

PW-ACN-996

**DETERMINANTS OF  
LABOR MARKET PARTICIPATION  
IN RURAL BANGLADESH  
AFTER THE 1998 FLOOD**

**CARLO DEL NINNO  
DILIP K. ROY**

**FEBRUARY 2001**

*FMRSP Working Paper No. 22*

**FMRSP** Bangladesh

Food Management & Research Support Project  
Ministry of Food, Government of the People's Republic of Bangladesh

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*This work was funded by the United States Agency for International Development (USAID)*

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Contract Number: 388-C-00-97-00028-00*

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*The views expressed in this report are those of the author and do not necessarily reflect the  
official position of the Government of Bangladesh or USAID.*

## ACKNOWLEDGEMENTS

The report deals with labor participation issues and the livelihood of the rural poor in Bangladesh in the aftermath of the 1998 flood. The data used in this report covers 757 households that have been interviewed three different times in seven flood-affected thanas of the country. A set of questions in section B of the detailed household level questionnaire was asked to analyze the behavior of rural labor market in Bangladesh.

The data collection was carried out with the support of 'DATA' and interviewers of IFPRI-Dhaka office. We wish to register our sincere thanks to those who have to stay in rural areas even in difficult situations. We are also thankful to Abdullah-Al-Amin for his excellent secretarial support.

We are grateful to Prof. Ismail Hossain and Dr. Raisuddin Ahmed for their valuable comments on the paper in the seminar.

Last, but not least, special thanks are due to the rural household heads who have given full co-operation with the interviewers time and again during the survey.

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## EXECUTIVE SUMMARY

This paper is one of the few attempts to deal with labor participation issues in rural Bangladesh. These issues are very important because they have a direct impact on the livelihood of the poor. In our sample, we found that 21 to 32 percent of rural household income originates from wage income (dependent workers and daily laborers' work), and 19 to 24 percent from self-employment in business and cottage activities.

After briefly discussing the employment situation in the economy, this paper focuses on the determinants of labor force participation in rural areas using three rounds of collected data. The first round of data was collected in November-December, 1998, immediately after the floods, the second round in April-May, 1999 and the third round in November, 1999, one year after the flood. Then the level of wage earnings and other characteristics of the occupations of those who are working are investigated, comparing the periods before and after the 1998 flood.

An attempt was also made to describe the family labor participation in household non-market activities such as work on house repairs, tending livestock, etc.

### LABOR FORCE PARTICIPATION

Labor force participation rate was low (40.8 percent) during the flood and in the immediate post-flood period (round one) in the rural areas of Bangladesh, and it declined slightly to 39 percent in April-May, 1999 and to 37 percent in October-November, 1999. The curve of labor participation shows an inverted "U" shaped pattern with respect to age for both males and females.

There is a clear gender difference in labor participation between males and females. Lower female labor participation may be explained in part by the involvement of a large majority of females in housework and in school (for 10-14 years old). A majority of males in the 10 to 24 year age group go to school and do not participate in the labor market.

The labor participation model used in this paper confirms that age is positively correlated with labor participation at a decreasing rate. As expected, males are more likely to participate in the labor market than females, as well as married people. We also found that while primary education has a positive impact on the participation of males and females, higher levels of education are a deterrent to male participation.

The size of land ownership negatively influences rural labor participation in each of the time periods. This means that poor households want to supply more workers to the labor market to earn at least a subsistence income for their family. The flood variables, relative to the severity of village level agriculture-flood exposure, show that the flood had an overall negative impact on the labor market.

#### LABOR STATUS OF WORKERS

In our survey area, dependent workers represent only 15 percent of rural employed persons. More than one-third of rural male workers were found to be daily laborers. The first round of data collection found that about 44 percent of rural male workers were self-employed in their own businesses and owned farm activities. There is an increasing trend in the percentage of individuals engaged in self-employment. The percentage increase in females self-employed in their own businesses is even higher than that of males. The proportion of unpaid family workers was found to be lower than in the labor force survey of 1995-96 and to decline between rounds one and two.

Dependent workers have relatively higher levels of education. More than 14 percent have completed 11 or more years of schooling, compared to about 5 percent for those engaged in business and cottage activities. Non-government projects, along with the private sector, employed 73.3 percent of all dependent workers in July-October, 1997. About 60 percent of the dependent workers were employed in the service sector in July-October, 1999 and October-November, 1999. The rural manufacturing sector absorbed about 16 percent of workers, followed by off-farm work (10.7 percent). The service, trade, transport and rural manufacturing sectors paid higher monthly earnings than other

sectors. Monthly average earnings from the agriculture sector were relatively higher in December, 1998 through April, 1999.

Daily laborers were mostly males (90 percent) aged between 25 to 54 years (75 percent), while the females were more concentrated in a 35-54 age group (more than 50 percent). The daily wage rate varied from Tk. 55 to Tk. 60 including meals. They never exceeded US \$20 a month and dropped even lower at the time of the peak of the flood in August, 1998. Agriculture was the single largest source of employment for daily laborers. Labor absorption in agriculture varied from month to month, going from 42 percent in the pre-flood and flood period (July-October, 1998) to a high of 61 percent in October-November, 1999. The second most important source of use of daily laborers was the rural manufacturing sector, which absorbed 20-24 percent of all daily laborers in July-December of 1998 and 1999, followed by the construction sector in the months of January-May, 1999.

Business and cottage activities (self-employed non-farm activities) absorbed more than one-third of total employment in October-November, 1999. An average monthly income from rural non-farm activities was much higher than earnings from daily labor; during the July-October, 1999 period the average monthly earnings were reported to be 89 percent higher. The monthly income of self-employed persons in non-farm activities was lower than that for dependent workers, except in the period of November-December, 1998 when self-employed workers earned more than dependent workers by four percent. Trade accounts for about one-fifth to one-fourth of rural employment in the non-farm sector, followed by rural manufacturing (14-17 percent), transport (14-15 percent) and fish sales (12-17 percent). Rural trade was dominated by retail trade and, together with other businesses, accounted for 35-43 percent of non-farm employment. Non-farm activities were performed for more than an average of 180 hours per worker per month in July-October, 1997, November-April, 1999, and July-October, 1999.

Besides participating in the formal labor market, individuals perform a large variety of tasks at home, ranging from repairs of their homes, working on their own farms, tending livestock, fishing, cleaning the house, etc. During the flood (July-October, 1998), more than one-fifth to one-third of family labor was engaged in fishing. Then the percentage declined. In fact, the percentage of family labor in fishing varied from six to nine percent in 1999. Other important activities performed by a large proportion of family labor were house-repairs and tending livestock. In January-May, 1999 more than one-third of family labor was involved in own farm activities on which an average of 74 to 87 hours was spent per month. Time allocation for livestock activities varies from one period to another, ranging from one-third to half of family labor time.

#### LABOR DEMAND IN CROP PRODUCTION

There is no doubt that family labor constitutes the highest proportion of total labor used in farm activities. Nevertheless, hired labor was one-third of all labor used and larger farmers (with 150 or more decimals of land) used more hired laborers than smaller farmers (with less than 50 decimals of land).

The comparisons between the use of hired labor between agricultural periods shows that the demand for labor was relatively higher at the time of the production and harvest of the HYV boro rice that took place in the season after the flood. At that time the use of labor per acre also increased from round one to round two. Therefore, it appears that the loss of labor demand suffered during the period of the flood was offset, at least to some extent, by higher demand and higher earnings in the period after the flood.

#### CONCLUDING OBSERVATIONS

In conclusion, it emerges that labor markets in rural areas of Bangladesh are dominated by male daily laborers, with seasonal variations of demand, and that this demand may be subject to further reduction caused by disasters and other shocks. There is also concern for female workers. Their participation is very small. They sometimes participate in the production process only as unpaid family labor.

The challenge of improving the labor participation of a growing active population can only be met by an increase in opportunities in off-farm and cottage activities, since off-farm activities grow at a faster rate and provide employment in the agricultural sector. These activities can include sericulture, horticulture, reforestation and watershed development for rain-fed areas. This means that infrastructure, training and credit opportunities need to be available and that literacy and education have to be expanded to provide a more efficient labor force.

