

(2) It is, however, seen from the Diagrams 7.3 and 7.4 that labour inpur per hectare decreases as farm size goes up both for H farms and

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F farms whereas output per hectare decreases as farm size goes up for F farms only but does not do so for H farms. From these we can draw the following two important conclusions :

(a) There are factors other than cheapness of family labour which operate in Punjab to give rise to decreasing labour intensity in larger sized farms.

(b) However, decreasing labour intensity in large sized farms results in decreasing value of output per hectare with farm size only on F farms; there is no such tendency operating for H farms. One interpretation of this may be that the larger H farms use higher amounts of capital and other non-labour inputs than smaller H farms.

(3) Coming now to mixed farms — i.e., those using the combination of family labour and hired labour — it is seen from Diagrams 7.7 and 7.8 that the total labour input per hectare does indeed go up as proportion of family labour to hired labour goes up (thus confirming H_5), but this does not result in the output per hectare going up at the same time, thus refuting H_7. This is because, as seen in Diagram 7.9, the productivity of labour goes down as proportion of family labour to hired labour goes up (confirming H_8) in such a fashion as to counteract the higher intensity of application of labour with higher proportion of family labour to hired labour.

To conclude, in Punjab, the fact of the proportion of H farms going up with size and the proportion of hired labour to family labour in farms with mixed labour going up with size, results in the contrary of what the cheap labour based explanation would have; that is, output per hectare increases instead of decreasing as farm size goes up.

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Assam (Nowgong) :

Hypotheses H_1 and H_2 both fail to receive either refutation or confirmation — there being no clear pattern over the different size classes (see Diagrams 7.3 and 7.4). However, when it comes to a farm using a combination of hired labour and family labour, labour intensity goes up as proportion of family labour to hired labour goes up (Diagram 7.7), but output per unit of labour remains more or less unchanged (Diagram 7.9). This may imply that complementary inputs are increased along with the input of labour in such a fashion as to prevent labour productivity from declining. The net result is output per hectare going up as the proportion of family labour to hired labour goes up (Diagram 7.8). The case of Assam can, therefore, be treated as a case supporting by and large the cheap labour based explanation as far as mixed farms (farms of type FH) are concerned. The explanation in terms of pure H farms and pure F farms does not, however, apply unambiguously. But, it may be noticed from Diagrams 7.3 and 7.4 that output per hectare decreases with farm size for F farms and the input of labour per hectare shows a similar tendency, though much less marked. The same tendencies are not particularly discernible in the case of H farms. This, however, indicates that in the case of Assam whether or not cheapness of family labour is a factor giving rise to the inverse relationship between output per hectare and farm size, certainly there are other factors giving rise to the phenomenon.

West Bengal (Hooghly) :

In the matter of intensity of labour input as well as productivity of land, there does not seem to be any difference between F farms and

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H farms as long as the farm size is small(Diagrams 7.5 and 7.6). But, for larger sized farms, the H farms do seem to apply labour less intensely and obtain lower per hectare output (Diagrams 7.5 and 7.6). However, in farms using a combination of hired labour and family labour, neither intensity of labour input nor output per acre vary systematically with the proportion of family labour to hired labour (see Rudra [1973c]). Productivity of labour, however, does fall with a proportion of family labour to hired labour going up (see Rudra [1973c]). This suggests that farms utilising more of hired labour use more of non-labour inputs per acre. Hence, the net result is that even though proportion of family labour to hired labour goes down as farm size goes up, it is not accompanied by any decrease in output per acre. In this connection, we may further note that the labour input per hectare as well as output per hectare decreases with farm size for H farms, though they do not do so for F farms (Diagrams 7.5 and 7.6). This once again suggests that there are factors other than cheapness of family labour which give rise to a tendency of decreasing output per hectare with farm size increasing for farms based on hired labour. There must be other compensatory factors, once again other than cheapness of family labour, which prevents this tendency from operating in the case of F farms.

We may now conclude that the 'cheap labour' based explanation may possibly be the one explanation for the alleged inverse relationship where it holds, but certainly not one that is either universally valid or takes precedence over various explanations that have been advanced by other research workers.

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Diagram 7.1A : Showing output per hectare against farm size

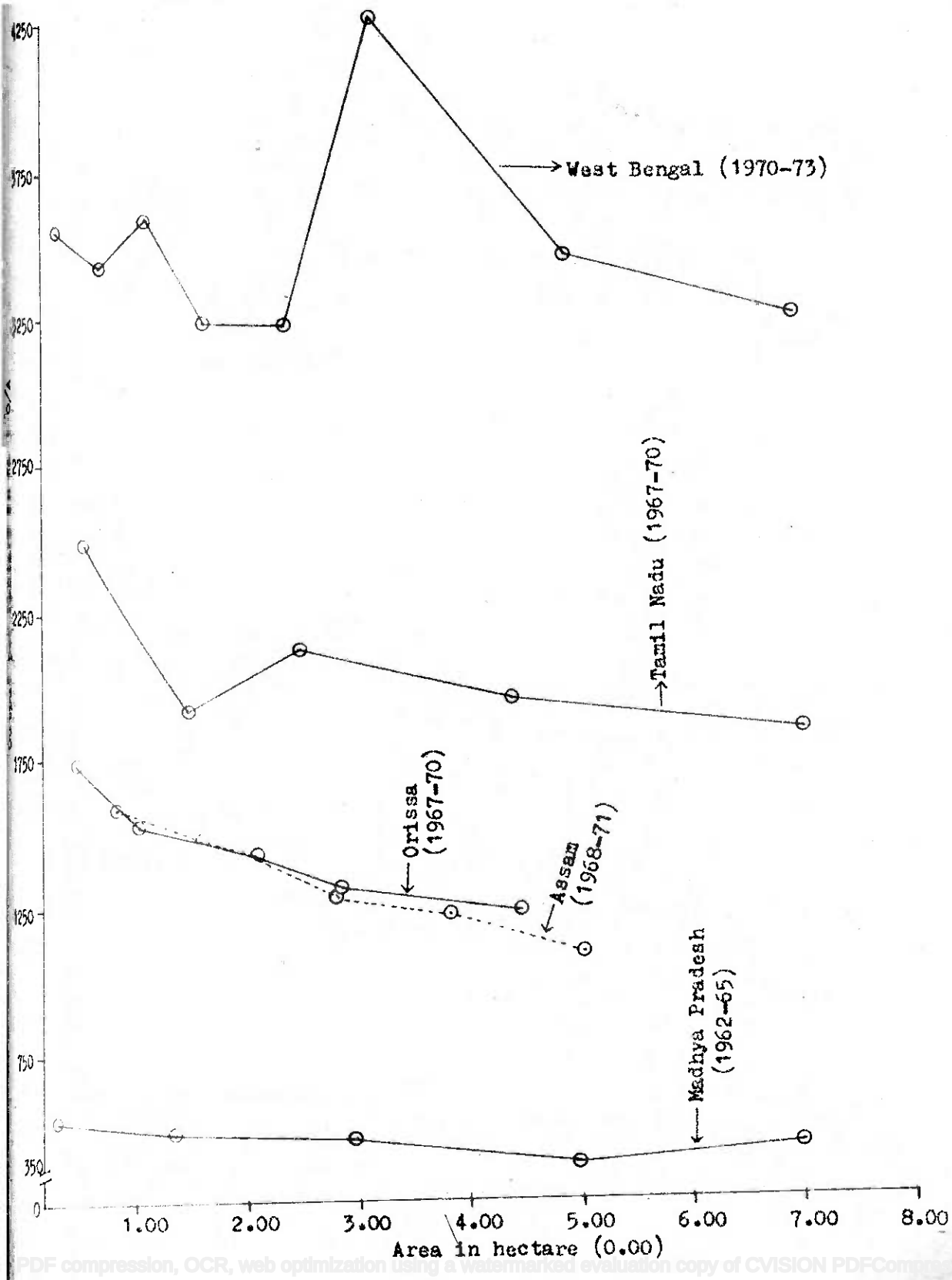

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Diagram 7.1B : Showing output per hectare against farm size

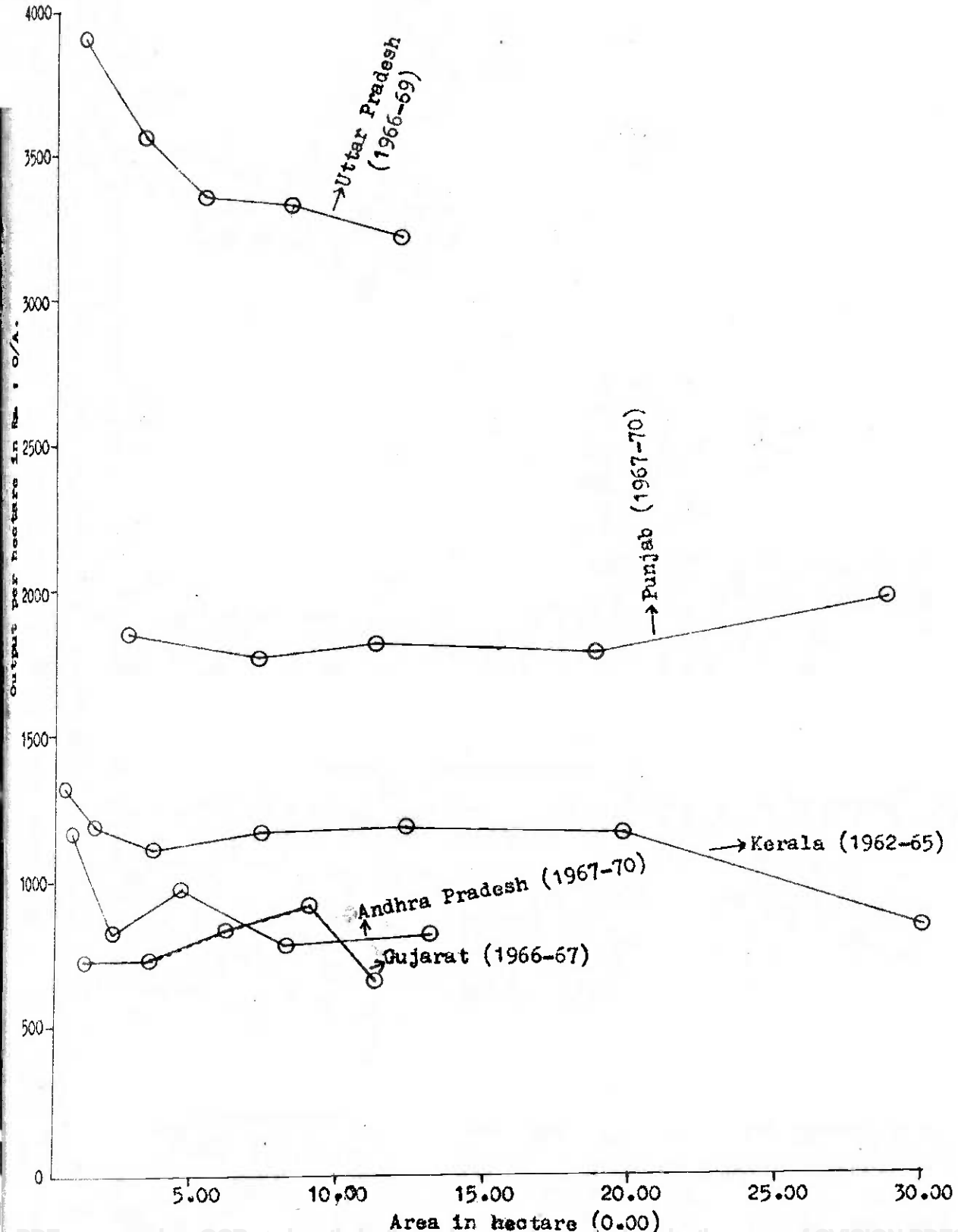

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Diagram 7.2A : Showing labour input per hectare against farm size

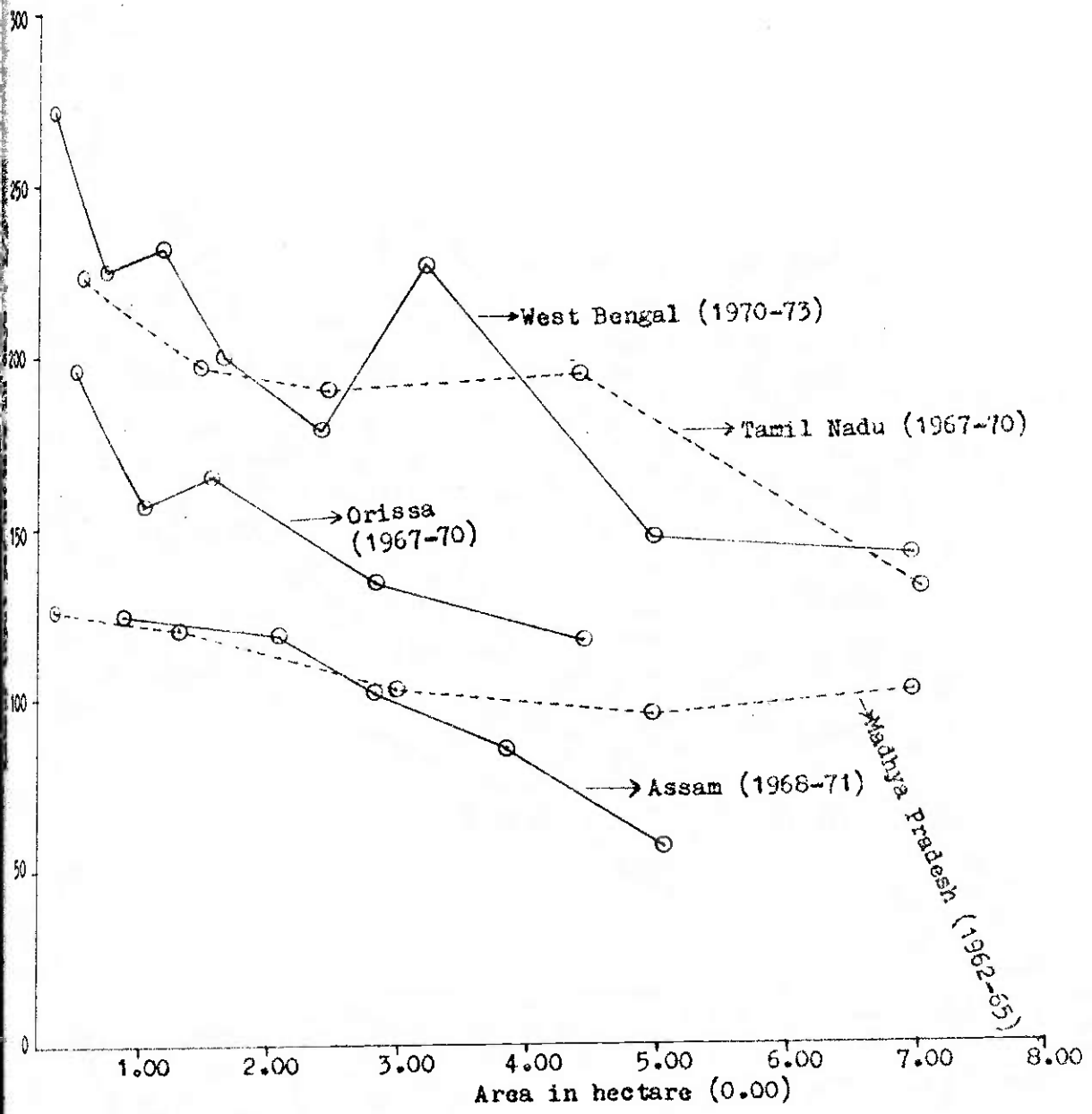

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Diagram 7.2B : Showing labour input per hectare against farm size

