

P A R T - II

C H A P T E R - III

FARM LABOUR SUPPLY BEHAVIOUR WITH SPECIAL REFERENCE  
TO SOME AREAS OF THE DISTRICT OF WEST DINAJPUR.

INTRODUCTION :

The most obvious problem in a rural agrarian society emerge out of land, labour, credit and production relations.

The various institutions in the factor markets arise from land and labour markets. The phenomenon of the process of functioning of rural labour markets is of much analytical importance. Therefore, the studies of the farm-labour-supply-function and the farm-labour-demand-function are very much important from the point of view of the study of development economics in an agrarian and in a backward region of the district of West Dinajpur. The district is experienced by heavy demographic pressures resulting in high rate of growth of landless farm-labourers. The studies of the census reports of 1971 and 1981 justify this fact which is said to be an indicator of economic backwardness of the district.

In order to study the demand and supply functions of farm-labour, it is necessary to study the various economic, demographic and technological factors.

The present chapter (Chapter-III) of the study deals with the analysis of the determinants of the rural farm-labour-supply-function both theretically and empirically with special reference to some areas of the district of West Dinajpur.

LABOUR SUPPLY FUNCTION--A THEORETICAL APPROACH

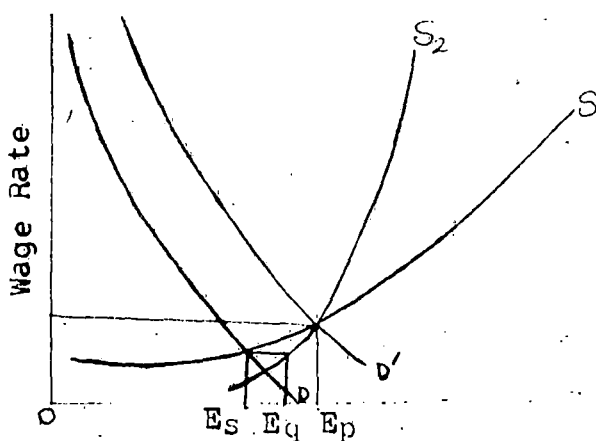
All economic problems involve scarcity and choice. The productive resources needed to bring about the satisfaction of our many and varied wants are scarce and we therefore have to make choices about how we will use them. One of these scarce resources is human labour. However, the process of functioning of rural labour markets is of much analytical importance now-a-days. But lack of data limits the scope of rigorous economic interpretation. With the advent of modern technology, the institutions of capitalism polarize the peasantry into large commercial farmers and wage labourers. The traditional institutions are being replaced by modern market institutions ; village aristocrats begin to accumulate land for commercial production by encroaching on commons, evicting tenants, and purchasing small peasant holdings. This process is augmented by modern technology in the farm sector resulting in added efficiency in large scale operations as opposed to small scale operations. This phenomenon drives off small and marginal farmers and converts them into landless agricultural labourers. The class of agricultural labourers consists of the full time farm labourers most of whom own no land or farm implements. They mainly earn through working as wage labourers.

Most landless labourers in the less developed economies are desperately poor and probably not inclined to reject any chance of extra employment in favour of leisure. Therefore, the supply function of labour is likely to be quite inelastic at least beyond a very low level of wages. Furthermore, there are evidences of

fairly inelastic supply curves of unskilled labour force in the vast rural areas.

On the other hand, the advocates of the supply-demand model assume elastic supply curves of labour. This may be due to the peak season and lean season fluctuations in agricultural employment in a year. Most of these extra peak season workers turn up in the slack season in the category "not in the labour force and waiting for the agricultural season".

It is true that in a less developed economy, the volume of agricultural employment is higher in peak season than in the lean season. During the peak season, withdrawal from labour force may be caused by so many explanatory variables other than the wage rate. But during lean season such withdrawal may be solely caused by the phenomenon of lower wage rate being offered. The voluntary withdrawal from farm labour force in rural areas in the less developed economies may be estimated by the difference between the labour market equilibrium in the lean season and that of the peak season. This may be shown with the help of the following diagram :-



Volume of labour demanded and supplied.

Figure - 1

In the above figure, the curve "D" represents demand curve for farm labour and "D'" represents the peak period demand curve. "S" curve denotes the supply curve of labour. The difference, ESEP, represents the voluntary withdrawal from labour force. Here  $E_s$  and  $E_p$  represent equilibrium supply of farm labour during slack and peak agricultural seasons respectively.

However, the same fact is also consistent with another interpretation, also shown in the above figure. This interpretation postulates a fairly inelastic supply curve of labour, " $S_2$ "; what we observe in the slack season then becomes a disequilibrium situation with involuntary unemployment equal to  $E_s E_p$ .