## 1. INTRODUCTION

The study of labor markets and the analyses that explain rural household participation in the labor market are very important because employment is an important source of income. The type of job performed affects the livelihood and well being of the poor since they have less access to land for farming. Therefore, participating in the labor market and being employed for longer periods of time and at higher wages translates into better access to income and ultimately to improved food security.

In Bangladesh, an overwhelmingly large proportion (82 percent) of the total labor force live in rural areas; 73 percent of the rural employed population are involved in agricultural activities (Labor Force Survey henceforth LFS, 1995/96), and a significant proportion of the rural poor are engaged in economic activities associated with low productivity. While employment and wage rates are crucial for wage dependent labor, input prices, productivity and rates of return are important for those who are self-employed.

In this report, we discuss in detail the status and the determinants of labor force participation. Labor force participation has been defined as the ratio of persons in a given population group who are working, plus those not working because they are temporarily sick and those who are not working but are looking for jobs. Thus, participation rate determines the size of the labor force.

Those who participate in the labor market can be engaged as casual laborers, dependent-wage workers, self-employed in agriculture or in other non-farm activities. Otherwise, they would be looking for employment. Understanding the difference between alternative occupation possibilities in self-employment and wage employment will give more insight into the possibilities available for income earning for rural households.

There are a host of factors that determine the participation of an individual in the rural labor market. While the decision for a male laborer can be based on the choice determined by the marginal utility derived from a given activity in the labor market, the female labor supply is based more on the difference between the earning in a market and the value of time in home-based, non-market production, household work and childcare. The labor supply model, in such a context, will explore the inter-relationships among market wage rates, participation in the labor market, days worked for wage, hours of work at home, hours devoted to schooling for adult males, females, boys and girls respectively. The important determinants for the choice between school attendance and child labor may also be highlighted.

On the other hand, the demand for hired labor depends on the wage rate, the agricultural season, production of agricultural crops, etc. Thus, to gain some insights into the possibilities available in the labor market, we estimated the employment elasticity of major crop production, taking into account the seasonal variations of labor demand. Seasonal fluctuations in wage and employment opportunities of households may have serious effects on household income and welfare. The wage rate has a different effect on the demand for labor, depending on the stage of each production cycle such as pre-harvest operation, harvesting and harvest processing activities.

The paper is organized as follows: Section I is the introduction. Section II briefly discusses the employment situation in the economy, using the latest available Labor Force Survey (LFS), 1995/96. Section III reports a literature review on labor participation. The survey methodology, the data and the results of the estimates of the labor participation model are discussed in Section IV. Section V presents the analysis on the labor status of workers, including characteristics of dependent workers, the employment situation of daily laborers, and rural non-farm employment. Section VI discusses labor demand in crop production. Concluding observations and policy suggestions are given in the final section.

## 2. THE RURAL LABOR MARKET IN BANGLADESH

Following the devastation of the 1998 flood, the Bangladesh economy showed a strong recovery in the production of the winter rice crop (*boro*) and other crops. The subsequent increase in agricultural production gave a boost to the economy, thus offsetting the adverse effects of the flood on the overall GDP growth rate. In fact, Bangladesh attained an economic growth rate of slightly over five percent in the latter half of the 1990s, which translates into a per capita growth rate of three to four percent (Table 2.1). In 1998-99, the agriculture and service sector contributed about 32 and 57 percent respectively to the GDP. The share of manufacturing in GDP was very low (a little over 11 percent).

The growth of agricultural GDP has not kept pace with the growth of agricultural labor (Table 2.2). The growth rate of agricultural GDP over the period between 1959 and 1997 has been less (1.73 percent) than the growth rate (2.58 percent) of agricultural labor over the period 1959-96. One of the reasons is that the growth of agricultural labor has been even higher than the growth of the rural population over the last four decades. In general, the size of the labor force depends on the size of the population and its age

Table 2.1 — GDP Growth Rate and Share of Economic Sectors

Fiscal Year	GDP Growth Rate	Agriculture		Manufacturing		Other sectors	
		Share in GDP	Growth rate	Share in GDP	Growth rate	Share in GDP	Growth rate
1995-96	5.4	32.2	3.7	11.3	5.3	56.5	6.5
1996-97	5.9	32.4	6.4	11.1	3.5	56.5	6.1
1997-98	5.7	31.6	2.9	11.5	9.5	56.9	6.5
1998-99	5.2	31.5	5.0	11.2	2.5	57.3	5.9

Source: APADA (2000): Table 4.1 & Table 4.2

**Table 2.2 — Trend in Rural Population, Agricultural Labor, Agricultural GDP and Nominal Wage, 1959/60-1999/2000**

Year	Rural population		agricultural labor		agricultural real GDP		Nominal wage (tk/day)
	(million)	Index	(million)	Index	(million taka)	Index	
1959/60	51.15	100.00	14.62	100.00	23722	100.00	1.85
1960/61	52.74	103.11	15.00	102.60	24947	105.16	1.95
1969/70	65.73	128.50	18.93	129.48	31836	134.20	3.13
1976/77	73.36	143.42	22.68	155.13	30903	130.27	8.82
1979/80	77.22	150.97	24.52	167.72	33136	139.68	12.63
1980/81	78.55	153.57	25.16	172.09	34908	147.15	13.95
1981/82	79.54	155.50	25.82	176.61	35225	148.49	15.56
1989/90	87.88	171.81	33.67	230.29	42220	177.98	33.80
1990/91	89.00	174.00	33.97	232.35	42900	180.84	42.61
1995/96	95.93	187.54	37.08	253.63	45940	193.66	47.63
1996/97	97.40	190.42	37.09	253.71	48896	206.12	49.56
1997/98	98.86	193.28	37.24	254.71	50339	212.20	52.15
1998/99	100.34	196.18	37.37	255.62			57.86
1999/00	101.85	199.12	37.49	256.44			

Source:

1. Rural population 1980/81 figure is taken from Population Census 81 (adjusted figure) and 1990/91 figure is taken from Population Census 1991 (adjusted figure) and 1996/97 figure is taken from BBS recent estimates (BBS Monthly December 1999 issue) and from 1981/82 to 1989/90 and 1991/92 to 1995/96 and 1997/98 to 1999/2000 figures were interpolated by the difference equally all years.
2. Adjusted Agricultural Labor 1988/89, 1990/91 and 1995/96 figures were taken from Labor Force Survey 1989, 1990/91 and 1995/96 and 1989-80 to 1990-91, 1991-92 to 1995-96 and 1996-96 to 1999/2000 figures were interpolated by the difference equally all years conserving population change.
3. Spliced Agricultural Real GDP is calculated by using GDP at constant prices (base 1984/85=100) from BBS.
4. Gross cropped area, Total HYV area, Fertilizer consumption, Irrigated area and net cropped area all were taken from various issues of Statistical Yearbook, BBS and HYV area for 1997/98 and 1998/99 figures were taken from BBS unpublished data.
5. For Spliced CPI figures, Dhaka Middle Income CPI was taken from 1988/89 to 1997/98 and National CPI was used after 1997/98 and from BBS.

Nominal Wage figures were taken from Taslim's paper upto 1977/78 and after

1978/79 from various issues of BBS monthly Bulletin.

composition, which in turn is dependent on the cumulative effects of the population growth from previous years. The size of the labor force has been increasing because younger persons are entering the labor force.

The employment elasticity (measured as the ratio of employment growth to the growth in GDP) in the agriculture sector, including forestry and fisheries, is found to be 0.54 over the period 1989/90 to 1995/96. Usually, the agriculture sector is more labor intensive and the service and construction sectors have higher elasticity. Employment elasticity is observed to be considerably higher than one in the 'transport, storage & communication', 'trade, hotel & restaurant' and 'electricity, gas & water' sectors.

The structure of employment has also changed over the last four decades. The agriculture, forestry and fisheries sectors absorbed as much as 84.5 percent of the employed population in 1961. In 1996, the proportion of total employment in this sector declined to 51.1 percent as a result of the remarkable growth in the tertiary industry, while the manufacturing sector absorbed only 9.9 percent of total employment (using an older definition of the labor force).