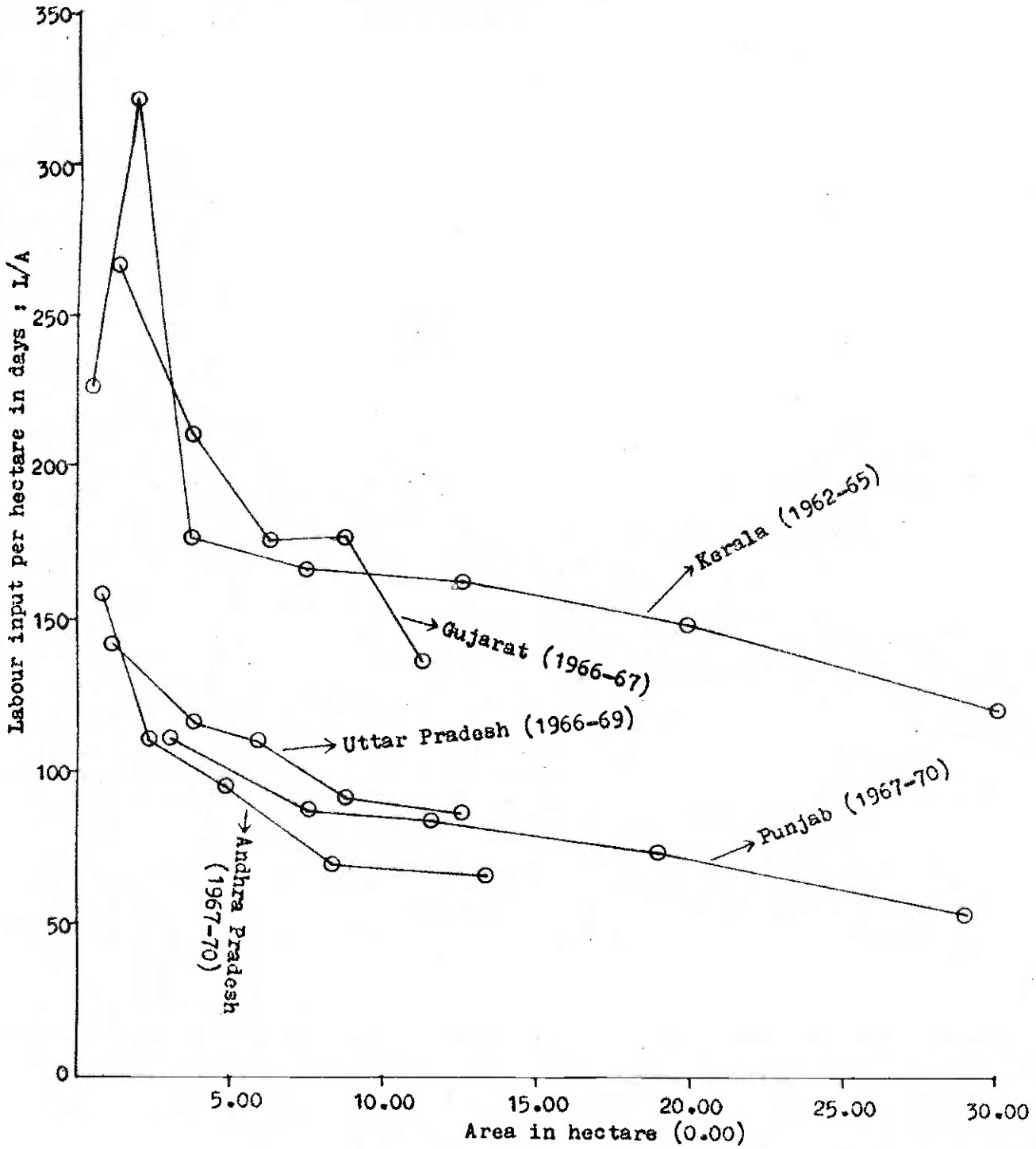

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Diagram 7.3 : Showing labour input per hectare against farm size in H farms and F farms

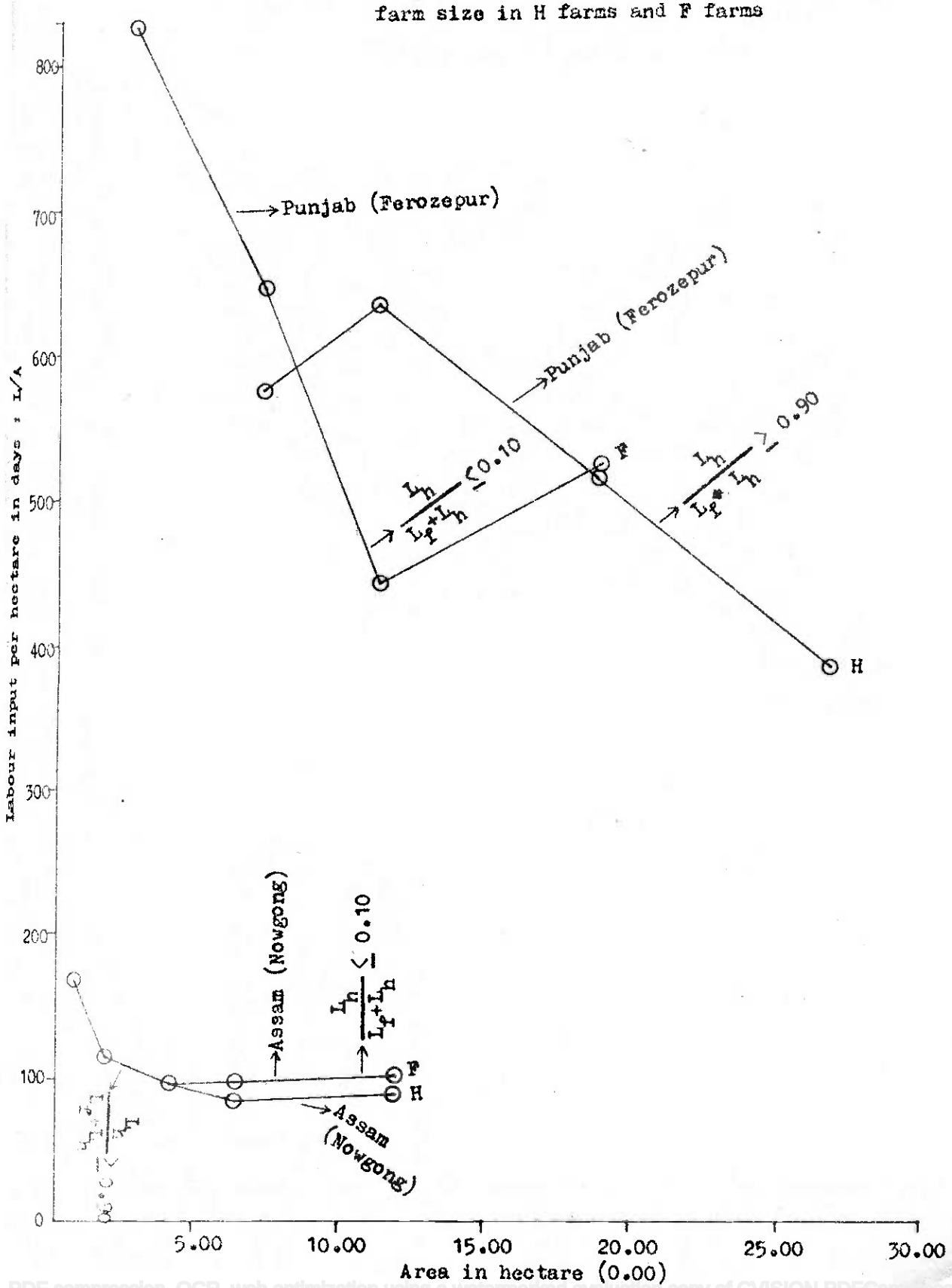

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Diagram 7.4 : Showing output per hectare against farm size in H farms and F farms

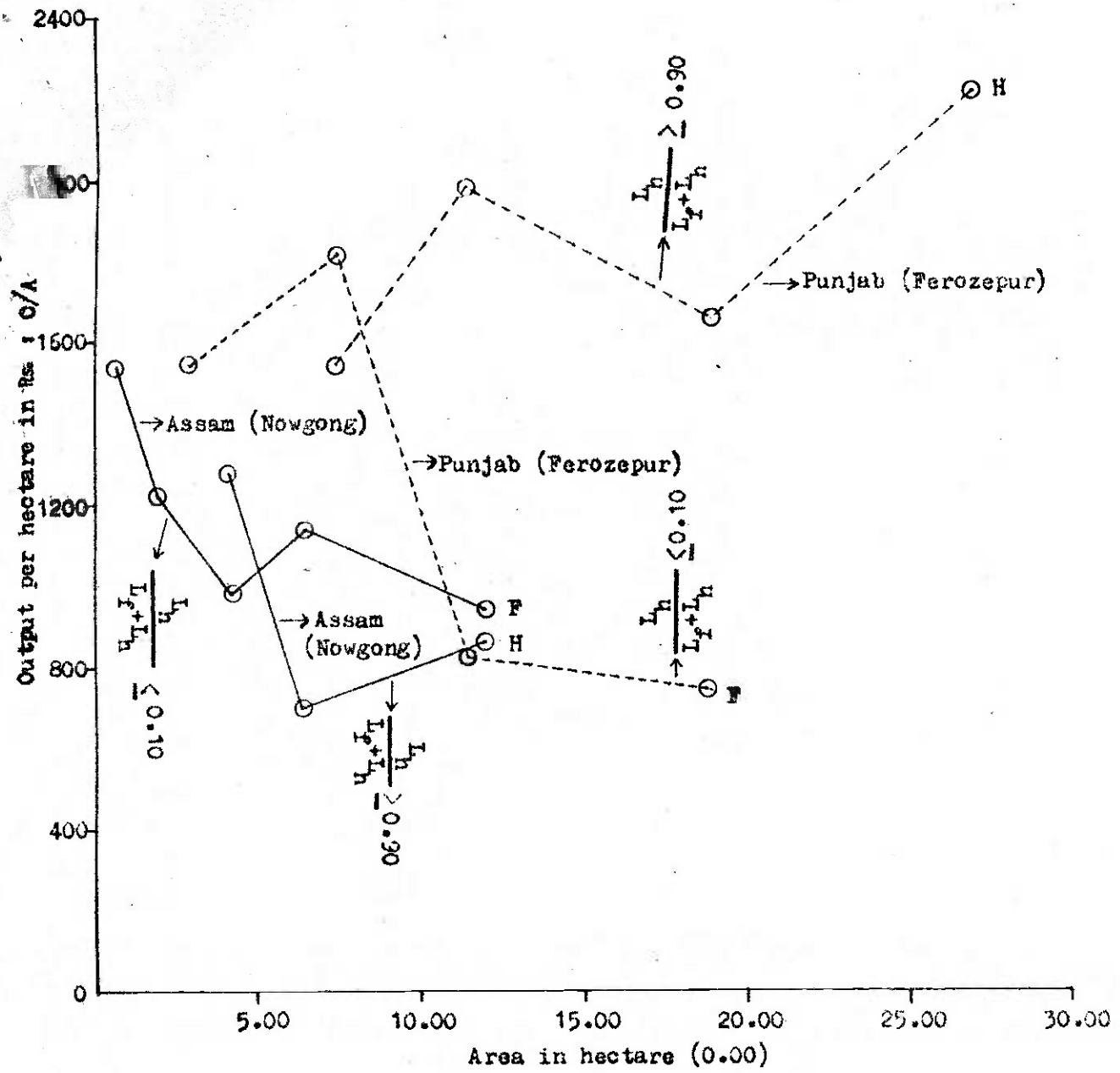

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Diagram 7.5 : Showing labour input per hectare against farm size in H farms and F farms

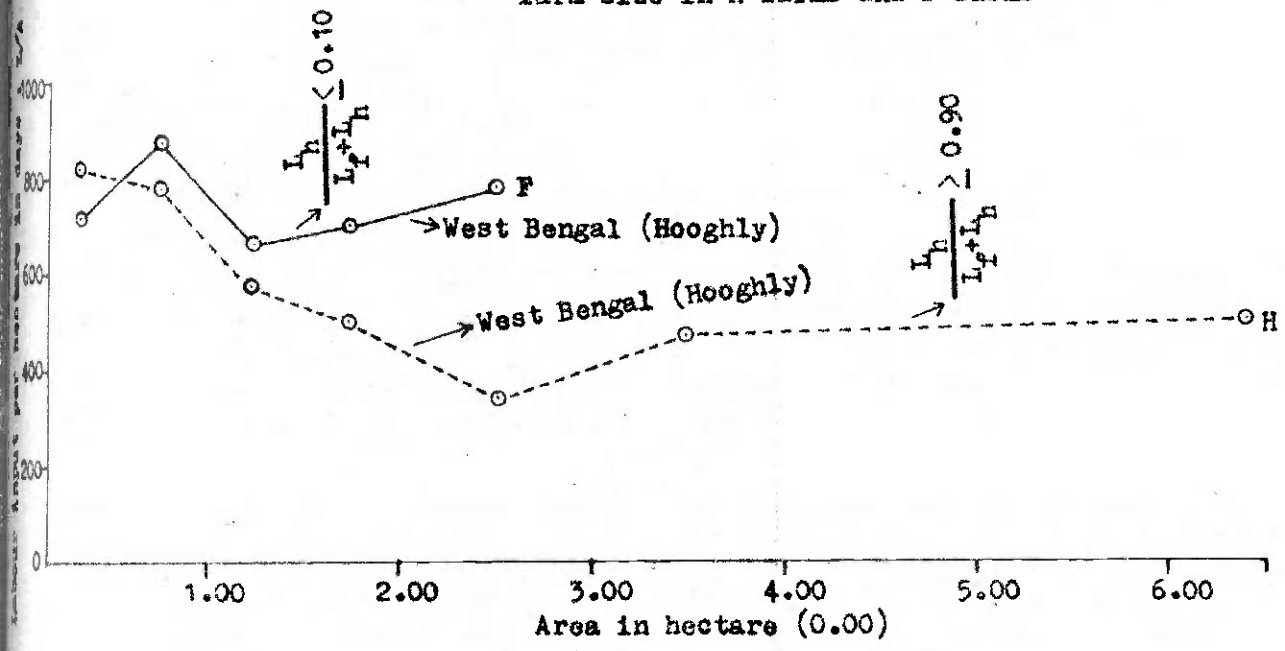

Diagram 7.6 : Showing output per hectare against farm size in H farms and F farms

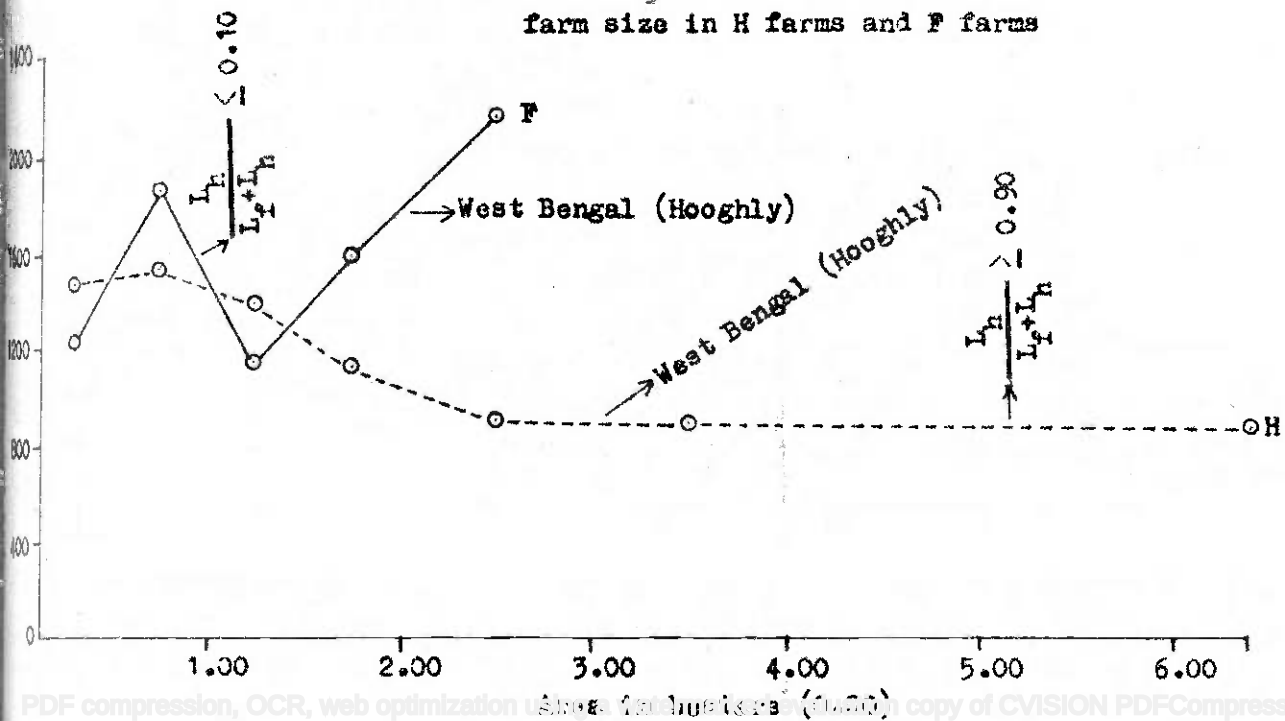

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Diagram 7.7 : Showing labour input per hectare against proportion of family labour to total labour