The supply curve of labour may also be backward sloping in a less developed economy where people have limited wants and high preference for leisure. Their limited wants could be satisfied by few hours of work at higher wages. Thus there emerges the concept of "reservation price of labour" below which labour would not be supplied. This view of the reservation or supply price of labour as the average product on the family farm is only applicable in the case where labour actually has a family farm to fall back on; it cannot determine the reservation wage for a landless labourer. The backward bending supply curve of labour refers to the fact that at some higher wage rate, the hours offered for work may decline. In such cases, the supply curve of labour may take the shape as shown below :-

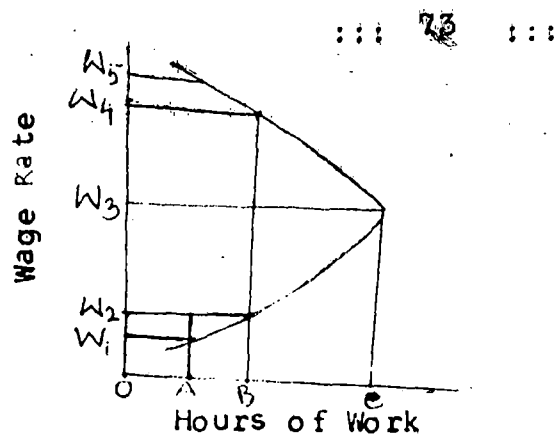


Figure-2

In figure(2), wage-increases create an incentive for increased supply of labour upto  $W_3$ . However, higher wage rates create a disincentive for longer hours of work. The reason for this behaviour is the fact that longer working hours imply less leisure-hours. As the wage rate increases, the individual's income rises, and this enables the worker to have more leisure-activities. However, the time of such activities is less. Hence, beyond a certain level of the wages rate, the supply of labour decreases as the worker prefers to use his income on more leisure-activities.

#### DETERMINANTS OF FARM-LABOUR-SUPPLY-FUNCTION :

Generally, the relationship between supply of labour and the wage rate defines the supply function of labour in either agrarian or industrial sector of an economy. Besides wage rate, there are other shift-factors determining the labour supply function. The shift-factors include, among others, (i) the tastes of consumers which define their trade-off between leisure and work; (ii) the size of population ; (iii) the labour force participation-rate ; (iv) the occupational, educational and geographical distribution of the labour force. These factors become operative mainly in the less developed economy.

In a backward and agrarian economy like that of West Dinajpur district, the suppliers of farm labour belong mostly to the

category of landless wage labour households comprising caste and tribal classes of population. Analysis of cross section variations reveals that the main determinants of the farm labour-supply are of social, demographic and economic in nature. Other than the wage variable, there are certain other variables influencing the volume and nature of the farm labour-supply. These "other variables" may be categorized as (i) the "asset effect", (ii) the "status effect" and (iii) the "income effect".

By "income effect" we mean to say income from supplementary sources other than the agricultural sources. Public works and the like constitute income from supplementary sources in the rural agrarian areas.

The "asset effect" refers to the farm-size of the households concerned who are mainly the agricultural labourers or marginal farmers possessing a small size of land. The size of farms (the "assets") play crucial role in the variations of the supply of labour.

The "status effect" represents the schooling of male members of the households under our study. This "effect" is a good indicator in the labour-supply-decision.

However, in a district like West Dinajpur, the rural areas under our study have negative income effect signifying that the higher the level of supplementary income, the smaller the number of days seeking employment in the farm sector and vice-versa.

Similarly, the "asset effect" signifies a negative correlation between the volume of farm-assets like farm-size, equipments etc. and the number of days seeking employment in the reference period. The higher the volume of assets, the lower would be the number of days for which employment is sought.

Finally, the "status effect" shows a negative correlation between the two variables viz , educational status and the volume of farm-labour-supply-function.

MEASUREMENT OF FARM-LABOUR-SUPPLY-FUNCTION WITH SPECIAL REFERENCE TO SOME SELECTED AREAS OF THE DISTRICT OF WEST DINAJPUR :

In order to estimate the phenomenon of rural farm labour supply function in the context of some areas of the district of West Dinajpur, we must, first of all, examine the method of collection of data from the respondents under our study.

COLLECTION OF DATA :

The steps in a statistical investigation, which involves collection of data, may be designated as : (i) planning the study, (ii) devising the questions and making the schedule , (iii) selecting the type of sample, (iv) using the schedules to obtain the information, (v) editing the schedules, (vi) organising the data. (vii) making finished tables and charts, (viii) analysing the findings.