In rural areas, about four-fifths of employed persons were engaged in the agriculture, forestry and fisheries sectors (using an expanded definition of the labor force, including all individuals 10 years of age and older), only 5.6 percent were in the manufacturing sector and the rest in the service sector. Even though the share of the total workforce engaged in agriculture has fallen, this sector was still the largest source of employment for the civilian labor force, and still plays a vital role in the economy. This is confirmed by Sadoulet and Janvry (1995), who showed that the agricultural sector performs better than the industrial sector in creating linkages with other sectors, and induces a relatively more equitable distribution of growth.

Alauddin and Tisdell (1995) maintain that the labor absorption effect that took place in the earlier years of the Green Revolution is now tapering off. Since 1969-70 (i.e. after the introduction of the Green Revolution), crop sector employment in the *boro*

season (*boro* rice and wheat) has increased to a significant extent (by fourfold). The area under cultivation during the *rabi* season has more than doubled since the 1960s. The increase in the share of irrigated area and the consequent incidence of multiple cropping led to an increase in the effective area under cultivation, which resulted in the increase of the demand for labor during the *rabi* season. As a result, the seasonal differences in employment (between the *kharif* and *rabi* season) have been reduced considerably. Labor intensity in *rabi* crops, after increasing in previous years, now shows a declining tendency partly due to the use of relatively less labor intensive-modern technology compared to traditional irrigation techniques. The *kharif* (wet season) employment has either remained stagnant or may have even declined.

Table 2.3 shows the distribution of labor by self-employment, employer, employee, unpaid family labor (for definition see Appendix II) and daily labor for 1995/96. Self-employment (for 15 years and above) accounts for the overwhelming majority (75.6 percent) in trade, hotel and restaurant, and transport (65 percent) and communication, indicating the existence of a large number of petty traders and rickshaw-pullers in those sectors. In agriculture, forestry and fisheries, about 25 percent were self-employed, 54 percent were unpaid family workers and 20.3 percent were daily laborers. Agricultural daily laborers may be engaged in their own business or work as construction workers to supplement their income in the off-season. It is worthy to note that 79 percent of the employed persons in construction activities are daily laborers and 21.4 percent of manufacturing employees are daily laborers.

The overall unemployment rate was very low at 2.5 percent, but it is higher (10 percent) for those having a Secondary School Certificate (SSC) or above due to their reluctance of working in jobs with a poor working environment and requiring physical work (LFS 1995/96). Even though general unemployment was very low, more than one-third of the employed persons in the rural area were underemployed. Underemployment has been measured calculating the percentage of persons working less than 35 hours per week (FFYP, p. 148).

**Table 2.3 — Distribution of Employed Persons (15 years and Above) by Employment Status by Rural Sectors in Bangladesh in 1995/96 (Percentage)**

Sectors	Self employed	Employee	Unpaid family labor	Daily laborer	Total	Number
Agriculture, forestry and fisheries	24.6	0.9	54.1	20.3	100	3091
Manufacturing	21.5	39.9	16.7	21.4	100	363
Construction	14.8	5.1	1.2	79.0	100	102
Electricity, gas and water	8.7	77.7	1.0	2.9	100	10
Trade, hotel & restaurant	75.6	10.3	11.0	2.2	100	606
Transport, communication	65.5	19.1	1.4	3.5	100	220
Finance and insurance	17.8	77.5	0.5	3.8	100	21
Public/private service	23.6	61.1	5.6	9.4	100	451
Domestic etc.	32.5	5.1	44.3	17.6	100	41
Total	32.2	11.9	37.6	17.9	100	4907

Source: LFS, 1995/96, p.129; based on "expanded definition"

**Table 2.4 — Number of Emigrant Workers and Amount of Remittances**

Year	No. of emigrant Workers (thousand)	Amount of remittances million \$	Export million \$	Percent of remittances over exports
1991	97	764	1718	44.47
1992	185	848	1993	42.55
1993	238	944	2383	39.61
1994	192	1089	2534	42.98
1995	200	1198	3473	34.49
1996	181	1217	3882	31.35
1997	228	1475	4427	33.32
1998	243	1525	5172	29.49

Source: Reprinted from APDA (2000), Table 5.5, page 90

One of the effects of the difficulty of finding a good job in Bangladesh is reflected by the increase in the number of emigrant workers from 185,000 in 1992 to 243,000 in 1998 (Table 2.4). The amount of remittances also increased steadily, although its share over the total amount of exports continued to decline. The rate of growth for exports from garments (including knit products) has been higher than that for remittances. Non-government organizations, various donor-financed projects and Grameen Bank are no less important in terms of labor absorption for unemployed persons with higher education levels. It is noteworthy to mention here that in 1996/97, NGOs employed 140,000 people (APADA 2000).

The fifth five-year plan proposed a comprehensive employment strategy (FFYP, page 51) and envisages that there would be a large increase in employment in agriculture, fisheries, livestock and forestry, and infrastructure building in rural areas, etc. Total employment was expected to be 56.35 million persons in 2001/2002, an increase from 50 million employed persons in 1996/97.

### 3. LABOR PARTICIPATION: REVIEW OF LITERATURE

The purpose of this section is to highlight some of the findings from various studies on labor participation. In fact, there are very few studies (Hossain 1988; Chowdhury 1991; LFS 95/96, Table 3.11, page 29) dealing directly with labor participation in Bangladesh.

Choudhury's (1991) study covers the participation of rural women and is based mainly on the 1981 census data. The author estimated the determining factors for female labor participation employing OLS techniques using district level information for each age group and observed that the determinants of rural female participation are not the same for all age groups. The supply side variables (such as education, per capita livestock, child-woman ratio) in certain age groups and demand side variables such as irrigated area and infrastructure are more important for females who are 15-29 years old.

There are now a few published and unpublished works on the participation behavior of rural persons in self-employment activities due to micro-finance programs (Zohir 1999; Mahmud 2000). The positive effects on the probability of women participating in the micro-credit program (to be self-employed) are family size, households owning land between 1-249 decimals, and health status (negative effects are years of schooling, age, attitude variables, etc).

Varma and Kumar (1996) and Hossain et al. (1993) employed a probit model to determine the factors affecting the participation of the rural labor force in non-farm activities. The Hossain study revealed that the extent of participation was higher for landless households rather than landholding households, and that education has a negative impact on participation in rural non-farm activities except in the case of trade. Trade and shop keeping were the most important non-farm occupations, followed by services and construction. Varma and Kumar selected households engaged in non-farm, using the

Household Expenditure Survey 1991 (Bangladesh Bureau of Statistics). Their probit estimation shows that higher education levels and bigger family size increase the probability of entering the non-farm sector, while higher landholding reduces the probability of participation.

Rahaman and Islam (1988) estimated some multiple regression equations for labor use (labor days per year per worker) separately for agriculture and non-farm activities in Dhaka and Chittagong. The data used contains a year long weekly survey of 140 pre-selected rural households in Dhaka and Dinajpur (July, 1981, to June, 1982). The regression analysis for the determinants of total labor use shows a negative influence of both ownership of land and education variables, but education is positively associated with non-farm labor use. In the study, wage rate was not used as an explanatory variable for landless households.

More studies on labor absorption in crop production are available (Muqdata 1986; Alauddin & Tisdell 1995). Ahmed (1981) observed an inverse relationship between farm size and labor use because small farmers adopted more labor-intensive crops and a higher cropping intensity on their farms than large farmers (Ahmed 1981; Mazumder 1963; reprinted in Salam 1986). Most micro-level studies are, however, consistent in their finding of a substantial degree of seasonal variation in employment. The authors (1999) report that the coefficient of variation in monthly labor use for daily labor is significantly high, that is, there is a large variation in labor use from slack seasons to peak seasons. Rahman and Khandker (1996) have shown that rural underemployment is estimated to be around 25-26 percent. Rural workers are found to be fully employed in peak seasons and a shift from wage labor to self-employment (non-farm employed) can create an upward pressure on the wage rate. As the wage rate increases, employers themselves work on their own farms. This will reduce the demand for wage labor, resulting in expansion of self-employment.