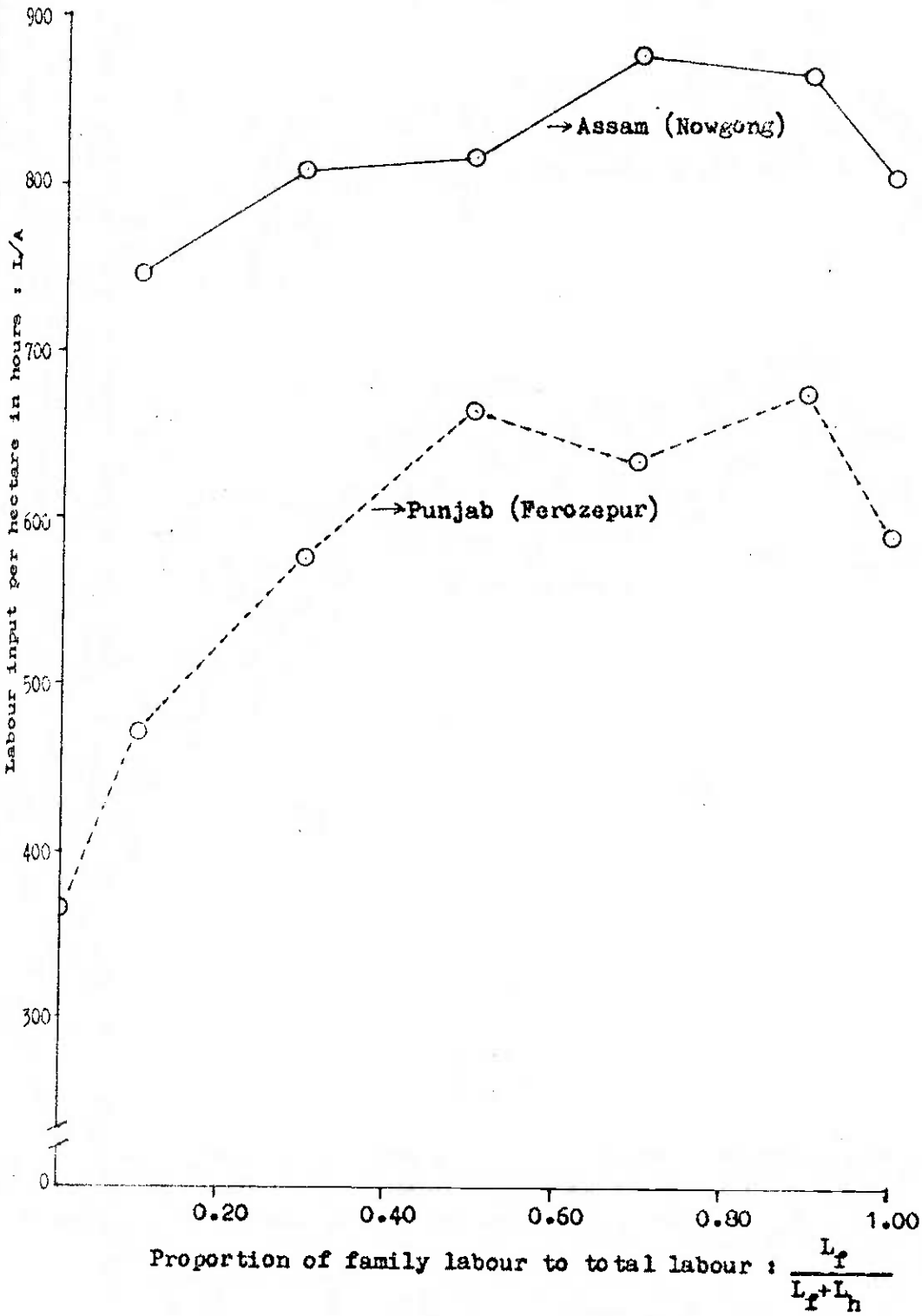

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Diagram 7.8 : Showing output per hectare against proportion of family labour to total labour

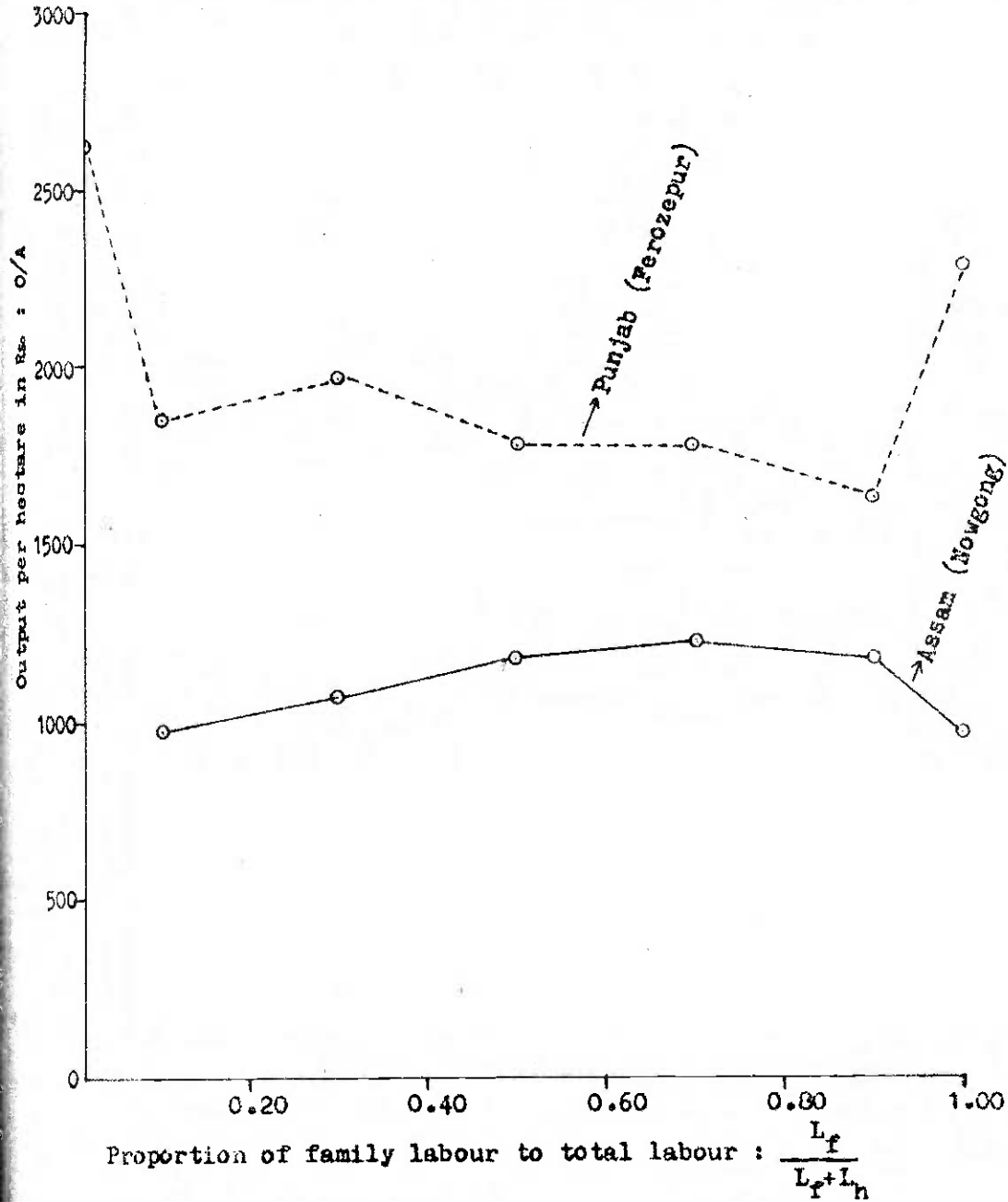

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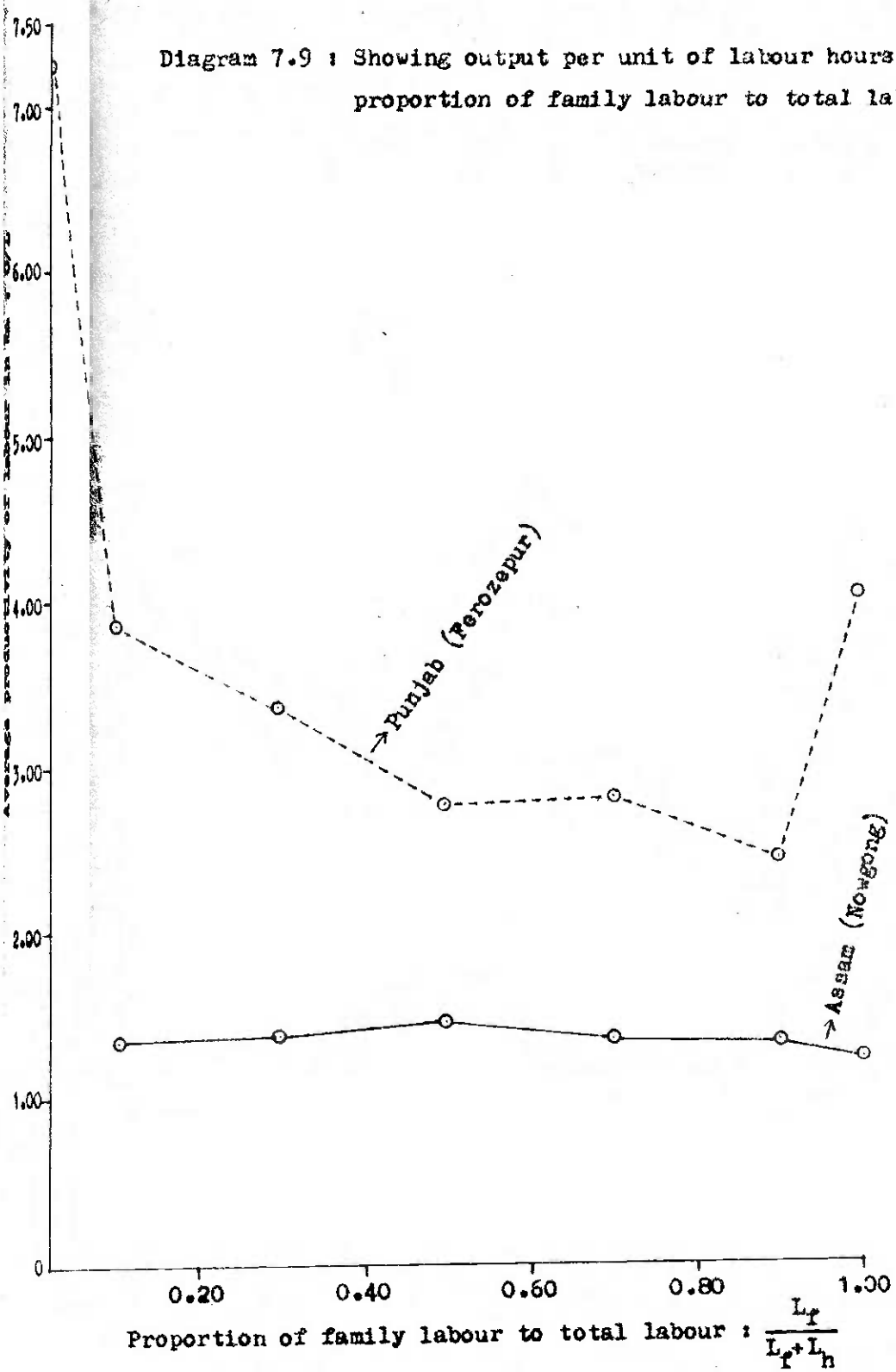
Diagram 7.9 : Showing output per unit of labour hours against proportion of family labour to total labour



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CHAPTER 8

Labour and Tenure

This chapter examines the relationship between size of holding, the intensities with which different types of labour input are applied, and output obtained under different types of tenure. The discussion is presented in two sections. Section I presents some quantitative results pertaining to the interrelations between different types of labour input and tenure. In Section II, the view of some scholars in this field are re-examined in the light of the results obtained in Section I.

I

Intensity of labour use in relation to tenancy has been analysed here with the help of three sets of Farm Management data : two disaggregated and one aggregated. Disaggregated data include two regions of India, namely, Punjab (Ferozepur) for the year 1969-70, and Assam (Nowgong) for the year 1970-71 respectively. Aggregated data include only the region of Tamil Nadu (Thanjavur) for the year 1969-70. It has not been possible to include other regions of India in this study for lack of complete information in the Farm Management reports.

We have classified the different types of tenure into three major groups indicated in the Farm Management reports : (i) Owners (possessors solely of own land), (ii) Tenants (possessors solely of land belonging to others), and (iii) Owner-cum-tenants (possessors of own as well as leased-in land). The input of human labour days, at the imputed rate of 8-hours per day, per hectare of cultivated area has been worked

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out for different types of tenure. Such inputs classified as family labour, annual farm servant, and casual labour are then distributed against each type of tenure.

Presented in Tables 8.1A, 8.1B and 8.1C are results of this distribution for the regions of Punjab, Assam, and Tamil Nadu respectively. The results show that total human labour days per hectare of cultivated area is higher in owner-cum-tenant cultivated farms than in other types of tenure for all the cases under study.

Table 8.1A : Utilisation of human labour days per hectare of cultivated area according to tenurial status : Punjab (Ferozepur), 1969-70.

Types of tenure	Family labour	Annual farm servant	Casual labour	Total	Proportion of family labour to total labour
(1)	(2)	(3)	(4)	(5)	(6)
Owners	30.03	25.97	19.78	75.78	0.40
Tenants	70.97	-	3.28	74.25	0.96
Owner-cum-Tenants	40.52	24.81	17.66	82.99	0.49
All	34.31	25.19	18.80	78.30	0.44

Table 8.1B : Utilisation of human labour days per hectare of cultivated area according to tenurial status : Assam (Nowgong), 1970-71.

Types of tenure	Family labour	Annual farm servant	Casual labour	Total	Proportion of family labour to total labour
(1)	(2)	(3)	(4)	(5)	(6)
Owners	77.88	15.13	20.90	113.91	0.68
Tenants	115.95	-	4.36	120.31	0.96
Owner-cum-Tenants	105.54	7.99	16.05	129.58	0.81
All	84.13	13.36	19.51	117.00	0.72

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Table 8.1C : Utilisation of human labour days per hectare of cultivated area according to tenurial status : Tamil Nadu (Thanjavur), 1969-70.

Types of tenure	Family labour	Annual farm servant	Casual labour	Total	Proportion of family labour to total labour
(1)	(2)	(3)	(4)	(5)	(6)
Owners	48.94	18.73	113.40	181.07	0.27
Tenants	66.53	14.18	117.04	197.75	0.34
Owner-cum-Tenants	62.60	20.56	137.46	220.62	0.28
All	59.36	17.82	115.67	192.85	0.31

It is interesting to note from the same tables that, when it comes to family labour input per hectare, there are strong indications that purely tenant cultivated farms by and large apply family labour with a greater intensity than other types of farms. Further, purely owner cultivated farms use more hired labour input compared to both the owner-cum-tenant and the tenant cultivated farms. In case of the latter hired labour input is almost insignificant. These phenomena are true for the majority of the cases, but not true for all the cases. (The exception is noticed in the case of Tamil Nadu.)

Higher intensity of hired labour use in the purely owner cultivated farms may be explained as follows. Since owner cultivators by and large belong to certain higher castes, they are not permitted to do manual work in agriculture at all. Naturally, their farm work is carried out by hired labourers. Tenant cultivators or owner-cum-tenant cultivators, on the other hand, belong to the lower or intermediate castes mostly and hence

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possess no bar to do manual work in agriculture. They thus hire labourers whenever necessary to supplement family labour.

Let us now turn to an explanation regarding the higher intensity of labour use in the owner-cum-tenant cultivated farms. It is only understandable that those depending upon both owned and share-rented land would try to produce maximum output on their holdings to improve their economic position. They would thus try to employ family labour with maximum intensity and also employ hired labour as and when necessary. They would also possibly try to apply non-labour and non-monetised inputs with maximum intensity. Pure tenant cultivators, on the other hand, would apply inputs (including labour input) less intensely for the reason that they have no command over the entire output on this type of holdings.

We now turn to results of analysis pertaining to labour input and output presented in Tables 8.2A, 8.2B and 8.2C. The tables show that output per hectare for all crops is higher in owner cultivated and lower in tenant cultivated farms for the two regions of Punjab and Tamil Nadu, but the picture is reversed in the case of Assam. Average productivity of labour, that is, output — labour input ratio is also higher in the purely owner cultivated farms compared to the other two types of tenure in the cases of Punjab and Tamil Nadu, but this is not true in the case of Assam. In the case of Assam, both output per hectare and output per labour-unit is higher in tenant cultivated farms compared to owner or owner-cum-tenant cultivated farms.

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Table 8.2A : Labour input, output and productivity of labour per hectare of cultivated area according to tenurial status : Punjab (Ferozepur), 1969-70.

Types of tenure	Labour input per hectare (days) L/A	Output per hectare (in Rs.) O/A	Average productivity of labour O/L
(1)	(2)	(3)	(4)
Owners	75.78	2252.41	29.72
Tenants	74.25	1013.35	13.65
Owner-cum-Tenants	82.99	2081.23	25.08
All	78.30	2011.67	25.69

Table 8.2B : Labour input, output and productivity of labour per hectare of cultivated area according to tenurial status : Assam (Nowgong), 1970-71.

Types of tenure	Labour input per hectare (days) L/A	Output per hectare (in Rs.) O/A	Average productivity of labour O/L
(1)	(2)	(3)	(4)
Owners	113.91	1366.51	12.00
Tenants	120.31	1744.58	14.50
Owner-cum-Tenants	129.58	1566.34	12.09
All	117.00	1421.53	12.15

Table 8.2C : Labour input, output and productivity of labour per hectare of cultivated area according to tenurial status : Tamil Nadu (Thanjavur), 1969-70.