However, we have tried to design our study in such a manner as to give us the desired information. In the present chapter, we have tried to estimate the farm-labour-supply-function of rural farm-households under the category of landless agricultural labourers and marginal farmers. With a view to serve our end, such areas have been selected for study most of which fall under the above categories. "Kharua", "Sundail", "Itakhor", "Betna Ramkrishnapur", "Ukhali", "Bamundanga" etc. are some of the villages selected for the purpose. Almost all of these areas are mainly inhabited by socially and economically backward sections of population like scheduled castes and tribes most of whom are landless agricultural workers and marginal farmers. The primary source of income in these areas is the farming activity. Alternative employment opportunities in the areas are very much negligible. Periodic fluctuations in agricultural activities are common as a result of which seasonal variations in labour absorption occur.

For our present study, data have been collected by conducting field survey in these areas. The method of enumeration has been followed for our purpose. The respondents were approached with some hypothetical questions regarding : (i) the number of adult men and women currently in labour force , (ii) the land area cultivated by household, (iii) the number of dependents in the family, (iv) the level of schooling among children in the family. (v) the level of education among adult males and females in the family, (vi) daily farm wage-rate in the reference period during which the survey was conducted, (vii) the number of days of employment in public works other than agriculture, (viii) number of days of employment in lean and peak agricultural seasons, (ix) identification of caste/tribal/general category.



The field survey was undertaken during 1989 in the selected areas under our study.

Apart from field survey, data were also collected through secondary sources, viz., census reports, Government publications and also from statistical, economic and some other departments of the Government.

#### LIMITATIONS OF DATA :

Data thus collected for our present study are not without limitations. Collection of data through field survey had a number of limitations. In many cases, the respondents' answers were not real and accurate. Many among them did not want to disclose the real informations related to our study. Language problem was another major constraint which made it difficult to collect data accurately.

Data collected from official sources had also certain limitations. First of all, all types of data that we required were not available. Further, the type and form of data were not in accordance with the requirements of our study. Finally most of the data, thus collected, suffered from lack of accuracy.

#### THE METHODOLOGY :

The starting point for estimating the nature of relationship between the variables which we require to test is the measurement of farm labour supply function for some of the selected areas of

the district of West Dinajpur. The problem of estimation requires the following choices :

- (a) choice of the algebraic form of the function;
- (b) choice of the variables;
- (c) choice of the form of the variables by which they would be included in the labour-supply-function;
- (d) choice of the method of statistical measurement of the function.

Before we proceed to estimate the function, we make some assumptions which are given below :

- (i) Wage rates are quoted as "acceptable" by farm labour respondents.
- (ii) Farm work in different farms during roughly the same period is homogeneous.
- (iii) The labour supply function is constituted by the number of days seeking work or reported being available for work.
- (iv) The objective of the labourer is to maximise utility with respect to the volume of work effort offered at current wage rate.
- (v) All of our respondents belonging to farm wage-labour-house holds are assumed to be in the usual labour force.
- (vi) There are very few job opportunities outside the farm.
- (vii) Most of the respondents belong to SC and ST communities.

Given these assumptions, let us choose the form of the function. In doing so, we can either experiment with a number of alternative forms or choose a function which has empirically been tested and found to be efficient in explaining the particular phenomenon.

However, in the light of our empirical findings, the farm labour supply equation in the context of the rural areas of the West Dinajpur district may be denoted algebraically by the function:

$$N(M) = F(A, C, D, P, L, E, V) \dots (i) \text{ (Males)}$$

where  $N(M)$  = Total number of male labour days available.

A = number of adult men currently in labour force.

C = land area cultivated by the household.

D = Number of dependents in the family

P = Days of employment in public works

L = Days of employment in lean agricultural season

E = Number of males who are educated above primary level

V = Average daily wage rate for male agricultural labour in the village.

Again, the algebraic function of female labour supply may be denoted as :

$$N(F) = f(A^F, C, P^F, V^F) \dots (2) \text{ (For Females)}$$

where  $N(F)$  = Total number of female-labour days available,

$A^F$  = Number of adult women currently in labour force.

C = Land area cultivated by the household.

$P^F$  = Employment in public works for females.

$V^F$  = Average daily village-wage-rate for females.

#### CHOICE AND FORM OF VARIABLES :

In the measurement of farm labour supply function of males and females, we must choose some variables to represent various social, demographic and economic factors determining the function. On the basis of our data-set collected from primary, secondary, official and Census sources, we shall use the variables in the forms of :

- (i) The dependent variable
- (ii) The explanatory variables

CHOICE OF THE DEPENDENT VARIABLE :

In the study of rural farm labour supply function, the dependent variable is the total number of farm-labour-days in the reference period which includes labour days hired out as well as the days sought for employment. Let us use the dependent variables both for males and females in order to measure the labour supply function in the agrarian sector. In symbolic forms, the dependent variables for males and females may be denoted as " NDM " and " NDF " respectively. " NDM " and " NDF " are computed as the total household labour supply variable in the farm sector.