Skoufias (1993) argues that the wage rate may have a different effect on the demand for labor, depending on the stage of production because the productivity of a variable input such as labor depends not only on the total amount used but also on the timing of its application. Skoufias (1993) defines seasonality in agriculture as a two-stage process such as planting (in area intensive activities) and harvesting (production intensive activities). Each crop is modeled as two seasons, planting and harvesting. Labor hours used in each cultivated plot by each household for stages one and two, as well as for combined stages, are considered dependent variables. The analysis is based only on the rainy season (*Kharif* season). The author used OLS regressions (Single Stage-pooled) on both planting and harvesting seasons for all rural workers with the following dependent variables: log of total (family plus hired), male and female labor hours, and independent variables: male village hourly wage rate, cropped area, value of fertilizer, irrigation (1 or 0), plot (0=otherwise, 1=leased or shared), cost of seeds, year dummy and village dummy. The wage rate is the village average hourly-wage rate. The results of the labor demand study suggest that the response of rural labor wages to shifts in the demand for or supply of labor differ substantially from season to season. The coefficient of the wage rate for male labor is found to be negative.

Skoufias also considered family and hired labor together as dependent variables. Family labor here means self-employed labor in the own farm. There is a difference in status between wage workers and employers (including self-employed) in South Asian countries compared to other developing countries as well as developed countries. In rural areas, self-employment is more prestigious than wage employment in the agriculture labor market.

In another paper, the same author (Skoufias, 1993) stated that the average village wage for each category of worker is used to represent the opportunity cost of time of adult males, females and younger household members. In order to account for the potential correlation between omitted variables and regressors, OLS is applied to transformed data. Each variable is transformed into a deviation from its individual specific mean so as to

eliminate all individual specific effects. The study shows that increased male wage rates are associated with lower market-labor supply, lower hours of work at home and higher leisure for males. Higher male wage rates increase child schooling.

The determining variables of labor use of female workers are, according to Skoufias (1993), the number of children (below age five) as a proportion of family size, total owned area of the household, percentage of owned area devoted to kitchen gardening, and the number of cows, goats and buffaloes. The coefficients of child, land owned and education are found to be negatively significant.

A good deal of research has been done on the problems of unemployment and underemployment, and on wage determination in rural Bangladesh (Khuda 1982; Islam 1986; Masum 1989; Osmani 1988, reviewed in Islam 1995). The studies on unemployment and underemployment concentrated on estimates of unemployment and underemployment using a combination of 'time' and 'productivity' criteria. It appears that labor participation is likely to be influenced not only by supply side variables such as education, age, household size, value of productive assets, but by demand side variables as well.

#### 4. DETERMINANTS OF RURAL LABOR PARTICIPATION

For the reasons explained above, it is important to understand why some individuals decide to participate in the labor market, while at the same time, others prefer not to participate. The economic theory suggests that it is not a random choice, but emerges from a household's desire to maximize income and utility and it also depends on the capital and human resource endowment of the individuals. In this study, we use a detailed household data set collected over 12 months in the rural areas of Bangladesh that have been affected by the flood in 1998.

##### THE DATA

The data used in this report covers 757 households that have been interviewed three different times in seven flood-affected thanas of the country. The main purpose of the data collection was to analyze the impact of flood on food security and rural labor markets. The data collected contains detailed information of the labor allocation of all household members starting a year before the flood until a year after; therefore, it allows a good comparison across different seasons and economic situations (for a detailed description of the data set and the methodology used to collect it (see del Ninno et. al. 2000).

In particular, the seven flood affected thanas were randomly selected using the following three main criteria:

- (i) The level of flood exposure according to the classification of the Bangladesh Water Development Board based on the level and depth of water. The thanas were categorized as not-affected, moderately affected and severely affected.
- (ii) The level of poverty, calculated as the percentage of poor people in the district.
- (iii) Inclusion of thanas in other studies.

Table 4.1 — List of Thanas in the Sample

	Non Poor Thanas	Poor Thanas	Total
Severely affected	Muladi BARISAL (BA)	Mohammadpur MAGURA (KH) <sup>BINP</sup>	...
	Shibpur NARSHINGDI (DH) <sup>BINP</sup>	Saturia MANIKGANJ (DH) <sup>Micro</sup>	4
Moderately affected	Shahrasti CHANDPUR (CI) <sup>BINP</sup>	Madaripur MADARIPUR (DH) <sup>BINP</sup>	...
		Derai SUNAMGANJ (SY) <sup>HKI</sup>	3
<b>Total</b>	3	4	7

Source: Ninno, Carlo del et. al, (2000)

Notes: BINP: denotes thanas where the Bangladesh Integrated Nutrition project was active  
 Micro: Denotes thanas where IFPRI collected data for the micro-nutrient analysis  
 HKI: Denotes survey areas for the nutritional Surveillance conducted by Hellen Keller International

Finally, we made sure that the thanas selected would provide a regional and geographical balance throughout the six administrative divisions of the country. The selected thanas are listed in Table 4.1. Although these thanas have not been selected to be statistically representative of all of rural Bangladesh because of their geographical representation, they give a very good indication of the situation of the rural labor market between October, 1997, and October, 1999.

Multistage probability sampling was employed for the random selection of the households to be interviewed. In the first stage, three unions in each thana were randomly selected (with the exception of Saturia, where the random sample of another IFPRI study is used). Then, six villages were selected in each union with the probability proportionate to the population in each village and subsequently, two clusters (paras) were randomly selected using pre-assigned random numbers in each village. At the last stage, three households were randomly selected in each cluster from a complete list of all households in the paras. As a result, six households per village, 36 households per union, 108 households per thana were selected to give a sample of 757 households in 126 villages.

The field survey was conducted in October-November, 1998, April-May, 1999, and November- December, 1999. The structured questionnaire at the household level contained detailed information on all household members, including labor participation, main type of employment (such as dependent worker, daily labor, self-employment in business and cottage activities and own farm), days worked in each type of jobs and earnings between July, 1997, and December, 1999.

#### DESCRIPTION OF LABOR PARTICIPATION

The labor participation rate is calculated as the percentage of persons (which include the employed and the persons in search of a job) in the population aged 10-65 years. An alternative participation rate is also estimated in which discouraged workers are also included. Discouraged workers are defined as persons who are not employed and who are not actively looking for a job because they feel that jobs are not available.

The labor force participation rate was 40.8 percent in the flood and immediate post-flood period (round one) in rural Bangladesh (Table 4.2). The low rate of participation in economic activities was partly due to the low rate of female participation in income earning activities. There is clearly a gender differential in labor participation. The percentage of males who worked was nearly five times that of females, and this percentage increased over the rounds. The rate of participation of women in income earning activities was estimated to be higher (14.3 percent) in the flood and immediately post-flood period and it subsequently declined to 10.1 and 8.4 percent respectively in the period six months and one-year after the flood. The male participation rate (66 percent) remained almost at the same level throughout the three periods under study.