Types of tenure	Labour input per hectare (days) L/A	Output per hectare (in Rs.) O/A	Average productivity of labour O/L
(1)	(2)	(3)	(4)
Owners	181.07	2169.81	11.98
Tenants	197.75	1983.18	10.03
Owner-cum-Tenants	220.62	2152.63	9.76
All	192.85	2151.66	11.16

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Some comparisons between different types of tenure can now be made on the basis of the results presented above.

(i) Higher intensity of labour use, higher proportion of family labour, but lower productivity of both land and labour are observed in the majority of purely tenant cultivated farms than that of purely owner cultivated farms. A similar pattern is observed in the majority of owner-cum-tenant cultivated farms in relation to purely owner cultivated farms.

(ii) Lower intensity of labour use, lower output per hectare, with higher proportion of family labour and higher productivity of labour are observed in the majority of tenant cultivated farms than that of owner-cum-tenant cultivated farms.

It is quite clear from these comparisons that the pure tenants use more labour input, particularly family labour input than the pure owner cultivators. Similarly, owner-cum-tenants use more labour input (both family and hired labour input) than that of pure tenants or owner cultivators. But output per unit of land in the owner-cum-tenant cultivated or in the purely tenant cultivated farms seems to be lower than that of the purely owner cultivated farms. Thus, the greater amount of labour in the owner-cum-tenant cultivated or in the purely tenant cultivated farms does not result in higher production. Presumably, the owner cultivators while devoting less labour apply capital and other non-labour inputs at a higher rate so as to obtain the same amount of production or more than the owner-cum-tenant or pure tenant cultivators. In fact, one will not be able to discover from these results that both labour input and output per hectare is higher in any particular type of tenure. It is, therefore, not possible to suggest any hypothesis in relation to the resource-use efficiency of different types of tenure.

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As a matter of fact, results of our analysis suggest three distinct pictures in relation to labour, output and tenancy for three distinct regions under study. In Punjab, pure owner cultivators appear to be more efficient than owner-cum-tenant or pure tenant cultivators in terms of output - labour input relationship. In Assam, pure tenant cultivators seem to be more efficient than owner or owner-cum-tenant cultivators. Similarly, owner-cum-tenant cultivators are likely to be more efficient than pure tenant or owner cultivators in the region of Tamil Nadu. A possible explanation for this pattern is the following.

The explicit bias of the New Agricultural Strategy towards regions like Punjab with developed irrigation potential, and the institutional biases against small farmers in general and tenants in particular in the distribution of credit and other infrastructural facilities have been affecting the efficiency of owner-cum-tenant or pure tenant cultivators. The relative efficiency of tenants tends to be higher in areas like Assam where poor irrigation facility enhances production risks, and where no certainty in getting an alternative of wage employment exists. In a situation like Tamil Nadu where production risks are relatively low due to better irrigation and where the alternative of wage employment is not so uncertain, the relative efficiency of owner-cum-tenants is seen to be higher.

All the phenomena presented above may be examined in terms of size of holdings. But unfortunately, data about holdings classified according to types of tenure and size groups are not available in the Farm Management reports. We have disaggregated data for two regions out of the three. These have been possible to incorporate in this analysis.

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Table 8.3A : Utilisation of human labour days per hectare of cultivated area by tenurial status and farm size-groups: Punjab (Ferozepur), 1969-70.

Types of tenure	Farm size groups	Family labour	Annual farm servant	Casual labour	Total	Proportion of family labour to total labour
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Owners	0 - 6	88.43	15.40	25.57	129.40	0.68
	6 - 9	46.82	19.48	18.41	84.71	0.55
	9 - 14	33.34	30.26	17.52	81.12	0.41
	14 - 24	26.91	24.64	22.72	74.27	0.36
	24 & above	8.77	27.10	16.67	52.54	0.17
	All	30.03	25.97	19.78	75.78	0.40
Tenants	0 - 6	59.90	-	4.26	64.16	0.93
	6 - 9	-	-	-	-	-
	9 - 14	-	-	-	-	-
	14 - 24	-	-	-	-	-
	24 & above	75.73	-	3.03	78.76	0.96
	All	70.97	-	3.28	74.25	0.96
Owner-cum-tenants	0 - 6	75.25	23.75	18.28	117.28	0.64
	6 - 9	59.95	17.37	17.19	94.51	0.63
	9 - 14	46.24	26.01	14.90	87.15	0.53
	14 - 24	34.98	29.87	19.14	83.99	0.42
	24 & above	19.25	20.56	17.25	57.06	0.34
	All	34.31	25.19	18.80	78.30	0.44

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Table 8.3B : Utilisation of human labour days per hectare of cultivated area by tenurial status and farm size groups: Assam (Nowgong), 1970-71.

Types of tenure	Farm size groups	Family labour	Annual farm servant	Casual labour	Total	Proportion of family labour to total labour
(1)	(2)	(3)	(4)	(4)	(5)	(6)
Owners	0.01 - 1.25	138.72	2.34	19.22	160.28	0.87
	1.26 - 2.50	104.12	9.69	21.61	135.42	0.77
	2.51 - 5.00	69.29	18.09	24.07	111.45	0.62
	5.01 - 7.50	65.27	9.08	7.84	82.19	0.80
	7.51 & above	28.18	38.62	20.69	87.49	0.32
	All	77.88	15.13	20.90	113.91	0.68
Tenants	0.01 - 1.25	-	-	-	-	-
	1.26 - 2.50	55.61	-	-	55.61	1.00
	2.51 - 5.00	126.83	-	5.13	131.96	0.96
	5.01 - 7.50	-	-	-	-	-
	7.51 & above	-	-	-	-	-
	All	115.95	-	4.36	120.31	0.96
Owner-cum-tenants	0.01 - 1.25	71.24	-	-	71.24	1.00
	1.26 - 2.50	113.75	4.23	18.72	136.70	0.83
	2.51 - 5.00	111.37	2.80	9.27	123.44	0.90
	5.01 - 7.50	108.20	5.19	6.58	119.97	0.90
	7.51 & above	61.20	48.21	60.97	170.38	0.36
	All	105.54	7.99	16.05	129.58	0.81

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Presented in Tables 8.3A and 8.3B above are the results of our analysis regarding the intensities of different types of labour input per hectare of cultivated area by tenure and farm size groups for the regions of Punjab and Assam respectively. It is noticed from the above tables that, as farm size increases intensity of labour input per hectare decreases in the purely owner and owner-cum-tenant cultivated farms whereas the picture is not clear in the case of purely tenant cultivated farms as the tenant cultivators do not belong to all the farm size groups.

If we now compare the intensities of different types of labour input with farm size groups under different types of tenure, it is found that, while family labour input per hectare decreases with the increase in farm size in the cases of owner and owner-cum-tenant cultivators, it seems to increase with the size in the case of tenant cultivators. Annual farm servant input per hectare shows no distinct pattern with size in the cases of owner and owner-cum-tenant cultivators, and its intensity is almost nil in the case of tenant cultivators. Incidence of casual labour input is almost negligible in the case of tenant cultivators and shows no distinct pattern with the size groups in the cases of owner and owner-cum-tenant cultivators.

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Table 8.4A : Labour input, output and productivity of labour per hectare of cultivated area by tenurial status and farm size groups : Punjab (Ferozepur), 1969-70.

Types of tenure	Farm size groups	Labour input per hectare (days) L/A	Output per hectare (in Rs.) O/A	Average productivity of labour O/L
(1)	(2)	(3)	(4)	(5)
Owners	0 - 6	129.40	1993.25	15.40
	6 - 9	84.71	1855.85	21.91
	9 - 14	81.12	1996.46	24.61
	14 - 24	74.27	2057.55	27.70
	24 & above	52.54	2802.59	53.34
	All	75.78	2252.41	29.72
Tenants	0 - 6	64.16	910.71	14.19
	6 - 9	-	-	-
	9 - 14	-	-	-
	14 - 24	-	-	-
	24 & above	78.76	1057.49	13.43
	All	74.25	1013.35	13.65
Owner-cum-tenants	0 - 6	117.28	2228.77	19.00
	6 - 9	94.51	2006.29	21.23
	9 - 14	87.15	2074.18	23.80
	14 - 24	83.99	1973.60	23.50
	24 & above	57.06	2331.62	40.86
	All	82.99	2081.23	25.08

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Table 8.4B : Labour input, output and productivity of labour per hectare of cultivated area by tenurial status and farm size groups : Assam (Nowgong), 1970-71.

Types of tenure	Farm size groups	Labour input per hectare (days) L/A	Output per hectare (in Rs.) O/A	Average productivity of labour O/A
(1)	(2)	(3)	(4)	(5)
Owners	0.01 - 1.25	160.28	1806.86	11.27
	1.26 - 2.50	135.42	1587.10	11.72
	2.51 - 5.00	111.45	1346.80	12.08
	5.01 - 7.50	81.19	1095.86	13.50
	7.51 & above	87.49	899.60	10.28
	All	113.91	1366.51	12.00
Tenants	0.01 - 1.25	-	-	-
	1.26 - 2.50	55.61	1466.33	26.37
	2.51 - 5.00	131.96	1794.76	13.60
	5.01 - 7.50	-	-	-
	7.51 & above	-	-	-
	All	120.31	1744.58	14.50
Owner-cum-tenants	0.01 - 1.25	71.24	1015.29	14.25
	1.26 - 2.50	136.70	1463.43	10.71
	2.51 - 5.00	123.44	1567.87	12.70
	5.01 - 7.50	119.97	1195.23	9.96
	7.51 & above	170.38	2495.41	14.65
	All	129.58	1566.34	12.09

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Coming now to the results of analysis pertaining to input of labour and resultant output with the farm size groups under different types of tenure presented in Tables 8.4A and 8.4B above for the regions of Punjab and Assam respectively, it is seen that :

(a) Output per hectare for all crops is positively associated with size in the cases of owner and tenant cultivated farms, and its association gets rather questionable support in the case of owner-cum-tenant cultivated farms for the region of Punjab. But for the region of Assam, it is seen that output per hectare decreases with size in the case of owner cultivators while it is positively associated with size in the cases of tenant and owner-cum-tenant cultivators. Thus, inverse relation between size and productivity is found not to be operating for all types of tenure and for all the regions under study. The results of our analysis also show that the inverse relation between size and productivity (where it is true) does not necessarily mean that the relationship holds in all ranges of the size variable for each type of tenure.

(b) Average productivity of labour, i.e., output - labour input ratio, increases with size in the cases of owner and owner-cum-tenant cultivators, but it decreases with size in the case of tenant cultivators for the region of Punjab. But for the region of Assam, average productivity of labour with size reveals no distinct pattern of association in the cases of owner and owner-cum-tenant cultivators. However, in the case of tenant cultivators, average productivity of labour decreases with size as in the case of Punjab. Thus, the marginalist model (discussed at length in Chapter 7) which is used to explain the phenomenon that as farm size

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increases, labour gets employed with increasing quantities of land and capital, the net result would be diminishing yield per hectare and diminishing output per labour — does not seem to work unrestrictedly over various types of tenure and regions.

We may now put together our findings with regard to the different interrelations for the two different regions as follows.

Punjab : It has been observed that intensity of labour input per hectare is greater in owner-cum-tenant cultivated farms, and it is lower in purely tenant cultivated farms; proportion of family labour to hired labour is greater in purely tenant cultivated farms and lower in purely owner cultivated farms; output per hectare is greater in purely owner cultivated farms and lower in purely tenant cultivated farms in this region.

Considering the labour input per hectare by farm size groups under different types of tenure, it is seen that small farmers of purely owner cultivated farms use more labour input compared to the small farmers of purely tenant or owner-cum-tenant cultivated farms, but middle farmers of owner-cum-tenant cultivated farms use more labour input compared to the middle farmers of purely owner cultivated farms; and big farmers of purely tenant cultivated farms use more labour input than the big farmers of other two types of tenure. The same pattern is also revealed in the case of family labour input per hectare.

Taking comparisons of annual farm servant input, one may discover that small and medium farmers of purely owner cultivated farms use more annual farm servant input compared to owner-cum-tenant cultivated small and medium farmers. But big farmers of owner-cum-tenant cultivated farms

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use more farm servant input compared to purely owner cultivated big farmers. The same pattern is also revealed in the case of casual labour input per hectare. However, the incidence of annual farm servant or casual labour input is almost nil in the case of purely tenant cultivated farms of all size groups.

Coming now to the analysis of size-productivity, it is seen that output per hectare is lower for all categories of purely tenant cultivated farms than that of purely owner or owner-cum-tenant cultivated farms. Between owner and owner-cum-tenant cultivators, output per hectare is higher in the case of owner cultivators. But output per hectare in the small and medium size groups is comparatively lower in the purely owner cultivated farms. Average productivity of labour between these two types of tenure also bears the same pattern.

From these we can now draw the following two conclusions regarding the relationships between labour, output and tenancy for the region of Punjab.

(a) There is no remarkable difference in the utilisation of different types of labour input and output per hectare among the farmers of corresponding size groups under purely owner and owner-cum-tenant cultivated farms. In both types of tenure output per hectare increases and labour input per hectare decreases with farm size. That is, small farmers of both types of tenure seem to cultivate their land more intensely in the sense that they put in more of labour per hectare, more intensive effort of family labour and probably more of non-labour material inputs per hectare for obtaining higher output.

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(b) Pure tenant cultivators of corresponding size groups operate in a sharply different fashion in relation to the utilisation of different types of labour input and output per hectare. In fact, pure tenant cultivators in this region seem to be at a disadvantage compared to pure owners or owner-cum-tenants in so far as their capacity to apply various inputs is concerned. Probably for this reason, pure tenant cultivation is not economical in this region.

Assam : We observe that intensity of labour input per hectare is greater in owner-cum-tenant cultivated farms and it is lower in purely owner cultivated farms; proportion of family labour to hired labour is greater in purely tenant cultivated farms and it is lower in purely owner cultivated farms; and output per hectare is greater in purely tenant cultivated farms and it is lower in purely owner cultivated farms.

Considering the labour input per hectare by farm size groups under different types of tenure it is noticed that small and medium farmers of purely owner cultivated farms use more labour input than that of big farmers. But small and medium farmers of other two types of tenure use less labour input compared to big farmers of these categories. The same pattern is discerned for the family labour input in the respective farm size groups of different types of tenure.

Taking annual farm servant input per hectare it is seen that small and medium owner cultivators use more annual farm servant input compared to small and medium tenant or small and medium owner-cum-tenant cultivators. On the other hand, big farmers of owner cultivators use less annual farm servant input than the big farmers of owner-cum-tenant

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cultivators. In the case of casual labour input per *hectare the* same pattern *is revealed* in the corresponding size groups of different types of tenure.

Coming now to the comparisons of output-labour input ratio by different farm size groups of different types of tenure it is seen that output per hectare is higher in the small and medium farms of pure owners than that of pure tenants or owner-cum-tenants. In the case of big farmers output per hectare is higher in the owner-cum-tenant cultivated farms than that of purely owner cultivated farms. Average productivity of labour is high in the case of small farmers of purely tenant cultivated farms than that of purely owner or owner-cum-tenant cultivated farms. Average productivity of labour in the case of big farms is, however, higher in the owner-cum-tenant cultivated farms than that of purely owner cultivated farms.

Now, taking the results of our analysis altogether we can draw the following conclusions for the region of Assam.

(a) Pure tenant cultivators as well as owner-cum-tenant cultivators of this region operate in a more or less similar fashion in so far as the intensity of labour use and output per hectare of these farms are concerned. But a sharp variation of labour input and output per hectare is noticed among the farmers of corresponding size groups between purely owner cultivated farms on the one hand and the purely tenant and owner-cum-tenant cultivated farms on the other.

(b) In terms of labour-output relations big owner-cum-tenant cultivators of this region seem to be more efficient than the other categories of farmers. On the whole, tenant and owner-cum-tenant cultivation seems to be more lucrative than the purely owner cultivation at least in the case of Assam.

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We now present our own view about the relationship of farm size and the intensities with which different types of labour input are applied and output obtained under different types of tenure. In the regions under study for which data are available, the owner-cum-tenant cultivators seem to cultivate their holdings more intensely in the sense that they put in more of labour per hectare and probably more of non-labour material inputs per hectare and thus obtain more of output. These efforts are given both by the small farmers as well as the big farmers of owner-cum-tenant cultivated farms. While the small farmers put these efforts mainly due to his need for survival, the medium or big farmers do so both for meeting self-consumption as well as investing a part of the produce to enlarge the scale of their farm business. That is, a middle or a big farmer under owner-cum-tenant cultivated farms usually tries to change his economic position through some productive investments rather than to spend the entire share of crops for self-consumption. But this explanation does not hold good for the pure tenants. A tenant by his very position is at a disadvantage compared either to the owner or to the owner-cum-tenant cultivator in so far as his access to monetised inputs is concerned. As such, even after all the efforts he can undertake, output per hectare on his farm may not be larger than on the farms of owners or owner-cum-tenant cultivators (see for details, Chattopadhyay [1979b]). Hence, he is not able to change his economic position by employing a part of his share of crops into productive investments.