CHOICE OF THE EXPLANATORY VARIABLE :

In the present study, we want to choose a number of explanatory variables to explain the variations in the labour supply function of farm-wage-labour-households both for males and females.

For the purpose of measurement through multiple regression analysis, let us choose the following explanatory variables in order to estimate the labour supply function of male farm-labour-households :-

- (i) Number of adult men currently in labour force ( " ALABM " )
- (ii) Area of land cultivated by the household ( CULAND ).

- (iii) Number of dependents in the family (DEP)
- (iv) Number of males who are educated above primary education in the 15-60 age group (EDUM)
- (v) Average daily wage rate for male agricultural labour in the village (VWM).

Again, let us choose the following explanatory variables for estimation of labour supply function of female farm-wage-labour households.

- (i) Number of adult female currently in labour force (ALABF)
- (ii) Area of land cultivated by the household (CULAND)
- (iii) Number of days of employment of females in public works (PWF)
- (iv) Average daily wage rate for female agricultural labour in the village (VWF).

#### THE RESULTS :

Given the above mentioned explanatory variables and the dependent variables, let us now turn to the regression analysis in the estimation of labour supply function of both male and female labour force in the farm sector for the areas under our study.

The results of the regression analysis are tabulated below :-

T A B L E - 1

Results of Multiple Regression Analysis In Respect of Farm  
Labour Supply For Males.

Explanatory variables	Regression Coefficient	Standard error	"T" values
"ALABM (Number of adult men in labour force)	0.1716	0.1452	1.1821
"CULAND" (Area of land cultivated by household in acres).	-0.4354	0.041032	-10.612
"DEP" (Number of dependents)	0.1970	0.1147	1.7178
"EDUM" (Education among men in 15-60 age group)	-0.2494	0.1680	-1.4841
"VWM" (Village wage rate in Rs. for male agricultural labourer)	-0.3743	0.1083	-3.4549

$$R^2 = 0.8540$$

$$F = 41.933$$

Degrees of Freedom = 43

No. of sample observations : 50

Source of data : Field Survey.

ANALYSIS OF THE RESULTS :

The dependent variable in the table given above is the number of days hired out on farm work or reported seeking or being available for work. This variable is symbolised as "NDM" which includes hired out farm labour days and days unemployed.

In the analysis of farm labour supply function, certain social, demographic, technological and economic variables play crucial role, specially in the backward and agrarian areas of West Dinajpur district.

First of all, the explanatory variable "ALABM" is an important determinant in this regard. It has a positive coefficient in the regression analysis indicating that the larger the number of adult men in labour force, the greater would be the extent of hiring out on farm work and vice-versa.

In the second place, the area of land cultivated by the household (in acres) is another major determinant in the decision of labour supply in agriculture. In the above table, the regression coefficient of this variable ("CULAND") is strongly negative. This relationship indicates that the larger the size of farms, the smaller is the extent of hiring out of family labour and vice-versa.

Thirdly, another crucial factor affecting the decision on farm labour supply in the district of West Dinajpur is the number of dependents in the family of the wage-earner. Thus, the variable "DEP" has a positive coefficient indicating the fact that as the number of dependents in the family increases, the willingness to work as farm labourer also increases.

Fourthly, the coefficient of "EDUM" (education among males in the 15-60 age group) is significantly negative. This indicates that the higher the level of schooling of the male members in the household, the lower is the extent of hiring out on farm work and vice-versa.

Finally, the coefficient for "VWM" (the village wage rate for males) is also negative indicating that the higher the village wage rate, the lower is the volume of farm labour supply and vice-versa.

Besides these variables considered in the multiple linear regression analysis, there are certain other variables that may be considered in the estimation of farm labour supply behaviour. These variables are caste-tribal identity of households, availability of public works often called the " supplementary income effect ", normal annual rainfall in the district, percentage-deficit in actual rainfall from the normal level in the district etc.

It is often observed that the larger the volume of employment in public works in or near the village concerned, the lower is the extent of hiring in farm labour and vice-versa.

Similarly, the larger is the percentage-deficit in actual rainfall from normal rainfall, the smaller is the possibility of hiring out of farm labour and vice-versa. Further more, the higher the normal rainfall in the district, the larger would be the extent of hiring out of farm labour.