Table 4.2 — Labor Participation Rate Over Three Periods by Age Categories

Age category	Nov-Dec 1998		Apr-May 1999		Oct-Nov 1999	
	Participation rate	Persons	Participation rate	Persons	Participation rate	Persons
<b>All</b>						
10—14	9.57	606	9.76	594	10.09	565
15—24	34.18	667	30.62	676	28.51	698
25—34	49.22	575	46.02	578	43.99	582
35—54	60.28	793	58.26	793	55.97	795
55—60	52.87	157	49.04	157	50.33	153
61—65	59.68	62	54.84	62	50.75	67
Total	40.80	2860	38.60	2860	37.34	2860
<b>Male</b>						
10—14	13.31	308	16.00	300	15.84	284
15—24	54.32	324	51.06	331	52.34	342
25—34	88.35	266	86.52	267	81.48	270
35—54	94.25	435	93.79	435	91.74	436
55—60	84.52	84	86.90	84	89.02	82
61—65	75.56	45	75.55	45	68.75	48
Total	66.14	1462	65.89	1462	64.98	1462
<b>Female</b>						
10—14	5.70	298	3.40	294	4.27	281
15—24	15.16	343	11.01	345	5.62	356
25—34	15.53	309	11.25	311	11.54	312
35—54	18.99	358	15.08	358	12.53	359
55—60	16.44	73	5.48	73	5.63	71
61—65	17.65	17	0.00	17	5.26	19
Total	14.31	1398	10.09	1398	8.44	1398

Source: IFPRI-FMRSP Survey 1998-1999

**Table 4.3 — Alternative Labor Participation Rate over Three Periods in Various Age Categories**

Age category	Nov-Dec 1998		Apr-May 1999		Oct-Nov 1999	
	Alternative participation rate	Persons	Alternative participation rate	Persons	Alternative participation rate	Persons
<b>All</b>						
10—14	11.06	606	11.62	594	12.74	565
15—24	35.83	667	32.54	676	30.23	698
25—34	49.91	575	47.06	578	45.02	582
35—54	61.66	793	60.28	793	56.73	795
55—60	53.50	157	49.68	157	50.98	153
61—65	61.29	62	56.45	62	53.73	67
Total	42.10	2860	40.28	2860	38.81	2860
<b>Male</b>						
10—14	15.26	308	18.33	300	20.07	284
15—24	56.17	324	54.68	331	55.26	342
25—34	88.72	266	87.27	267	82.96	270
35—54	95.86	435	95.86	435	93.12	436
55—60	85.71	84	88.1	84	90.24	82
61—65	75.56	45	77.78	45	70.83	48
Total	67.58	1462	68.06	1462	67.31	1462
<b>Female</b>						
10—14	6.71	298	4.76	294	5.34	281
15—24	16.62	343	11.3	345	6.18	356
25—34	16.50	309	12.54	311	12.18	312
35—54	20.11	358	17.04	358	12.53	359
55—60	16.44	73	5.48	73	5.63	71
61—65	23.53	17	0	17	10.53	19
Total	15.45	1398	11.23	1398	9.01	1398

Source: IFPRI-FMRSP Survey 1998-1999

Table 4.4 — Reasons for Not Looking for Jobs - All

Age categories	% of Persons reporting reasons for not looking						Total	Persons
	No need	No job	Sick	Student	H. keeping	Other		
<b>November - December 1998</b>								
10—14	0.64	1.28	0.21	83.51	10.28	4.07	100	467
15—24	1.53	1.28	0.77	42.86	48.72	4.85	100	392
25—34	1.14	0.38	0.76	3.42	91.25	3.04	100	263
35—54	2.68	1.01	2.35	0.67	92.62	0.67	100	298
55—60	1.49	0.00	10.45	0.00	79.10	8.96	100	67
61—65	4.55	0.00	22.73	0.00	68.18	4.55	100	22
All	1.46	0.99	1.66	37.71	54.54	3.64	100	1509
<b>April - May 1999</b>								
10—14	0.60	1.59	0.20	83.13	11.90	2.58	100	504
15—24	1.79	1.28	0.26	41.07	53.83	1.79	100	392
25—34	1.40	0.70	0.00	2.11	93.33	2.46	100	285
35—54	3.54	1.61	1.93	0.64	92.28		100	311
55—60	1.32	0.00	10.53	0.00	78.95	9.21	100	76
61—65	3.85	0.00	11.54	0.00	69.23	15.38	100	26
All	1.69	1.25	1.19	36.89	56.59	2.38	100	1594
<b>October - November 1999</b>								
10—14	0.88	2.41	0.44	85.78	7.88	2.63	100	457
15—24	1.62	1.62	0.54	39.08	56.06	1.08	100	371
25—34	2.15	0.00	0.00	1.43	94.98	1.43	100	279
35—54	1.55	0.31	0.62	0.00	96.28	1.24	100	323
55—60	1.47	0.00	2.94	0.00	82.35	13.24	100	68
61—65	7.14	0.00	10.71	0.00	53.57	28.57	100	28
All	1.57	1.18	0.72	35.45	58.39	2.69	100	1526

Table 4.5 — Reasons for Not Looking for Jobs - Males

Age categories	% of Persons Reporting Reasons for not Looking						Total	Persons
	No need	No job	Sick	Student	H. keeping	Other		
<b>November - December 1998</b>								
10—14	0.88	1.77	0.00	87.17	4.87	5.31	100	226
15—24	2.42	2.42	0.81	75.00	10.48	8.87	100	124
25—34	5.26	0.00	5.26	31.58	15.79	42.11	100	19
35—54	31.58	5.26	15.79	0.00	42.11	5.26	100	19
55—60	9.09	0.00	27.27	0.00	54.55	9.09	100	11
61—65	0	0.00	36.36	0.00	63.64	0.00	100	11
All	3.17	1.95	2.93	72.20	11.71	8.05	100	410
<b>April - May 1999</b>								
10—14	1.27	1.69	0.00	89.41	4.24	3.39	100	236
15—24	5.17	4.31	0.00	79.31	6.90	4.31	100	116
25—34	6.67	6.67	0.00	33.33	26.67	26.67	100	15
35—54	46.15	23.08	23.08	7.69	0.00	0.00	100	13
55—60	10.00	0.00	40.00	0.00	20.00	30.00	100	10
61—65	11.11	0.00	33.33	0.00	55.56	0.00	100	9
All	4.51	3.26	2.51	77.44	7.27	5.01	100	399
<b>October - November 1999</b>								
10—14	1.40	4.21	0.47	88.32	1.40	4.21	100	214
15—24	5.26	5.26	2.11	82.11	2.11	3.16	100	95
25—34	28.57	0.00	0.00	21.43	21.43	28.57	100	14
35—54	33.33	6.67	6.67	0.00	40.00	13.33	100	15
55—60	20.00	0.00	0.00	0.00	40.00	40.00	100	5
61—65	8.33	0.00	25.00	0.00	25.00	41.67	100	12
All	5.35	4.23	1.97	76.06	5.35	7.04	100	355