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II

There seems to be very few studies dealing with the use of labour in relation to tenancy. Mention may be made in this connection of the work of some scholars which examined the resource-use efficiency of different types of tenure, considering labour input as one of the factors for explaining the variations. The existing literature does not infact throw much light on the intensity of labour use in different types of tenure. We may briefly recapitulate the work that has been done and the conclusions that have been drawn by other research workers.

We may first refer to a study of C. H. Hanumantha Rao [1971] who undertook analysis of farm level observations taken from Farm Management data in a rice zone of Andhra Pradesh during 1957-58 and 1958-59. An attempt was made in this study to examine the comparative efficiency with which land is cultivated among owner-operated and share-rented farms. He observed that there is a high correlation among all the inputs-land, labour, and capital. Land and labour inputs share the highest correlation between both the tenurial groups of farms, and this correlation does not differ between the groups.

The hypothesis proposed in this study is that, "in a free institutional setting, the lease arrangements may themselves be influenced by the relative significance of entrepreneurial functions". The results of analysis suggest that, "when the relative alternatives are specified, the evidence examined does not indicate significant inefficiencies in the use of land under sharecropping".

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Also an attempt in fitting the Cobb-Douglas type of production function to the data suggests that, "there is a decline in the marginal productivity of land with an increase in the size of holding among owner-operated farms. Over a wide range, the marginal productivity of land among the share-rented farms is higher than owner-operated farms of corresponding size and is not lower than large owner-operated farms, which account for the bulk of land leased out". Rao ultimately concluded that share-croppers cultivate the land more intensively than the large owner-operators.

It may be recalled that the results of our analysis also suggest this, but not in the same fashion as that of Hanumantha Rao. As a matter of fact, among the share-rented farms, owner-cum-tenant cultivators seem to cultivate their lands more intensely than the pure tenant cultivators. That is, owner-cum-tenant cultivators put in more of labour and obtain more of output per hectare. considering the other factor substitutions constant It is not, however, true that the owner-cum-tenant cultivated farms of all the size classes for different regions of India follow the same fashion. According to our analysis, small owner-cum-tenant cultivators of Punjab use more labour input and obtain more output per hectare compared to the middle or big farmers, whereas big owner-cum-tenant cultivators of Assam use more labour input and obtain more output per hectare compared to the other size classes of this tenurial group. Thus, a general remark about the interrelations between labour, output and tenancy cannot possibly be drawn.

We may now turn to an exercise done by Bharadwaj [1974b] regarding certain relationships between levels of tenancy (i.e., the proportion

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of land leased in to the size of holding and on broad categories of tenure) and input and output per unit of land. An attempt was made in this study to compare costs and returns between different levels of tenancy in a region of Maharashtra. According to Bharadwaj "with increasing levels of tenancy output per acre showed a tendency to decline. Also, at lower levels of tenancy inputs were applied relatively more intensively".

The results of our analysis, however, show that the proposition cannot be accepted unambiguously. In the matter of intensity of labour input as well as productivity of land, there does not seem to be considerable differences between owners and owner-cum-tenants of different size classes in the case of Punjab. But, in the case of Assam owner-cum-tenant cultivators except smaller size group do seem to apply labour more intensely and obtain more output per hectare compared to the corresponding size classes of pure owner cultivators. This once again suggests that relationships of farm size of different tenurial groups and the intensity of labour input as well as productivity of land operate differently in different regions under study.

Coming now to an exercise done by Vyas [1970], it is found that the resource-use efficiency of tenant cultivated farms is higher than the owner cultivated farms. This study was based on a survey data of four Gujarat villages in the 1960s. On the basis of empirical evidences he came to the conclusion that "the high efficiency of tenants, especially the medium and small ones, in resource use is indicated by the high (average) input-output ratio on their farm". It is to be noted that Vyas examined the resource-use efficiency of two tenurial groups without separating the incidence of labour input into different tenurial groups.

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Apart from these studies, there are some other studies which have dealt with different forms of tenancy and/or with the size distribution of tenants in different regions at different time points (e.g., Narain and Joshi [1969]; Raj [1970]; Sanyal [1972]; Rudra and Newaj [1975]; Bardhan, P. K. [1976]). These studies are not directly relevant to our purpose. However, a part of the work of Raj may be mentioned where he attempted to examine the intensity of hired labour input in different sharecropping zones of India. He, in this context, observed that the incidence of hired labour input, particularly annual farm servant input, is higher in zones in which there is a greater concentration of operational holdings in the smaller size groups and more land is leased-in by them than in the zones in which large proportions of both owned and leased-in area are accounted for by the bigger size groups of operational holdings.

Data presented by us are not obviously suitable for taking a view of the evidences provided by Raj. But our analysis, in general, indicates that the incidence of hired labour input, particularly annual farm servant input, is comparatively higher in the zones like Punjab, Tamil Nadu etc., where larger proportions of bigger size groups of operational holdings are met with.

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CHAPTER 9

Labour and Agricultural Operations

An attempt has been made in this chapter to examine the nature and extent of labour use in agriculture during different agricultural operations and in different types of farm and non-farm work. We have restricted our analysis to only two of the leading factors which have bearing on labour use : (a) the characteristics of different kinds of labour employed in agricultural operations, and (b) the nature of work and farm size. We have examined these two aspects of labour use separately in the following two sections. Our knowledge of these two aspects is extremely limited. Studies by Martin Billings and Arjan Singh [1970a, 1970b] provide some information about the characteristics of labour use in different agricultural operations, but they are too specific to be relevant for wider coverage.

I

Variations of employment per unit of land as between different agricultural operations are, in a general way, well known. What needs to be ascertained is the quantitative magnitude of the variations of the operations for different categories of labourers. We shall do this by comparing the utilisation of labour inputs of different kinds in different agricultural operations for a number of different regions. For

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this purpose, we have used Farm Management data of different regions from the respective Farm Management Survey reports.

These data regarding utilisation of human labour input per hectare of cultivated area for all crops vis-a-vis nine agricultural operations beginning from ploughing and ending with threshing and winnowing operations as presented in Table 9.1 suggest the following : One, the variation of labour use in agriculture within the operations is very sharp. Harvesting and carrying operation absorbs more labour per unit of land compared to other agricultural operations. Ploughing operation takes second place followed by sowing and weeding operations for the majority of the regions under study. Two, there is also a sharp variation of labour use for the same agricultural operation among the regions. As for example, the magnitude of labour use in most agricultural operations is much higher in the case of Gujarat and much lower in the case of Andhra Pradesh than in the cases of the other regions under study.

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Table 9.1 : Operationwise distribution of human labour per cultivated hectare in man days for some selected regions

Agricultural operations	Assam (Nowgong) 1970-71	Orissa (Cuttack) 1967-68	Andhra Pradesh (Cuddapah) 1969-70	Uttar Pradesh (Muzaffar-nagar) 1968-69	Gujarat (Surat & Bulsar) 1966-67	Maha-rashtra (Ahmed-nagar) 1967-68
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Ploughing	27.35	18.63	9.02	11.00	5.74	28.24
II. Levelling & Manuring		7.28	10.27	1.00	15.30*	
III. Sowing	1.14	6.79	9.98	7.00	15.92**	6.41
IV. Irrigation	-	4.43	15.53	7.00	5.12	14.71
V. Interculture & Transplanting	11.80	12.02	-	11.00	72.88 t	15.13
VI. Weeding	15.88	24.52	9.04	-	7.00 tt	6.89
VII. Harvesting & Carrying	48.41	24.48	21.70	54.00	49.06	22.77
VIII. Threshing & Winnowing		11.52	5.65	6.00		19.35
IX. Miscellaneous	-	4.23	1.76	-	18.68	-
Total	104.58	113.90	82.95	97.00	189.70	113.50

* including 'Harrowing & Transportation'.
** including 'Transplanting'.
t including 'Weeding'.
tt 'Watching & Spraying'.

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There are large differences in the application of labour input even among the more agriculturally developed regions like Andhra Pradesh, Uttar Pradesh, Gujarat as well as among the agriculturally less developed regions like Assam and Orissa. The extent of labour use for some specific agricultural operations is even more different as between the two types of regions. For example, the use of labour input per unit of land is much higher in the regions of Assam and Orissa than in the regions like Uttar Pradesh, Andhra Pradesh, Gujarat when the ploughing, levelling and manuring operations are taken together. On the other hand, the reverse picture is noticed in the combined operation of harvesting, carrying, threshing and winnowing in the same regions. It may be argued that in the regions like Assam and Orissa with traditional cultivation ploughing, manuring etc., operations are tasks requiring a great deal of manual activity. But in the agriculturally more developed regions utilisation of labour input per hectare of land is smaller in these operations because of mechanisation. Operations like harvesting, carrying, threshing and winnowing are probably much less affected by mechanisation.

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Table 9.2 : Operationwise distribution of human labour (family and hired separately) per cultivated hectare in man days for the regions

Agricultural operations	Gujarat (Surat & Bulsar)			Maharashtra (Ahmednagar)			Assam (Nowgong)		
	Family labour	Hired labour	Total	Family labour	Hired labour	Total	Family labour	Hired labour	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
I. Ploughing	2.88	2.86	5.74	19.66	8.58	28.24	21.96	5.39	27.35
II. Levelling and Manuring	7.22	8.08	15.30						
III. Sowing	6.32	9.60	15.92	4.36	2.05	6.41	1.14	-	1.14
IV. Irrigation	2.48	2.64	5.12	9.34	5.37	14.71	-	-	-
V. Interculture and Transplanting	27.16	45.72	72.88	6.93	8.20	15.13	8.50	3.30	11.80
VI. Weeding	5.00	2.00	7.00	4.07	2.82	6.89	9.68	6.20	15.88
VII. Harvesting and Carrying	20.44	28.62	49.06	13.00	9.77	22.77	27.07	14.08	48.41
VIII. Threshing and Winnowing				14.46	4.89	19.35	7.26		
IX. Miscellaneous	7.66	11.02	18.68	-	-	-	-	-	-
Total	79.16	110.54	189.70	71.82	41.68	113.50	75.61	28.97	104.58

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Table 9.3 : Operationwise distribution of human labour days by different types of labourers per cultivated hectare for the regions

Agricultural operations	Maharashtra (Ahmednagar) : 1967-68							Assam (Nowgong) : 1970-71						
	Family labour			Hired labour				Family labour			Hired labour			
	Male	Female	Total	Male	Female	Annual farm servant	Total	Male	Female	Total	Male	Female	Annual farm servant	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
I. Ploughing II. Levelling & Manuring	17.35	2.31	19.66	3.17	1.81	3.60	8.58	21.96	-	21.96	0.88	-	4.51	5.39
III. Sowing	3.66	0.70	4.36	1.20	0.58	0.27	2.05	1.14	-	1.14	-	-	-	-
IV. Irrigation	7.96	1.38	9.34	1.77	0.19	3.41	5.37	-	-	-	-	-	-	-
V. Interculture & Transplanting	2.21	4.72	6.93	0.99	6.96	0.25	8.20	5.95	2.55	8.50	2.06	0.81	0.43	3.30
VI. Weeding	2.92	1.15	4.07	1.71	0.51	0.60	2.82	7.82	1.86	9.68	5.07	0.23	0.90	6.20
VII. Harvesting & Carrying	5.45	7.55	13.00	2.04	7.05	0.68	9.77	22.78	4.29	27.07	10.24	0.77	3.07	14.08
VIII. Threshing & Winnowing	7.32	7.14	14.46	1.09	3.17	0.63	4.89	6.79	0.47	7.26				
IX. Miscellaneous	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	46.87	24.95	71.82	11.97	20.27	9.44	41.68	66.44	9.17	75.61	18.25	1.81	8.91	28.97

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We may now turn our attention to the differential input pattern of family labour and hired labour. In Table 9.2 above are presented data for three regions where labour is shown as composed of family labour and hired labour. In Table 9.3 above are presented data for two regions where each of these categories are further subdivided into some sub-categories. The following conclusions are suggested by Table 9.2.

(i) Not only labour input as a whole but the components family labour and hired labour per unit of land are each individually greater in harvesting and carrying operations as well as in ploughing-sowing operations than in other operations.

(ii) Hired labour input per unit of land is lower than the corresponding family labour input for all operations in the majority of the cases. Only in the case of Gujarat hired labour input per unit of land is greater than the corresponding family labour input for all major operations. This may be generally true of the relatively better-endowed regions. Because of multiple cropping and intensive cultivation relatively more hired labour may be used in these regions. But, of course, mechanisation may reduce the need for hired labour though probably not to a great extent.

The observed variations in the composition of labour input as between different agricultural operations suggest the following. Harvesting and carrying, ploughing, interculture and transplanting are activities that require to be finished speedily. This is usually not possible by the family labour alone and therefore calls hired hands.

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Other agricultural operations are not so time-bound and they can be carried out by family members alone. It is possibly for this reason that hired labour input is used with different intensities for different agricultural operations.

In Table 9.3 family labour is shown as composed of male family labour and female family labour; hired labour is shown as composed of three parts, male casual labour, female casual labour and labour of annual farm servants who are always male. The following observations are permitted by the data.

(i) Participation of female family labour in cultivation is noticed in every agricultural operation but of course less intensely compared to male family labour. (Ploughing, it may be noticed, has been merged with the operation of "Levelling and Manuring".)

(ii) Participation of female hired labour in cultivation is also noticeable in most of the agricultural operations. But female hired labour input per unit of land is lower than the corresponding female family labour input when all operations are taken together.

(iii) There are some agricultural operations viz., harvesting and carrying, interculture and transplanting where the participation of female family labour as well as female hired labour is higher than the male family labour in some regions (e.g., in Maharashtra though not in Assam).

(iv) In ploughing and manuring and levelling, input of labour of annual farm servants is higher compared to both male and female hired casual labour.

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(v) Female hired casual labour input per unit of land is greater than the corresponding male hired casual labour input as well as the input of labour of annual farm servants per unit of land in Maharashtra. In Assam, input of labour of annual farm servants per unit of land is greater than the male or female hired casual labour input per unit of land.

From the above observations we may formulate the following hypotheses which could be verified for the other regions of India.

Hypothesis 1: There are some types of agricultural operations (e.g., harvesting, interculture and transplanting) for which female labour is preferred on account of the very nature of the work.

Hypothesis 2: There are some agricultural operations (e.g., ploughing – levelling of land, irrigating) for which annual farm servants are preferred.

Hypothesis 3: Female hired labour is preferred to male hired labour for certain operations in those regions where cultivation is highly non-mechanised.

If the hypotheses mentioned above are true, the question arises why such preferences ? It may be borne in mind in this connection that there is a general tendency among farmers, especially in traditional agriculture, to employ hired labour only for some specific operations rather than for all of the agricultural operations. In the regions under study almost all farm operations are done solely by family members except, harvesting, interculture and transplantation for which labourers are

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hired to some extent. The incidence of employment of permanent labour is generally low. Harvesting and transplantation activities are to a large extent shared by female hired labourers. It is profitable for a farmer to employ female hired labour for certain activities as female labour is paid wages generally lower than that paid to male hired labour. The employment of an annual farm servant is profitable in such conditions where there is a great deal of work all round the year as the farm servant has no stipulated working hours. Thus, farmers would employ female hired labour and annual farm servants for certain specific agricultural activities or for certain scale of activities. But in the case of male hired casual labour it may be thought that a farmer employs such labour whenever necessary to supplement family labour.

II

In this section we seek to present some quantitative results pertaining to the inter-relations between family labour and farm servant in different types of farm and non-farm work and for different farm sizes. The present exercise is carried out for six regions namely, Andhra Pradesh (1969-70), Assam (1969-70), Tamil Nadu (1967-68), Uttar Pradesh (1968-69), Punjab (1969-70) and Maharashtra (1967-68) with the help of aggregated Farm Management data. For each farm size group, intensity and type of work done by family members as well as by annual farm servants have been calculated. Work has been classified here into two broad types : farm work and non-farm work. Farm work, again, has been subdivided into 'crop production' and 'other than crop production'.

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Non-farm work has been subdivided into 'exchange or gratis','hired out', and 'service and business'.

Andhra Pradesh

Presented in Table 9.4A are the results of our analysis for this region. It is seen from the results that there is a tendency for employment of family labour to decrease with farm size while employment of farm servant tends to increase. It may also be seen that the proportion of farm work to total work days of both family labour and farm servant increases with farm size.

It is also interesting to note from the same table that within the category of farm activities, the percentage of days of family labour devoted to 'crop production' is greater among the larger sized farms; and the reverse is true in the case of the labour of annual farm servants. Within the category of 'non-farm work', a family worker of smaller sized farms devotes the major part of his labour to others by hiring himself out. A family worker of larger farm size groups spends the major part of his labour to 'service and business'. In the case of annual farm servants, there seems to be no major difference between small and big farms in the matter of the pattern of utilisation of their labour in non-farm activities. It may further be noted that the intensity of employment of annual farm servants is considerably lower than that of family labour in all the size groups except the biggest ones.

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Table 9.4A : Distribution of labour days per farm by farm size groups and types of work : Andhra Pradesh (Cuddapah), 1969-70.