#### FARM LABOUR SUPPLY FUNCTION FOR FEMALE LABOUR FORCE

Similarly, the labour supply function of rural female-farm-wage-labour-households may be computed as follows :-



T A B L E - 2

Explanatory variables	Regression Coefficient	Standard error	"T" values
"VWF" (Village wage rate in Rs. for female farm labour households)	0.6854	0.2274	3.0141
"CULAND" (Area of land cultivated by the household).	-0.1742	0.061192	-2.8474
"ALABF" (Number of adult female in labour force)	0.9844	0.1972	4.9908
"PWF" (Public works for females).	-0.3521	0.3561	-0.9887

Number of observations = 50

$$R^2 = 0.6223882$$

$$F = 18.542$$

Degrees of freedom = 45

Source : Field survey.

ANALYSIS OF THE RESULTS (TABLE NO.2) :

In order to estimate the supply function of farm labour for female labour force in the same areas as for males, data have been collected on primary basis. The collected data have been applied to compute the linear regression analysis. The results of this computation have been tabulated in table no.2.

From table no.2, it is evident that like the case of the labour supply function of male labour households, the phenomenon of female labour supply function also depends upon a number of social demographic and economic variables, besides wage rate. These variables are designated as "CULAND" (area of land cultivated by household), "ALABF" (Number of adult females in labour force) and "PWF"(public works for females).

The coefficient for "VWF" (village wage rate for females) is positive signifying that the higher the wage-rate prevailing in the village, the higher is the incentive on the part of the female workers to participate in the labour force and vice-versa.

Secondly, the variable "CULAND" possesses a negative coefficient indicating that the larger the area of land cultivated by the family of the female labour, the lesser would be the possibility of participating in the labour force among females.

Thirdly, another variable determining the participation of female labour force in farm work is designated as "ALABF" (number of adult female in labour force) which has a positive coefficient (+0.9844). This relationship indicates that the larger is the number of woman members in the family, the higher would be the participation among females.

Finally, the coefficient of the variable "PWF" is significantly negative. This indicates that the higher is the availability of public works for females, the lower would be rate of participation among females in farm works.

#### SEASONAL WITHDRAWALS OF FEMALES FROM LABOUR FORCE

An important aspect in respect of labour supply behaviour is the involuntary withdrawal of females from farm works. This phenomenon is common in the cases of those who are cultivating households. The females belonging to such households are often not in a position to participate in farm work in other's

farms. Various factors force them to withdraw from labour force. The factors include size of land cultivated by the household ("CULAND"), number of babies in the family ("BABY"), number of days of unemployment among the male members ("UEM"), number of male earning members in the family (EAM) and the number of school-going children in the family ("Schoolch"). These are designated as the explanatory variables.

The dependent variable in this case is the number of days of participation in labour force ("FEMDAY"). Now, with the help of the dependent and the explanatory variables, we shall try to estimate the multiple regression analysis for the determination of seasonal withdrawals of rural females from labour force.

T A B L E - 3

MULTIPLE LINEAR REGRESSION ANALYSIS OF THE DETERMINANTS OF SEASONAL WITHDRAWALS OF FEMALES FROM LABOUR FORCE

Dependent variable :-	"FEMDAY" (the number of days of female participation in labour force )
Mean :	2.2000
Standard deviation :	1.7496
Variance :	3.0612
Coefficient of variance:	0.7953
Standard error :	0.7295
"T" Value :	7.8720

Explanatory variables	Regression Coefficient	Standard Error	"T" values
CULAND	-0.1584	0.0756	-2.0946
BABY	-0.3490	0.2665	-1.3096
UEM	-0.2998	0.1827	-1.6415
EAM	-0.4382	0.2164	-2.0249
SCHOOLCH	-0.2648	0.1959	-1.3517

Number of observations = 50

$R^2 = 0.4140950$

Degrees of freedom = 44

F = 6.2195

Source : Field Survey

Now, in order to establish the nature of relationships between the dependent and the explanatory variables as mentioned above, the methodology adopted for the study is the linear regression analysis. The data for the study have been collected from field survey through personal investigation. The result of this analysis is tabulated in table (3).

In table (3), the Coefficient of the variable "CULAND" is negative indicating that the larger the size of own cultivable land, the lower would be the possibility of participation as a worker in other's farm and vice-versa.

The Coefficients of "BABY", "UEM", "EAM" and "SCHOOLCH" are also negative indicating the inverse relationships with the dependent variables.

Thus, all the above-mentioned variables play crucial roles in the determination of the participation of females in farm labour force. It is because of these factors that the female work force avails of or withdraws from the current labour force.

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