Table 4.6 — Reasons for Not Looking for Jobs - Females

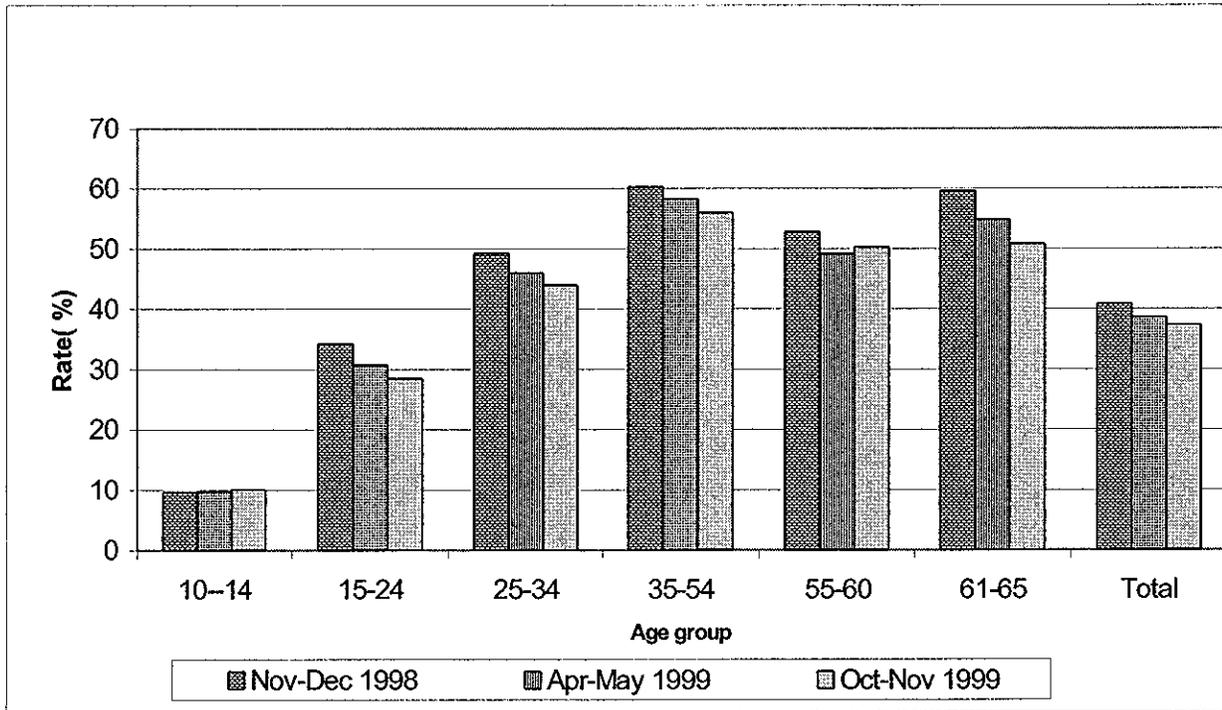
Age categories	% of Persons Reporting Reasons for not Looking						Total	Persons
	No need	No job	Sick	Student	H. keeping	Other		
<b>November - December 1998</b>								
10—14	0.41	0.83	0.41	80.08	15.35	2.90	100	241
15—24	1.12	0.75	0.75	27.99	66.42	2.99	100	268
25—34	0.82	0.41	0.41	1.23	97.13	0.00	100	244
35—54	0.72	0.72	1.43	0.72	96.06	0.36	100	279
55—60	0.00	0.00	7.14	0.00	83.93	8.93	100	56
61—65	9.09	0.00	9.09	0.00	72.73	9.09	100	11
All	0.82	0.64	1.18	24.84	70.52	2.00	100	1099
<b>April - May 1999</b>								
10—14	0.00	1.49	0.37	77.61	18.66	1.87	100	268
15—24	0.36	0.00	0.36	25.00	73.55	0.72	100	276
25—34	1.11	0.37	0.00	0.37	97.04	1.11	100	270
35—54	1.68	0.67	1.01	0.34	96.31	0.00	100	298
55—60	0.00	0.00	6.06	0.00	87.88	6.06	100	66
61—65	0.00	0.00	0.00	0.00	76.47	23.53	100	17
All	0.75	0.59	0.75	23.35	73.05	1.51	100	1195
<b>October - November 1999</b>								
10—14	0.41	0.82	0.41	83.54	13.58	1.23	100	243
15—24	0.36	0.36	0.00	24.28	74.64	0.36	100	276
25—34	0.75	0.00	0.00	0.38	98.87	0.00	100	265
35—54	0.00	0.00	0.32	0.00	99.03	0.65	100	308
55—60	0.00	0.00	3.17	0.00	85.71	11.11	100	63
61—65	6.25	0.00	0.00	0.00	75.00	18.75	100	16
All	0.43	0.26	0.34	23.14	74.47	1.37	100	1171

The participation rate declined slightly to 39 percent in April-May, 1999, and to 37 percent in October-November, 1999 from 40.8 percent in the flood and immediate post-flood period (round one) (Table 4.2). The higher participation rate in the immediate post-flood period may be ascribed to the fact that the rural workers found alternate forms of employment within the water sector like boating and fishing. The farmers cultivated alternative crops and found alternative means of feeding the livestock (del Ninno, July 20, 2000). Members of rural households, particularly the women, produced vegetables around their homestead and/or in farmland nearest to the homestead to cover losses caused by the flood. The government transfer-programs and NGO assistance programs were strengthened in the immediate post-flood period. The coverage of households under such programs declined over the rounds (Del Ninno & Roy, 2001). About 11 percent of all households and 14 percent of flood-exposed households were covered by the NGO assistance programs with an average amount of Tk. 350 per household in the immediate post-flood period.

Tables 4.4 through 4.6 report reasons for not looking for jobs in the three periods in 1998-99 by gender and age. Studying is the main reason reported by about 90 percent of males and about 80 percent of females in the age group of 10-14 years in all the periods. In the age group of 15-24 year olds, nearly 80 percent of males were students. The percentage of male students in this age group increased from 75 percent in round one to 79.3 percent in round two and thereafter to 82.1 percent in round three. A great majority of females over 15 years of age were involved in housekeeping activities. Less than five percent of the labor force reported remaining unemployed voluntarily. Low labor participation may be explained in part by the involvement of a large majority of females in housework, and the participation of a great majority of males (10 to 24 years old) and females (10-14 years old) in school.

The curve of labor participation shows an inverted 'U' shaped pattern with respect to age for both males and females (figure 4.1). The highest participation rate in the labor

Figure 4.1 — Labor Participation Rate by Age Category



force is given by males in the 25-60 years old age group and females in the middle of the age range (between 25 and 54 years old). In the crisis period, a higher proportion of women in the age group of 55-65 years were found to be working.

Among children (10-14 years old), the levels of labor participation were low for both boys and girls. They increased for males and declined for females over the rounds. The relationship between labor participation and education differs according to levels of education for males and females. Labor participation rates were higher for the illiterates for both males and females and lower for persons with primary education in each time period. Female work participation increased with increasing education from primary to higher levels.

Turning to the land-ownership status, it is observed that work participation declined with increasing size of owned land. This suggests that a small number of wealthier people participate in the rural labor market. This is also supported by the fact that the rate of labor participation was higher for households in the bottom 40 percentile of the expenditure distribution and relatively lower for households in the top 20 percentile (see del Ninno et al. 2000 for the calculation of total per capita expenditure distribution). Moreover, the rate of labor participation decreased from round one to round two and again in round three, while average household (per capita) income increased from round one to other periods in the rural area of Bangladesh.

#### DETERMINANTS OF RURAL LABOR PARTICIPATION

To estimate the determinants of rural labor participation, we used a regression model in which labor participation is a function of several individual characteristics. Since the outcome variable in this case is dichotomous (participation is denoted by a binary variable that takes the value one for participating individuals and zero for non participants), we used a probit regression to estimate the model.

The independent variables used for explaining the decision to participate in the rural labor market include both individual and household endowments such as marital

status, age, size of owned land, value of productive assets, and some variables that give an indication of the level of the impact of the flood on the economy of the village and finally, some dummy variables to take into account the differences between periods. In particular, the village agricultural flood exposure variables were calculated as the village median value of the difference in the depth of the flood in the agricultural plots. VFAG2 represents a moderate level of flood exposure and includes a difference in the flood level of an average 2.18 feet; VFAG3 represents a more severe level of flood exposure and measures a difference in the flood level of an average 3.80 feet.

The results of the model are reported in Table 4.7. In general, a coefficient of a variable larger than one means that an increase in the value of that variable would result in an increase in the probability that a person with those characteristics would participate in the labor market. The results show that age is positively correlated with labor participation at a decreasing rate. It is not surprising that the coefficient relative to males is positive and very large; that is, a male is more likely to participate in the labor market than a female. Similarly, married people are more likely to participate, and while primary education has a positive impact on participation, a higher level of education is a deterrent to participation. Significant odd values less than one for values of household owned-land and other productive assets signify that larger wealth endowments decrease the probability of participation. The flood dummy variables relative to the severe village agriculture-flood exposure shows that floods had an overall negative impact on the labor market in the year of the flood.

Note that the size of land ownership negatively influences rural labor participation in each of the time periods. It means that poor households want to supply more workers to the labor market to earn subsistence income for the family, which indicates that leisure substitutes labor when income increases. Household may also withdraw women and children from the labor force to have higher social status (as in the South Asian context) as income increases with larger amounts of land or with higher land productivity.