Size groups (hectare)	Total no.of days [col.(3) +col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Family labour					
Below 1.62	545.10	133.09 (100.00)	96.55 (72.55)	36.54 (27.45)	412.01 (100.00)	9.64 (2.34)	294.22 (71.41)	108.15 (26.25)	0.24
1.62 - 3.23	441.50	147.30 (100.00)	123.22 (83.65)	24.08 (16.35)	294.20 (100.00)	7.24 (2.46)	143.59 (48.81)	143.37 (48.73)	0.33
3.24 - 6.07	485.32	185.32 (100.00)	148.19 (79.96)	37.13 (20.04)	300.00 (100.00)	7.88 (2.63)	118.66 (39.55)	173.46 (57.82)	0.38
6.08 - 11.33	214.09	157.66 (100.00)	138.31 (87.73)	19.35 (12.27)	56.43 (100.00)	9.12 (16.16)	0.00 (0.00)	47.31 (83.84)	0.74
11.34 & above	264.17	231.61 (100.00)	196.29 (84.75)	35.32 (15.25)	32.56 (100.00)	10.64 (32.67)	0.00 (0.00)	21.92 (67.33)	0.88
All	397.50	168.18 (100.00)	138.36 (82.27)	29.82 (17.73)	229.32 (100.00)	8.95 (3.90)	121.37 (52.93)	99.00 (43.17)	0.42

Figures in bracket indicate percentage distribution.

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Table 9.4A : (contd.)

Size groups (hectare)	Total no.of days [col.(3) +col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Farm servant					
Below 1.62	0.00	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00
1.62 - 3.23	19.06	17.58 (100.00)	15.84 (90.10)	1.74 (9.90)	1.48 (100.00)	1.45 (97.97)	0.00 (0.00)	0.03 (2.03)	0.92
3.24 - 6.07	32.29	31.90 (100.00)	23.35 (73.19)	8.55 (26.81)	0.39 (100.00)	0.35 (89.74)	0.00 (0.00)	0.04 (10.26)	0.99
6.08 - 11.33	105.00	102.27 (100.00)	74.18 (72.54)	28.09 (27.46)	2.73 (100.00)	2.56 (93.77)	0.00 (0.00)	0.17 (6.23)	0.97
11.34 & above	205.05	204.02 (100.00)	151.54 (74.28)	52.48 (25.72)	1.03 (100.00)	0.91 (88.35)	0.00 (0.00)	0.12 (11.65)	0.99
All	64.58	63.42 (100.00)	47.19 (74.41)	16.23 (25.59)	1.16 (100.00)	1.10 (94.83)	0.00 (0.00)	0.06 (5.17)	0.98

Figures in bracket indicate percentage distribution.

Assam

Some major difference seems to exist between farm size groups in respect of employment of family labour and labour of annual farm servants. There is a tendency among larger sized farms to engage both family labour and farm servant over the major part of the year. Proportion of farm work is also larger under larger farm size groups for both these two categories of labour. Within the farm work category, both family labour and farm servant spends more time on 'crop production' in larger sized farms than in the smaller ones. (Table 9.4B).

However, within the 'non-farm work' category a family labourer in the larger sized farms spends the greater part of his labour time in 'service and business' activities whereas a family labourer in the smaller sized farms spends considerably less labour time on these activities. Similar is the case for annual farm servants. Further, it may be noticed that the intensity of employment of family labour is much higher than that of farm servants in all the size groups.

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Table 9.4B : Distribution of labour days per farm by farm size groups and types of work : Assam (Nowgong), 1969-70.

Size groups (hectare)	Total no.of days [col.(3) + col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Family labour					
0.01 - 1.82	504.19	464.10 (100.00)	224.97 (48.47)	239.13 (51.53)	40.09 (100.00)	6.50 (16.24)	0.50 (1.25)	33.09 (82.51)	0.92
1.83 - 2.43	579.56	501.47 (100.00)	258.59 (51.57)	242.88 (48.43)	78.09 (100.00)	2.08 (2.66)	1.90 (2.43)	74.11 (94.91)	0.87
2.44 - 3.24	657.64	566.47 (100.00)	295.83 (52.22)	270.64 (47.78)	91.17 (100.00)	1.65 (1.81)	14.09 (15.45)	75.43 (82.74)	0.86
3.25 - 4.45	639.22	570.14 (100.00)	298.93 (52.43)	271.21 (47.57)	69.09 (100.00)	1.98 (2.87)	8.73 (12.64)	58.38 (84.49)	0.89
4.46 & above	873.53	783.69 (100.00)	467.66 (59.67)	316.03 (40.33)	89.84 (100.00)	0.49 (0.55)	3.87 (4.31)	85.48 (95.14)	0.90
All	626.82	553.52 (100.00)	293.30 (52.99)	260.22 (47.01)	73.30 (100.00)	2.46 (3.36)	6.43 (8.77)	64.41 (87.87)	0.88

Figures in bracket indicate percentage distribution.

Table 9.4B : (contd.)

Size groups (hectare)	Total no. of days [col.(3) + col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Farm servant					
0.01 - 1.82	38.91	38.26 (100.00)	15.00 (39.20)	23.26 (60.80)	0.65 (100.00)	0.00 (0.00)	0.03 (4.62)	0.62 (95.38)	0.98
1.83 - 2.43	37.96	37.96 (100.00)	19.23 (50.66)	18.73 (49.34)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00
2.44 - 3.24	49.52	48.62 (100.00)	22.61 (46.51)	26.01 (53.49)	0.90 (100.00)	0.00 (0.00)	0.00 (0.00)	0.90 (100.00)	0.98
3.25 - 4.45	132.06	127.21 (100.00)	65.56 (51.53)	61.65 (48.47)	4.85 (100.00)	0.06 (1.24)	0.02 (0.41)	4.77 (98.35)	0.96
4.46 & above	229.92	227.57 (100.00)	148.64 (65.32)	78.93 (34.68)	2.35 (100.00)	0.00 (0.00)	0.00 (0.00)	2.35 (100.00)	0.99
All	86.31	84.67 (100.00)	46.47 (54.89)	38.20 (45.11)	1.64 (100.00)	0.01 (0.58)	0.01 (0.58)	1.62 (98.84)	0.98

Figures in bracket indicate percentage distribution.

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Tamil Nadu

This region seems to be distinct from others on the ground that (a) in the larger farm size groups, there is a tendency to employ higher amount of labour days of annual farm servants than of family labour; and (b) annual farm servant's labour is hired out by both the small and big farmers and its intensity is higher in the larger sized farms.

It is seen in Table 9.4C that the proportion of days of both family labour as well as farm servants devoted to 'crop production' is more or less the same as between the farm size groups. In the non-farm activities, however, there seems to be a major difference between these two categories of labourers especially in the activities 'business and service' and 'hiring out'. In the service and business activities, the employment of family labour increases with farm size and it decreases with size in the case of annual farm servants. The diametrically opposite is true in the case of the activity of hiring out labour of both these two categories.

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Table 9.4C : Distribution of labour days per farm by farm size groups and types of work : Tamil Nadu (Thanjavur), 1967-68.

Size groups (hectare)	Total no. of days (col.(3) + col.(6))	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Family labour					
Below 1.16	255.64	72.07 (100.00)	70.51 (97.83)	1.56 (2.17)	183.57 (100.00)	5.92 (3.22)	108.06 (58.87)	69.59 (37.91)	0.28
1.16 - 2.02	255.32	121.70 (100.00)	119.55 (98.24)	2.15 (1.76)	133.62 (100.00)	1.82 (1.36)	59.13 (44.25)	72.67 (54.39)	0.48
2.03 - 3.05	223.81	110.60 (100.00)	106.70 (96.47)	3.90 (3.53)	113.21 (100.00)	2.02 (1.78)	41.67 (36.81)	69.52 (61.41)	0.49
3.06 - 5.71	184.93	98.77 (100.00)	83.93 (84.98)	14.84 (15.02)	86.16 (100.00)	9.80 (11.37)	6.89 (8.00)	69.47 (80.63)	0.53
5.72 & above	178.58	145.95 (100.00)	141.52 (96.96)	4.43 (3.04)	32.63 (100.00)	1.28 (3.92)	0.33 (1.03)	31.02 (95.05)	0.82
All	209.76	95.07 (100.00)	90.15 (94.82)	4.92 (5.18)	114.69 (100.00)	4.00 (3.49)	48.09 (41.93)	62.60 (54.58)	0.45

Figures in bracket indicate percentage distribution.

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Table 9.4C : (contd.)

Size groups (hectare)	Total no. of days (col.(3) + col.(6))	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Farm servant					
Below 1.16	16.13	10.74 (100.00)	10.47 (97.49)	0.27 (2.51)	5.39 (100.00)	0.37 (6.87)	1.27 (23.56)	3.75 (69.57)	0.67
1.16 - 2.02	43.01	29.27 (100.00)	29.15 (99.58)	0.12 (0.42)	13.74 (100.00)	0.12 (0.87)	5.29 (38.51)	8.33 (60.62)	0.68
2.03 - 3.05	108.19	55.99 (100.00)	55.99 (100.00)	0.00 (0.00)	52.20 (100.00)	0.22 (0.42)	42.92 (82.22)	9.06 (17.36)	0.52
3.06 - 5.71	248.87	191.38 (100.00)	188.90 (98.70)	2.48 (1.30)	57.49 (100.00)	12.61 (21.93)	13.75 (23.92)	31.13 (54.15)	0.77
5.72 & above	408.88	305.52 (100.00)	300.58 (98.38)	4.94 (1.62)	103.36 (100.00)	1.90 (1.84)	36.48 (35.29)	64.98 (62.87)	0.75
All	104.22	69.95 (100.00)	69.13 (98.83)	0.82 (1.17)	34.27 (100.00)	1.89 (5.51)	18.53 (54.07)	13.85 (40.42)	0.67

Figures in bracket indicate percentage distribution.

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Uttar Pradesh

In this region average employment of family labour as well as annual farm servants increases with farm size. It is also seen that the proportion of farm work to total work decreases with size in the case of family labour and increases with size in the case of annual farm servants. (Table 9.4D).

Within the farm work category, the proportion of days of family labour devoted to 'crop production' increases with farm size while the reverse is noticed in the case of annual farm servants. Within the non-farm work, percentage of days of family labour devoted to work for others on 'exchange or gratis' basis is greater than other non-farm activities. 'Hiring out' of labour also plays an important role especially in the smaller sized farms. But in the case of annual farm servants, 'service and business' occupies a significant place and hiring out of labour is insignificant for all the size groups.

Also, it may be noticed from the results that intensity of employment of family labour is much higher than the employment of annual farm servants. This is true for all size groups, except bigger ones where the number of days worked by annual farm servants is little lower than the number of days worked by family labour.

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Table 9.4D : Distribution of labour days per farm by farm size groups and types of work : Uttar Pradesh (Muzaffarnagar), 1968-69.

Size groups (hectare)	Total no. of days [col.(3) + col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Family labour					
Below 2.87	458.05	411.71 (100.00)	192.74 (46.81)	218.97 (53.19)	46.34 (100.00)	17.20 (37.12)	17.10 (36.90)	12.04 (26.00)	0.90
2.87 - 4.71	517.47	444.42 (100.00)	272.19 (61.25)	172.23 (35.75)	73.05 (100.00)	22.05 (30.18)	11.10 (15.20)	39.90 (54.62)	0.86
4.72 - 6.96	527.18	452.82 (100.00)	303.64 (67.06)	149.18 (32.94)	74.36 (100.00)	42.80 (57.56)	3.56 (4.79)	28.00 (37.65)	0.86
6.97 - 10.65	564.33	486.02 (100.00)	352.12 (72.45)	133.90 (27.55)	78.31 (100.00)	50.10 (63.98)	0.00 (0.00)	28.21 (36.02)	0.86
10.66 & above	781.83	633.49 (100.00)	485.22 (76.59)	148.27 (23.41)	148.34 (100.00)	117.40 (79.14)	0.00 (0.00)	30.94 (20.86)	0.81
All	565.48	482.89 (100.00)	317.31 (65.71)	165.58 (34.29)	82.59 (100.00)	48.72 (59.00)	6.54 (7.92)	27.33 (33.08)	0.85

Figures in bracket indicate percentage distribution.

Table 9.4D : (contd.)

Size groups (hectare)	Total no. of days (col.(3) + col.(6))	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Farm servant					
Below 2.87	14.29	10.47 (100.00)	10.26 (97.99)	0.21 (2.01)	3.82 (100.00)	1.67 (43.72)	0.00	2.15 (56.28)	0.73
2.87 - 4.71	80.69	69.19 (100.00)	52.61 (76.04)	16.58 (23.96)	11.50 (100.00)	5.06 (44.00)	0.00	6.44 (56.00)	0.86
4.72 - 6.96	182.85	166.81 (100.00)	116.53 (69.86)	50.28 (30.14)	16.04 (100.00)	6.58 (41.02)	0.00	9.46 (58.98)	0.91
6.97 - 10.65	235.12	218.57 (100.00)	136.07 (62.26)	82.50 (37.74)	16.55 (100.00)	5.86 (35.41)	0.00	10.69 (64.59)	0.93
10.66 & above	579.95	563.17 (100.00)	447.39 (79.44)	115.78 (20.56)	16.78 (100.00)	0.00 (0.00)	0.00	16.78 (100.00)	0.97
All	213.38	199.78 (100.00)	147.69 (73.93)	52.09 (26.07)	13.60 (100.00)	3.87 (28.46)	0.00	9.73 (71.54)	0.94

Figures in bracket indicate percentage distribution.

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Punjab

The results presented in Table 9.4E for this region show that :

(i) intensity of employment of annual farm servants is higher than the employment of family labour in the largest farm size group;

(ii) proportion of farm work to total work is greater for family labour in the case of smaller sized farms, such proportion in the case of annual farm servants is more or less the same for all size groups;

(iii) within the farm work category, family labour in the smaller sized farms devoted to 'crop production' is less compared to larger sized farms. This is also true for annual farm servants;

(iv) family labour as well as labour of farm servants in larger sized farms are comparatively more intensively utilised on 'non-farm work' than in smaller sized farms. Intensity of non-farm work, however, is greater among the family labourers than among farm servants in all the size groups.

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Table 9.4E : Distribution of labour days per farm by farm size groups and types of work : Punjab (Ferozepur), 1969-70.

Size groups (hectare)	Total no. of days [col.(3) + col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Other functions	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Family labour					
Below 6	496.43	427.50 (100.00)	223.86 (52.36)	203.64 (47.64)	68.93 (100.00)	0.00	0.00	68.93 (100.00)	0.86
6 - 9	562.89	473.14 (100.00)	263.42 (55.67)	209.72 (44.33)	89.75 (100.00)	0.00	0.00	89.75 (100.00)	0.84
9 - 14	582.98	477.85 (100.00)	285.66 (59.78)	192.19 (40.22)	105.13 (100.00)	0.00	0.00	105.13 (100.00)	0.82
14 - 24	724.58	576.89 (100.00)	367.19 (63.65)	209.70 (36.35)	147.69 (100.00)	0.00	0.00	147.69 (100.00)	0.80
24 & above	543.43	408.58 (100.00)	281.47 (68.89)	127.11 (31.11)	134.85 (100.00)	0.00	0.00	134.85 (100.00)	0.75
All	574.75	464.91 (100.00)	279.26 (60.07)	185.65 (39.93)	109.84 (100.00)	0.00	0.00	109.84 (100.00)	0.81

Figures in bracket indicate percentage distribution.

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Table 9.4E : (contd.)

Size groups (hectare)	Total no. of days [col.(3) + col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Other functions	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Farm servant					
Below 6	116.99	109.69 (100.00)	63.36 (57.76)	46.33 (42.24)	7.30 (100.00)	0.00	0.00	7.30 (100.00)	0.94
6 - 9	242.57	219.71 (100.00)	142.29 (64.76)	77.42 (35.24)	22.86 (100.00)	0.00	0.00	22.86 (100.00)	0.91
9 - 14	409.49	384.78 (100.00)	269.81 (70.12)	114.97 (29.88)	24.71 (100.00)	0.00	0.00	24.71 (100.00)	0.94
14 - 24	656.14	618.88 (100.00)	425.11 (68.69)	193.77 (31.31)	37.26 (100.00)	0.00	0.00	37.26 (100.00)	0.94
24 & above	1158.24	1073.25 (100.00)	806.46 (75.14)	266.79 (24.86)	84.99 (100.00)	0.00	0.00	84.99 (100.00)	0.93
All	446.67	417.74 (100.00)	282.37 (67.59)	135.37 (32.41)	28.93 (100.00)	0.00	0.00	28.93 (100.00)	0.94

Figures in bracket indicate percentage distribution.