**Table 4.7 — Current Labor Participation and Flood Exposure: Probit Estimates**

Log likelihood	-2937.18
Number of Observation	7307
LR chi2	4194.69
prob>chi2	0
Pseudo R2	0.4166

<b>labor participation</b>	<b>odds ratio</b>	<b>z-statistics</b>
Age	1.101	14.95
Square of age	0.999	-14.65
Male	8.798	52.95
Household size (hhsizer)	0.982	-2.01
Married	1.087	1.72
dum educat (2-5 years school)	1.113	2.13
dum (educat): 6-10 years school	0.833	-3.29
dum (educat): 11 & more years school	0.547	-7.09
Pre-flood Value Of Land	0.999	-0.88
Productive assets Val Using M1	0.953	-3.26
Liquid assets Val Using M2	0.997	-0.62
Housing assets Val Using M1	0.977	-4.55
Domestic assets Val Using M2	0.920	-1.49
Other assets Val Using M2	0.802	-1.48
vfag2 (dum: ag village flood exposure=1)	0.987	-0.13
vfag3 (dum: ag village flood exposure=2)	0.785	-2.46
dprd2 (dum: period=2)	0.847	-3.66
dprd3 (dum: period=3)	0.748	-6.37
Constant	0.076	-16.32

Notes: Assets are multiplied by Tk. 10,000

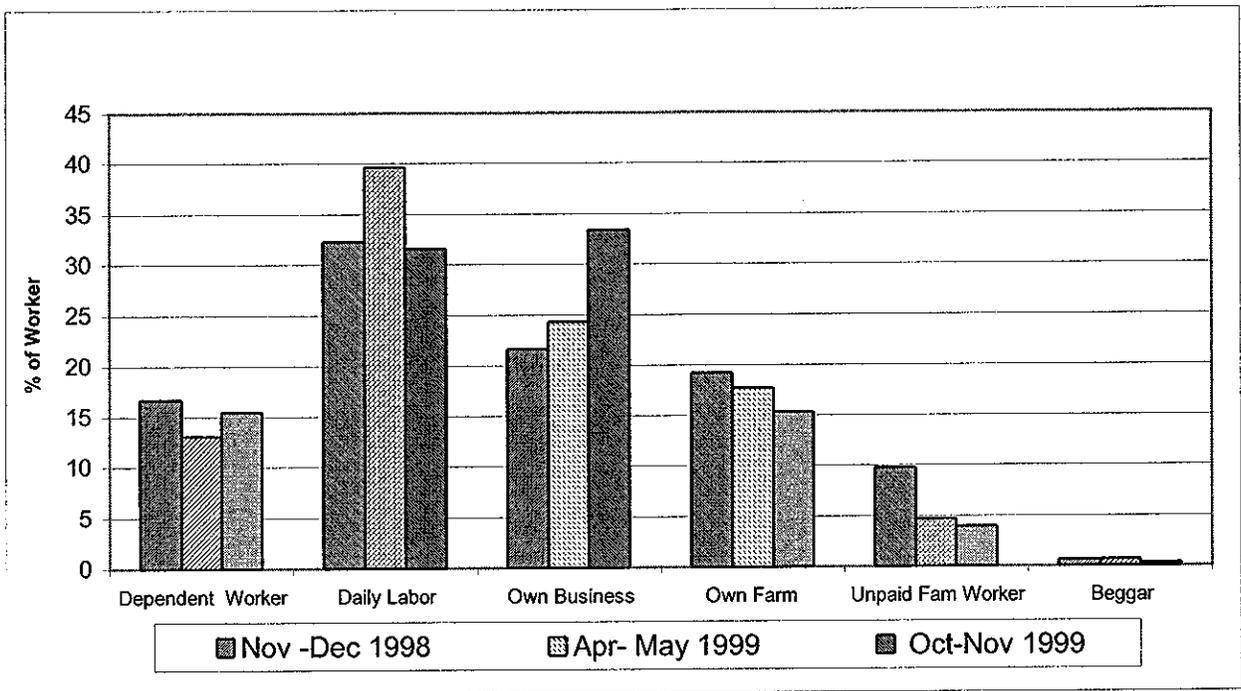
## 5. LABOR STATUS OF WORKERS

Rural employment constitutes a major source of household income. In our sample, wage income (for dependent workers and daily laborers together) accounts for 15-30 percent of total household income for non-poor households (top 20 percentile), 28 percent in round three, and 41 percent in both rounds one and two for poor households (bottom 40 percentile) (del Ninno et al, 2000). Self-employment in business and cottage activities accounts for 19 to 24 percent of the household income during 1998-99 (in three rounds). Poor households (bottom 40 percent) were able to increase the share of their income earned from self-employed activities over time (from round one to round three), indicating an improvement of their situation due to better access to investment and information.

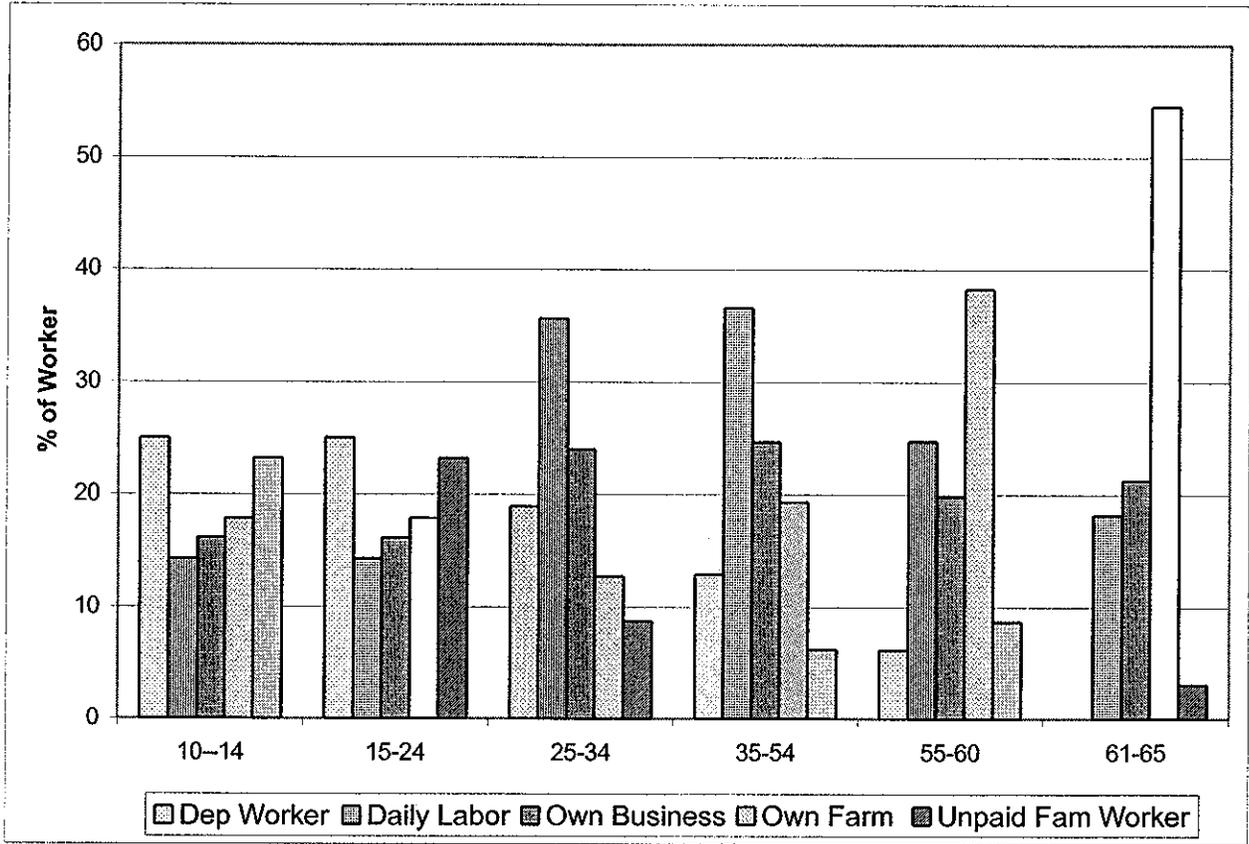
Tables 5.1 to 5.4 and figures 5.1 and 5.2 provide a description of the allocation of working individuals between several main activities by gender and age over the three main periods of data collection, giving a picture of the allocation of employment in different professions, reflecting the structure of the economy. Rural workers in Bangladesh comprise mainly of dependent workers, daily laborers, self-employed persons either in business and cottage activities or engaged in their own farm, and unpaid family labor. In rural areas, since people may be engaged in more than one occupation, the respondents were asked to name their principal occupation based on their earnings.