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Maharashtra

Presented in Table 9.4F are the results of our analysis for this region, the major findings of which reveal that :

(i) intensity of employment of annual farm servants is much lower than the employment of family labour in all the size groups;

(ii) proportion of farm work to total work increases with size in the case of family labour and it is more or less the same in the case of annual farm servants;

(iii) within the farm work category, family labour in the larger sized farms devoted to 'crop production' is greater than the smaller sized farms. This is also true for annual farm servants. Smaller sized farms, on the other hand, employ family labour as well as labour of annual farm servants with a higher intensity in the activities 'other than crop production';

(iv) within the category of 'non-farm work', a family worker of smaller size groups devotes the major part of his labour to others by hiring himself out. A family worker of larger sized farms spends the major part of his non-farm labour to working for others on 'exchange or gratis' basis. In the case of annual farm servants, there seems to be no major difference between smaller and larger sized farms in the matter of the pattern of utilisation of their labour in non-farm activities.

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Table 9.4F : Distribution of labour days per farm by farm size groups and types of work : Maharashtra (Ahmednagar), 1967-68.

Size groups (hectare)	Total no. of days (col.(3) + col.(6))	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Family labour					
Below 4.25	302.94	201.96 (100.00)	162.69 (80.56)	39.27 (19.44)	100.98 (100.00)	9.35 (9.26)	82.28 (81.48)	9.35 (9.26)	0.67
4. - 7.07	392.08	294.64 (100.00)	234.32 (79.53)	60.32 (20.47)	97.44 (100.00)	16.24 (16.67)	67.28 (69.05)	13.92 (14.28)	0.75
7.08 - 10.71	430.92	359.10 (100.00)	300.58 (83.70)	58.52 (16.30)	71.82 (100.00)	18.62 (25.93)	29.26 (40.74)	23.94 (33.33)	0.83
10.72 - 16.38	493.35	430.56 (100.00)	343.85 (79.86)	62.79 (20.14)	86.71 (100.00)	50.83 (58.62)	17.94 (20.69)	17.94 (20.69)	0.87
16.39 & above	379.94	370.26 (100.00)	331.54 (89.54)	38.72 (10.46)	9.68 (100.00)	4.84 (50.00)	4.84 (50.00)	0.00 (0.00)	0.97
All	399.35	328.30 (100.00)	271.95 (82.84)	56.35 (17.16)	71.05 (100.00)	14.70 (20.69)	44.10 (62.07)	12.25 (17.24)	0.82

Figures in bracket indicate percentage distribution.

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Table 9.4F : (contd.)

Size groups (hectare)	Total no. of days [col.(3) + col.(6)]	Farm work			Non-farm work				Proportion of farm work to total work
		Total	Crop production	Other than crop production	Total	Exchange or gratis	Hired out	Service and business	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Farm servant					
Below 4.25	26.40	25.68 (100.00)	13.80 (53.74)	11.88 (46.26)	0.72 (100.00)	0.48 (66.67)	0.24 (33.33)	0.00 (0.00)	0.97
4.25 - 7.07	49.25	47.25 (100.00)	35.75 (75.66)	11.50 (24.34)	2.00 (100.00)	1.00 (50.00)	0.00 (0.00)	1.00 (50.00)	0.96
7.08 - 10.71	163.10	140.70 (100.00)	104.30 (74.13)	36.40 (25.87)	22.40 (100.00)	19.60 (87.50)	0.00 (0.00)	2.80 (12.50)	0.86
10.72 - 16.38	92.61	88.20 (100.00)	66.15 (75.00)	22.05 (25.00)	4.41 (100.00)	1.47 (33.33)	0.00 (0.00)	2.94 (66.67)	0.95
16.39 & above	299.70	287.55 (100.00)	180.90 (62.91)	106.65 (37.09)	12.15 (100.00)	6.75 (55.56)	0.00 (0.00)	5.40 (44.44)	0.96
All	120.64	114.26 (100.00)	80.04 (70.05)	34.22 (29.95)	6.38 (100.00)	4.06 (63.64)	0.00 (0.00)	2.32 (36.36)	0.95

Figures in bracket indicate percentage distribution.

So far we have presented and discussed the results of our analysis for the six regions of India separately. We may now sum up the major findings of our analysis. Three types of relations may be studied from these findings namely, (i) between family labour and farm size groups, (ii) between annual farm servant and farm size groups, (iii) between family labour and annual farm servants.

Family Labour and Farm Size Groups

1. Intensity of employment of family labour increases with the farm size groups or decreases only in the biggest ones in the majority of the cases.

2. There is a tendency of proportion of farm work to total work to increase with the increase of farm size groups or to remain more or less at the same level.

3. Within the farm work category, the proportion of days of family labour devoted to 'crop production' increases with the size of holdings or remains more or less at the same level.

4. Within the 'non-farm work' category, the proportion of days of family labour that is 'hired out' decreases very sharply as farm size increases.

5. Within the category of 'non-farm work', a family worker of smaller sized farms devotes the major part of his labour to others by hiring himself out, whereas a family worker of larger sized farms spends the major part of his non-farm labour to 'service and business' or working for others on 'exchange or gratis' basis.

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Annual Farm Servant and Farm Size Groups

1. Intensity of employment of annual farm servants increases very sharply with the increase of farm size groups.

2. There is a tendency of proportion of farm work to total work to increase with the increase of farm size groups or to remain more or less at the same level.

3. Within the farm work category, the proportion of days of annual farm servants devoted to 'crop production' increases with the size of holdingsor remains more or less at the same level.

4. Within the 'non-farm work' category, the proportion of days of annual farm servants devoted to 'service and business' occupies significant place and hiring out of farm servants' labour is insignificant for all the size groups in the majority of the cases.

Family Labour, Annual Farm Servant and Farm Size Groups

1. Intensity of employment of annual farm servants is less compared to family labour of corresponding farm size groups in the majority of the cases.

2. There seems to be no major difference between farm and non-farm work in respect of the pattern of utilisation of family labour as well as labour of annual farm servants.

3. Within the farm work category, the proportion of days of family labour devoted to 'crop production' is lower than that of labour of annual farm servants for all the size groups as a whole in the

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majority of the cases. This is true for the larger size groups but not for the smaller size groups in the majority of the cases.

4. Within the 'non-farm work' category, the labour of annual farm servants is utilised by the small farmers on 'service and business' or working for others on 'exchange or gratis' basis, whereas the family labour is utilised by these farmers mainly for hiring out. Hiring out of labour of both these two categories is, however, insignificant in the larger sized farms.

We may now put forward our view about the relationship of farm size and the intensities with which two categories of agricultural labourers are employed in different types of farm and non-farm work.

In the regions, for which data are available, small farmers tend to utilise family labour intensively in the sense that they put in more of family labour days in crop production than in other farm or non-farm activities. They employ hired labour whenever necessary to supplement family labour and put the major part of hired labour days into farm work and very little into non-farm work. They also utilise surplus family labour time by hiring out labour for others. They make all these efforts for their survival. They always try to meet a certain basic minimum need of consumption, and for this reason, a small farmer always tries to utilise family labour input fully and satisfactorily. He also tries to optimize utilisation of farm servant days whenever employed. But since the size of holding is very small, the farmer cannot always

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utilise the farm servant days into more productive agricultural works throughout the year. The underutilised or unutilised farm servant days are then channelled into attending to household chores of the farmer.

Big farmers, on the other hand, do not utilise family labour intensively, not even in the peak seasons, but hire labourers. Though the family workers of these farms are formally engaged in agriculture, but most often they do not do full-time work. Farmers of these size groups thus employ farm servants for the whole agricultural year for various types of operations connected with cultivation. Since there is a great scope to utilise the services of farm servants throughout the year in the larger sized farms, farmers utilise the labour of farm servants more intensely compared to the other size classes.

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CHAPTER 10

Transformations of Labour Use in Agriculture

The major break-through in agriculture occurred through the evolution of HYV technology around 1965 in several regions of India, especially in Punjab and Western U.P. The immediate impact of this biological innovation, together with increased use of fertilizers, irrigation, and improved farm machineries, was an increase in output and total costs of cultivation. While the new agricultural technology has significantly increased foodgrains production in several areas of the country, relatively less has been known about its impact on farm employment. This chapter is mainly concerned with assessing the possible effects of the new technology on farm employment. The chapter is divided into two sections. Section I presents some quantitative results pertaining to the interrelations between different kinds of technology and farm employment. Section II reviews the work on this field by other research workers.

I

In this section we have based ourselves on comparisons of Farm Management data pertaining to different time points in those cases where they are comparable [e.g., FMS : Punjab (Ferozepur) 1954-57 & 1967-70; U.P. (Muzaffarnagar) 1954-57 & 1966-69; West Bengal (Hooghly) 1954-57 & 1970-73]. It may be mentioned at the very outset that the

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intensity of labour use per hectare of cultivated area as reported by the FMS has increased during the 1960s over that of the 1950s in all the regions referred to above. This increase may be attributed to (a) expansion of irrigation, (b) the so called new technology, and (c) associated changes in the cropping pattern. In the absence of detailed information on (a), we have focussed our attention on items (b) and (c) for which increase of labour use can be separately worked out from the data of cropping pattern.

Presented in Tables 10.1A & B, 10.2A & B and 10.3A & B are the results of our analysis for three regions of India, namely, Punjab (Ferozepur), Uttar Pradesh (Muzaffarnagar), and West Bengal (Hooghly) respectively. We have tried to isolate the changes in farm employment due to the two major factors namely 'acreage expansion' and 'new technology'. Interaction effect of these two factors upon farm employment has also been worked out. The methodology used is as follows.

We have computed for each crop in each region the change in acreage as well as the change in employment during the two time periods for which data are available. Thus, for each crop, the change in employment due to acreage alone is given by : $(\Delta A)L^{50}$ where ΔA is change in acreage and L^{50} is the labour input per hectare in 1950. Similarly, change in employment due to technology alone is given by : $A^{50}(\Delta L)$ where A^{50} is the acreage in 1950 and ΔL is the change in per hectare labour input. Combining all the crops together, we can have the total change in employment due to acreage alone and that due to technology

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alone for each region. We have to take separate account of the employment associated with the completely new crops i.e., crops which are grown in the 1970s or in the 1960s but not in the 1950s. We have also to take account of the ~~combined~~ interaction effect of acreage and technology upon farm employment by computing $\Delta A \times \Delta L$ where ΔA denotes the change in acreage and ΔL denotes the change in per hectare labour input. We now turn to a discussion of the results.

We shall start by taking a look at the results presented in Tables 10.1A and 10.1B for the region of Punjab. It is seen that except for unirrigated or "desi" wheat, the acreages of all the other crops have increased significantly so that total employment due to acreage change alone has increased to a considerable amount.

Table 10.1A : Cultivated area and intensity of labour input of major crops in Punjab (Ferozepur): 1955-56 and 1968-69.

Crops	Cultivated area (in hectare)		Labour input per hectare (in days)	
	1955-56	1968-69	1955-56	1968-69
(1)	(2)	(3)	(4)	(5)
(a) Irrigated or Mexican wheat	437.40	702.24	55.01	62.20
(b) Unirrigated or Desi wheat	230.91	170.70	33.95	50.55
(c) American cotton	251.92	373.44	82.00	57.06
(d) Desi cotton	37.07	71.31	86.45	84.52
(e) Paddy	-	78.05	-	64.92
(f) Desi maize	-	87.39	-	70.13

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Table 10.1B : Changes in employment, Punjab (Ferozepur) between 1955-56 and 1968-69.

(In days)

Crops	Change due to old and new crops	Acreage effect: $(A^{69}-A^{56})L^{56}$	Technology effect: $(L^{69}-L^{56})A^{56}$	Interaction effect : $(A^{69}-A^{56})(L^{69}-L^{56})$	Total change in employment : $(A^{69}L^{69}-A^{56}L^{56})$
(1)	(2)	(3)	(4)	(5)	(6)
Old :	-				-
New :					
(a) Improved paddy	+5,067.01				+5,067.01
(b) Desi maize	+6,128.66				+6,128.66
Present both in 1956 and 1969 :					
(a) Irrigated or Mexican wheat		+14,568.85 (+74.26)	+3,144.91 (+16.03)	+1,904.20 (+9.71)	+19,617.96
(b) Unirrigated or Desi wheat		- 5,044.13 (-258.92)	+3,833.11 (+485.52)	- 999.49 (-126.60)	- 789.49
(c) American cotton		+ 9,964.64 (+1530.55)	-6,282.88 (-965.04)	+3,030.71 (-465.51)	+ 651.05
(d) Desi cotton		+ 2,960.05 (+104.88)	- 71.55 (-2.54)	- 66.08 (-2.34)	+2,822.42
Total	+11,195.67 (+31.92)	+25,449.41 (+72.55)	+623.59 (+1.78)	-2,192.08 (-6.25)	+35,076.59

Note : Figures in bracket indicate percentage of total change in employment.

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It is interesting to note that the overall impact of technology alone upon farm employment is marginally positive, although for some individual crops its contribution is negative. However, the increased employment due to acreage alone is much higher than the increased employment due to technology alone. The role of new crops with regard to increasing new employment can, at least, partly be attributed to technology if it has been possible to introduce a number of new crops (viz., Paddy, Maize etc.,) that is surely due to the technological developments of the 1960s.

Table 10.24 : Cultivated area and intensity of labour input of major crops in Uttar Pradesh (Muzaffarnagar): 1954-55 and 1968-69.

Crops	Cultivated area (in hectare)		Labour input per hectare (in days)	
	1954-55	1968-69	1954-55	1968-69
(1)	(2)	(3)	(4)	(5)
(a) Sugarcane planted	110.53	217.92	196.37	114.00
(b) Sugarcane ratoon	89.07	140.91	140.79	99.00
(c) Paddy	47.00	130.95	92.63	69.00
(d) Unirrigated or Desi wheat	79.76	280.69	76.57	54.45
(e) Irrigated or HY wheat	168.83	70.21	106.21	62.18
(f) Maize	72.04	52.83	74.10	46.14
(g) Gram	75.14	55.19	34.58	31.00
(h) Cotton	12.57	-	83.98	-
(i) Pea	-	54.35	-	27.53
(j) Gochani	-	22.32	-	55.84

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Table 10.2B : Changes in employment, Uttar Pradesh (Muzaffarnagar) between 1954-55 and 1968-69.

(in days)

Crops	Change due to old and new crops	Acreage effect: $(A^{69}-A^{55})L^{55}$	Technology effect: $(L^{69}-L^{55})A^{55}$	Interaction effect: $(A^{69}-A^{55})(L^{69}-L^{55})$	Total change in employment : $(A^{69}L^{69}-A^{55}L^{55})$
(1)	(2)	(3)	(4)	(5)	(6)
Old :					
Cotton	-1,053.62				-1,053.62
New :					
(a) Pea	+1,496.26				+1,496.26
(b) Gochani	+1,246.35				+1,246.35
Present both in 1955 and 1969 :					
(a) Sugarcane planted		+21,088.17 (+672.00)	-9,104.36 (-290.12)	-8,845.71 (-281.88)	+3,138.10
(b) Sugarcane ratoon		+7,298.55 (+517.65)	-3,722.24 (-264.00)	-2,166.39 (-153.65)	+1,409.92
(c) Paddy		+7,776.29 (+166.09)	-1,110.61 (-23.72)	-1,983.74 (-42.37)	+4,681.94
(d) Unirrigated or Desi wheat		+15,385.21 (+167.66)	-1,764.29 (-19.23)	-4,444.57 (-48.43)	+9,176.35
(e) Irrigated or HY wheat		-10,475.42 (+77.21)	-7,433.59 (+54.79)	+4,342.24 (-32.00)	-13,566.77
(f) Maize		-1,423.46 (+49.07)	-2,014.24 (+69.44)	+ 537.11 (-18.51)	-2,900.59
(g) Gram		- 689.87 (+77.74)	-269.00 (+30.31)	+ 71.42 (-8.05)	- 887.45
Total	+1,688.99 (+61.63)	+38,959.47 (+1421.62)	-25,418.33 (-927.51)	-12,489.64 (-455.74)	+2,740.49

Note : Figures in bracket indicate percentage of total change in employment.

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Coming now to the data presented in Tables 10.2A and 10.2B for the region of Uttar Pradesh, it is seen that for all the individual crops, technology displaces labour to a very large extent and higher employment due to increase in acreage barely compensates for this displacement. Although the new crops contribute towards greater employment in the later period, its effect is lessened by the disappearance of some other crops which were grown in the 1950s. Thus, it appears that the impact of technology upon farm employment is very much pronounced in a negative fashion in this region.

Table 10.3A : Cultivated area and intensity of labour input of major crops in West Bengal (Hooghly) : 1954-55 and 1970-71.

Crops	Cultivated area (in hectare)		Labour input per hectare (in days)	
	1954-55	1970-71	1954-55	1970-71
(1)	(2)	(3)	(4)	(5)
(a) Paddy	91.43	47.79	130.20	125.30
(b) Jute	17.69	16.61	206.79	200.76
(c) Potato	3.96	9.28	442.53	278.07
(d) Pulses	9.82	-	50.29	-
(e) Improved paddy	-	13.40	-	204.07
(f) Wheat	-	2.92	-	126.02

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Table 10.3B : Changes in employment, West Bengal (Hooghly) between 1954-55 and 1970-71.

(in days)

Crops	Change due to old and new crops	Acreage effect: $(A^{71}-A^{55})L^{55}$	Technology effect : $(L^{71}-L^{55})A^{55}$	Inter-action effect: $(A^{71}-A^{55})(L^{71}-L^{55})$	Total change in employ-ment : $(A^{71}L^{71}-A^{55}L^{55})$
(1)	(2)	(3)	(4)	(5)	(6)
Old :					
Pulses	-493.85				-493.85
New :					
(a) Improved paddy	+2,734.54				+2,734.54
(b) Wheat	+ 367.98				+ 367.98
Present both in 1955 and 1971 :					
(a) Paddy		-5,681.93 (+96.04)	-448.01 (+7.57)	+213.84 (-3.61)	-5,916.10
(b) Jute		- 223.36 (+69.04)	-106.67 (+32.97)	+ 6.51 (-2.01)	- 323.49
(c) Potato		+2,354.26 (+284.31)	-651.26 (-78.65)	-874.93 (-105.66)	+ 828.07
Total	+2,608.67 (-93.07)	-3,551.00 (+126.69)	-1,205.94 (+43.03)	-654.58 (+23.35)	-2,802.85

Note : Figures in bracket indicate percentage of total change in employment.

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Results of our analysis pertaining to West Bengal (Hooghly) present a somewhat different picture. As is in Tables 10.3A and 10.3B, among the three major crops in this region, cropped area has decreased in the case of two. As a result, employment has decreased significantly over time due to acreage changes; employment has also decreased due to technology change but not to the same extent. Like other regions, this region is also marked with new crops giving rise to new employment, the decrease in employment due to change in acreage as well as change in technology is much higher than the increase in employment due to these new crops. Thus, in the case of West Bengal, a large amount of labour displacement seems to have taken place over time which is largely due to the changes in the cropping pattern.

Thus, the data analysed separately for the three regions of India give three distinct pictures of farm employment. In the case of Uttar Pradesh, farm technology is the most important factor accounting for change in farm employment; in the case of West Bengal, change in the cropping pattern is the most important factor; and in the case of Punjab, changes in farm technology and those in cropping pattern combine to accelerate the changes in farm employment. One thing that we may conclude is that farm employment implications of different kinds of technical inputs vary from one region to another, and it is misguiding to treat these effects as if they are the same everywhere.

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Our analysis suggests that modern farm technology (water-seed-fertilizer technology including the use of modern farm machinery) mostly displaces labour. This displacement of labour is sometimes minimised or nullified by the increased employment resulting from increase in acreage, changes in cropping pattern etc. The hypothesis suggests itself that whenever there is a substantial increase of labour use it is associated with shifts in cropping pattern and or irrigation.

We shall now in the next section briefly review the work that has been done and the conclusions that have been drawn by other research workers.

II

In studying farm employment implications of technological change, some scholars have examined the effects of HYV technology viewed narrowly i.e., the 'water-seed-fertilizer' innovations whereas some others have examined exclusively the effects of mechanisation, and some have examined the combined effects of the water-seed-fertilizer technology and mechanisation. The methodology that has been mostly used in these studies has been cross-section comparisons of various types of farms at the same point of time.

No one seriously doubts that the HYV technology (water-seed-fertilizer based technology) has substantially increased employment in agriculture. But regarding the employment impact of farm mechanisation there has been a lot of controversy. In fact, some investigators have

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observed in their surveys that the intensity of labour use on the tractorised farms is higher than on bullock operated farms (Sarkar and Prahladachar [1966]; Wills [1971]; Grewal and Kahlon [1972]; Sharma, R. K. [1972]; Acharya [1973]; Randhawa [1974]) but some others who have made similar studies in the same regions report having got opposite results (Singh [1968]; Singh and Singh [1972]; Sharma, A. C. [1976]).

The basic objection that has been raised by some against both these two kinds of studies mentioned above is that they attribute to tractorisation increments in yield, output, employment, productivity and profitability per unit of land, whereas strictly speaking none of these result from tractorisation per se but reflect effects of irrigation, intensity of cropping, cropping pattern etc. Only a few studies (e.g., Billings and Singh [1969], [1970a]; Raj Krishna [1974]) sort out the effects of tractorisation from these other effects.

The studies undertaken by Billings and Singh [1969, 1970a] show that HYV seeds appear to have increased the demand for human energy in Punjab, but mechanical appliances like pump-sets, tractors, and threshers appear to have reduced the same. They conclude that a change in technology displaces labour, but this loss is to a considerable extent offset by the additional labour required by the increase in cropping pattern and cropping intensity. It may be recalled that the results of our analysis in the former section also suggest this, but not in the same fashion. Our analysis suggested that not only changes in technology and cropping pattern but also acreage change for the same crops play a major role in changing labour absorption.

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Coming now to an exercise done by Raj Krishna [1974] we get a somewhat different picture. The exercise, carried out with data of the same region, considered the employment effects for all crops taken together in terms of cropping pattern, cropping intensity, specified items of mechanisation, and the interaction among these factors. He considered an extreme condition where mechanisation has been introduced in every operation of agriculture. The employment effect of tractor is found to be negative and this displacement of labour is not offset by the additional labour required by changes in cropping intensity and cropping pattern.

According to Hanumantha Rao [1975], a complementary relationship exists between the uses of certain modern inputs and the tractor, particularly in the larger farm size groups, and his important finding is that labour displacement takes place in the larger sized farms but not in the smaller size classes. Data pertaining to Ferozepur for 1968-69 and 1969-70 show that among the farms characterised by partial tractorisation direct displacement of labour associated with tractor use seems to have been more or less compensated by the indirect increase of employment of labour consequent on the increase in yield as a result of tractor use.

We may here refer to the results of our own analysis presented in Section I where it has been shown that the impact of technology on labour use may be neutralised by factors like increased acreage, cropping pattern, irrigation, new crops etc. According to us there is no basis to assume the existence of a complementary relationship as a

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general phenomenon for the following reasons :

(a) It is not true that all larger sized farms in all regions substitute capital for labour whether or not modern inputs have been used. There are empirical evidences which show that the larger farms in many places even in the agriculturally better-endowed regions like Punjab, Uttar Pradesh etc., devote more labour and apply less capital and other non-monetised inputs than smaller sized farms and obtain the same amount of production or more (for details see Chapter 7).

(b) There is no dearth of evidence to show that farmers other than the biggest also use tractors (either hired or owned) particularly for some specific agricultural operations for time scheduling and intensive cultivation. They also choose such cropping patterns which promise high returns.

(c) Although wide-scale tractor use by larger sized farms in some particular areas (Punjab, Uttar Pradesh etc.,) is obviously a recent phenomenon, evidence presented by some authors indicates that there are many instances in which larger farms have used tractors before the innovation of HYV seeds especially in Punjab (Iyengar [1949]; Patil [1949]; Sivaswamy [1949]). These farms used tractors without HYV seeds for better management and intensive cultivation.

Considering all these, it is our view in this context that the process of mechanisation does not follow any rigid pattern. Farmers who own better productive capital and other non-monetised inputs have a better access to modern inputs. This is likely to lead

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to greater use of irrigation and purchased inputs, and thus to higher cropping intensities and yields. Furthermore, the tractor operated farms might choose cropping patterns which would emphasize crops with high returns but would require at the same time relatively large amounts of purchased inputs. All these effects may lead to higher production, higher intensity of cropping and higher use of bullock and human labour.

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CHAPTER 11

Conclusion

In this concluding chapter we take an overall view of the changing role of labour under the changes that are taking place in the conditions of Indian agriculture in the light of the results presented in the preceding chapters.

It is a well-known fact that agriculture in the pre-1955 period was marked by the presence of landlordism centering round both the zemindari as well as ryotwari systems. This became possible owing to the concentration of a high proportion of cultivated land vested to them who leased it out to peasants and lived on rent or combined this with extraction of labour-rent from hereditary farm servants. Agrarian economy of the pre-1955 period, as per the opinion of some political economists, was one that caused pauperisation of the peasantry and the depression of agricultural labourers as a whole. Under conditions of patron-client relationship, usury and land policy played an important role in producing these results[1/].

Agrarian structure has not remained static since then. For a number of factors, mostly exogeneous in nature, has effected a significant change in its content and contour. Among these factors mention may be made of : (a) implementation of land reform legislation; (b) the impact of an expanding domestic market for agricultural products as a result of large-scale government outlays under the plans

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1/ See, Sen [1962], Chattopadhyay, P. [1972a, 1972b], Patnaik [1976] for an extensive discussion of this point.

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from the mid-fifties in particular; (c) technical changes introduced in agriculture by encouragement of private investment in improved techniques by the government etc.

About the employment situation in particular, it appears that (a) intensity of employment in agriculture has gone up during recent times for all the regions at any rate compared to the pre-sixties; (b) intensity of employment has gone up significantly from the mid-sixties in the green revolution areas compared to non-green revolution areas; (c) proportion of hired labour has gone up for all the regions, especially in the green revolution areas; and (d) share-cropping tenancy has declined and owner cultivation with hired labour has gone up.

From these, one would expect that traditional types of labour contracts to have become less prevalent and subsequent replacement of them by more commercial types would have taken place. We get such an impression from whatever little information has been collected in connection with the emerging employer-labour relations. Of course that is not enough to generalise about the country as a whole.

One would also expect to find rising wage rates for agricultural labourers. One of the significant findings in this context is that during the period since the mid-sixties, there are divergent tendencies in the movements of agricultural wage rates in the different states than in earlier periods (Chapter 4). The second important feature of changes in agricultural wage rates is that in most areas, they have lagged behind the rise in the labourers' cost of living (Chapter 4). This has happened possibly for the reason that the organised bargaining power of labourers

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has not yet developed. However, our study indicates that real wages of agricultural labourers in the so-called green revolution areas have increased or at least not decreased, and the average levels of living of labourers in these areas is better than in the other regions of India. It seems to us that wage gain is a function not just of labourer's institutional bargaining power such as in the case of Kerala, Tamil Nadu etc., but also of higher demand for labour generated by the agricultural development.

The increase in demand has not been large enough in most parts of the country in view of the increase in rural labour force in general and agricultural labourers in particular. The vast rural labour force depending on traditional methods of cultivation, carrying with it a large population of surplus labour without any alternative sources of employment and income, seems to have not been able to maintain their livelihood at a bare minimum. They are so dependent on their employers for credit and living space as well as for employment that collective bargaining to ensure a minimum level of living against rises in food prices and to allocate to them a fair share of the rising yields has been still a minor and localised phenomenon (Chapter 5). It is in this context that one has to evaluate the overall proletarianisation and immiserisation of rural workers in India.

It may be suggested that 'want of work' is a general corollary of the overall proletarianisation and immiserisation of the agricultural workers. It has already been observed in Chapter 1 that the number of rural workers has been increasing over the last few decades for various

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reasons. Concurrently, the increase in employment in the rural sector is also in clear evidence (Chapter 2). But at the same time, the increase in the latter is not commensurate with that in the former. Also, the rate of growth achieved in the non-agricultural sector and the technology adopted in that sector do not help much to reduce the dependence on agricultural employment (Chapter 2). In the agricultural sector majority of farm workers do not get employment throughout the year, not even in the agriculturally better-endowed regions such as Pubjab, Uttar Pradesh etc., (Chapter 3). On the same ground, their annual earnings are so low that they cannot meet even their minimum consumption needs (Chapter 6).

These evidences suggest that the labour demand generated by agricultural growth and the employment effect of technological changes have not only got to be large enough to absorb the growing rural labour force, but also to be biased in its composition in favour of wage labourers. In this context, one can consider the changes in farmer-labour relations, in the modes of employment and in the contracts used for hiring labour in agriculture that have recently been observed as a part of agrarian transformation in scattered areas.

For evaluating the employment effect of recent agricultural growth with technological change, we may once again refer to the results of our analysis presented in Chapter 10. We have found that a substantial increase in labour-use by modern farms has taken place which is mainly associated with shifts in cropping pattern or irrigation. It is suggested by certain studies that HYV technology including the use of farm machinery has raised the demand for attached labourers or permanent farm

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servants more than that of casual labourers (Singh [1968]; Raj Krishna [1974]; Sharma, A. C. [1976].

However, three points clearly emerge from the available studies including those of our own : (a) water-seed-fertilizer innovation has a clearly positive employment effect; (b) purely labour saving devices like harvesters has a clearly negative effect; and (c) employment effect of tractor is a variable one; it depends on the extent to which tractor is used in different farming operations. From these evidences, we may conclude that HYV technology excluding farm machineries (i.e., elements of water, seed and fertiliser only) in agriculture is favourable to all categories of agricultural labourers from the view point of their employment and income. It is, therefore, desirable that the application of water-seed-fertiliser mix technology should be widespread in various parts of the country so that employment opportunities of agricultural labourers are enlarged.

Irrigation, in particular plays a major role in bringing about the growth of employment because of the fact that growth of fertiliser use or increase of the use of HYV seeds for multiple cropping are largely dependent on the incidence of irrigation. For a better prospect of employment of agricultural labourers, rapid increase of irrigated areas in the country-side is extremely important. Contextually, it may be noted that according to official statistics, out of 142.7 mn. hectares of net sown area, only 32.6 mn. hectares were irrigated at the all-India level during the year 1973-74. That is, nearly 77 per cent of total net sown area is yet to be irrigated. Similarly, nearly 28 per cent and 35 per cent of

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total cropped area for the years 1973-74 and 1975-76 respectively are treated as HYV areas at the all-India level. All these clearly indicate that there is enough scope for increasing employment opportunities in agriculture through irrigation development.

Doubts can be expressed in this connection as to whether, in view of the small holdings and meagre resources of the majority of cultivators, it is possible to use HYV technology to any appreciable extent. The doubts are strengthened by the fact that a large farmer bias in the adoption of the water-seed-fertilizer innovation has been noticed in the so called green revolution areas. Big farmers have decisive advantages over the smaller ones in respect of their own capital as well as credit facilities. The official policies of low incidence on agricultural incomes and assets, and of subsidisation of modernising inputs have encouraged big landowners to take more and more direct interest in large-sized farming. On the other hand, economic pressures might have forced out the small farmers (either owners or tenants) and made them join the swelling ranks of agricultural labourers, particularly in view of the costlines and credit-intensity of the new agricultural technology.

Further more, greater use of permanent labour contracts (often with new tying instruments replacing the traditional ones) by the large farmers in many of the green revolution areas has been reducing the potential bargaining strength of the labourers (Bhalla [1976]). Permanent labourers-often picked out from households cultivating

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tiny farms and dependent on the employer for production loan as well as job security — are the ones least interested in any form of collective bargaining.

All these evidences show that the benefits of agricultural development have been directed to a particular land-owning class (i.e., big farmer) and not towards all the rural classes. The most important necessary change without which we cannot hope for any major transformation in rural incomes and rural employment is the reduction in the relative higher profitability of large scale farming and increase in the productivity and viability of the small farmer. It is desirable to have an integrated policy framework by which the benefits of agricultural development can be dispersed among the small and middle farmers, and utilisation of increasing rural labour force can be made intensively. In this context, attention has been directed in recent years to the infrastructural investment and integrated rural works schemes by which minimum security of self-employed persons as well as availability of work of wage labourers have been expected to be assured.

In this perspective, during the fourth plan period, a number of rural development programmes were initiated on an experimental basis which include : the Crash Scheme for Rural Employment (CSRE), the Pilot Intensive 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 (MFAL) etc. Some of these schemes have been discontinued and some, namely, DPAP, SFDA and MFAL, are still continuing. The basic objective of these schemes was to

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create employment through institutional help for the economically viable investment activities of the small and marginal farmers as well as landless labourers. Employment generation through rural public works, particularly in the lean seasons of agricultural operations, was also among the aims of some of these schemes such as, DPAP, MFAL etc.

Some attempts have been made to examine the impact of these schemes upon rural employment and poverty. The studies show that the programmes have achieved certain different results which they were not meant to do (see for details, Gupta [1971]; Minhas [1972]; Rodgers [1973]; Ahuja [1978]). For example, provision of institutional credit to the marginal and small farmers particularly, both for crop production and purchase of needed farm equipment for permanent improvement of land, has not yet been possible owing to the inability of the commercial and co-operative banking structure. Promotion of a high rate of capital formation by ensuring a continuous flow, to the farmers, of supplies of essential farm inputs like high-yielding varieties of seeds, fertilisers etc., has been hampered by their being diverted to some vested interests of big farmers. This has been possible due to the weak organisations of the rural poor.

Regarding the rural public work schemes, the main objection is that these have been operated as programmes of relief to the needy sections of rural society. These reliefs are of course not adequate, they do not reach all the members of village poor, and they do not serve the basic objective of these schemes namely labour intensive development of productive forces.

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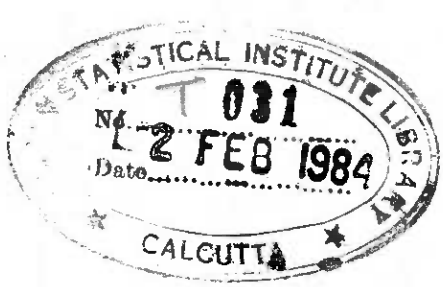

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