At the aggregate level, 85 percent of rural workers were between 15 and 54 years of age, and only 5 percent were children 10 to 14 years old. Dependent workers, mostly salaried persons, include also those whose jobs continue for more than a day. They represent only 15 percent of rural employed persons. More than one-third of rural male workers were found to be daily laborers in our survey area, while LFS 1995-96 reports only 28 percent. Daily laborers are casual workers who are hired on a daily basis in

Figure 5.1 — Distribution of Rural Workers by Main Occupation



**Figure 5.2a — Distribution of Rural Worker by Main Occupation and Age Category (Nov-Dec'98)**



**Figure 5.2b — Distribution of Rural Worker by Main Occupation and Age Category (April-May'99)**

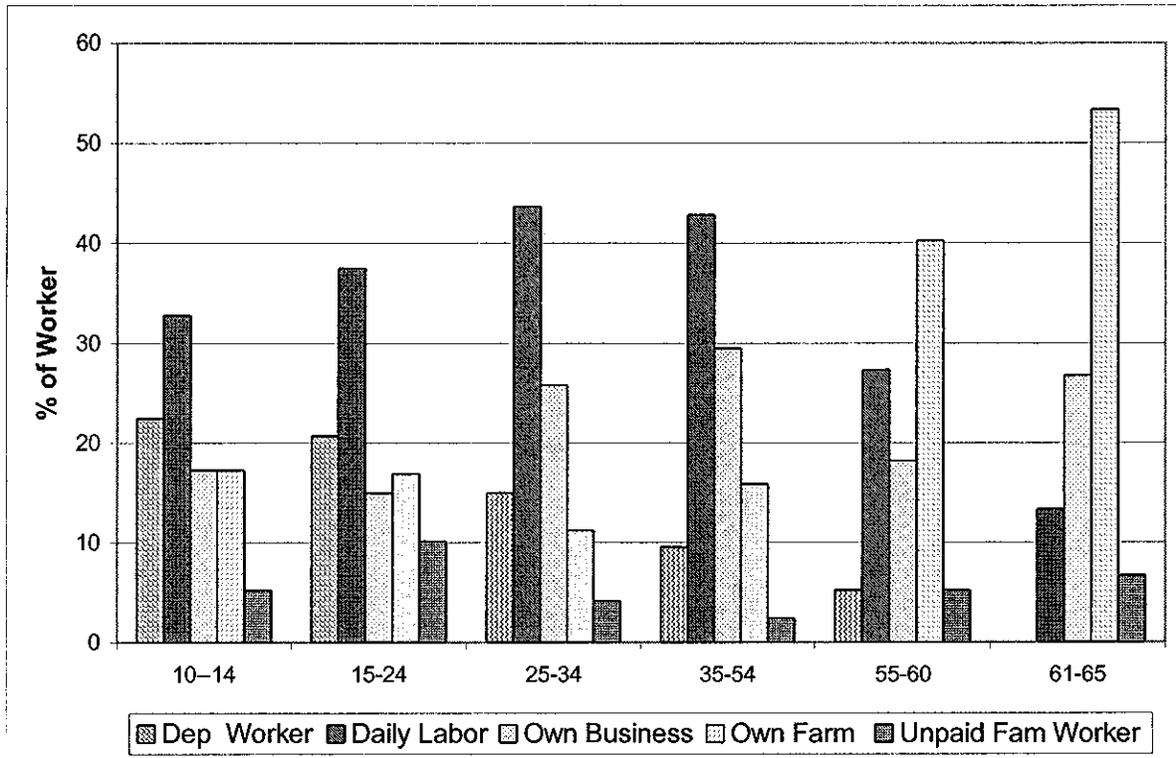
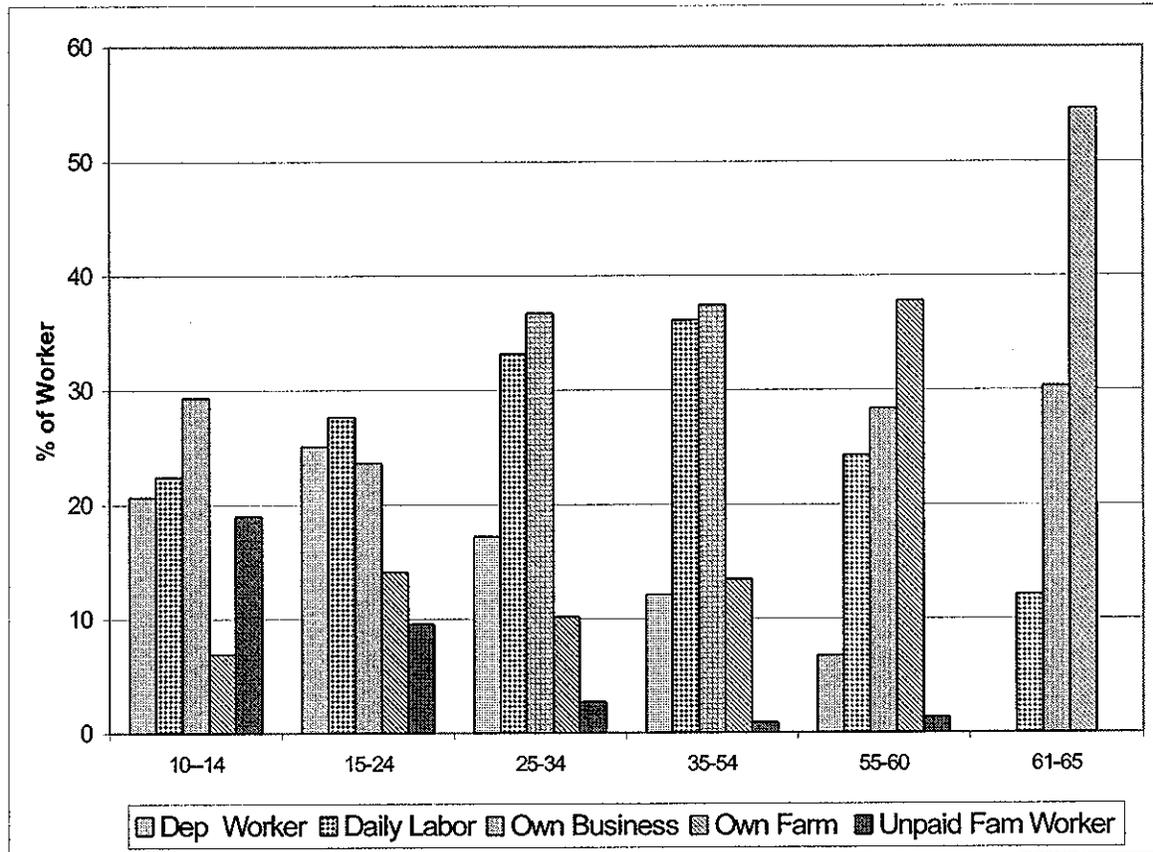


Figure 5.2c — Distribution of Rural Worker by Main Occupation and Age Category (Nov-Dec'99)



**Table 5.1 — Distribution of Working Individuals by Main Occupation and Gender  
(Percentages)**

	<b>Nov-Dec 1998</b>	<b>Apr-May 1999</b>	<b>Oct-Nov 1999</b>
<b>All</b>			
Dependent Worker	16.65	13.06	15.48
Daily Labor	32.24	39.62	31.52
Own Business	21.64	24.30	33.40
Own Farm	19.15	17.68	15.38
Unpaid Family Worker	9.71	4.71	3.94
Beggar	0.62	0.63	0.28
Total	100.00	100.00	100.00
Number	1123	1103	1066
<b>Male</b>			
Dependent Worker	16.79	12.03	13.76
Daily Labor	34.76	41.63	33.30
Own Business	22.35	24.48	32.35
Own Farm	22.03	19.67	16.70
Unpaid Family Worker	3.74	1.99	3.89
Beggar	0.32	0.21	0.00
Total	100.00	100.00	100.00
Number	935	956	952
<b>Female</b>			
Dependent Worker	15.96	19.73	29.82
Daily Labor	19.68	26.53	16.67
Own Business	18.09	23.13	42.11
Own Farm	4.79	4.76	4.39
Unpaid Family Worker	39.36	22.45	4.39
Beggar	2.13	3.40	2.63
Total	100.00	100.00	100.00
Number	188	147	114

**Table 5.2 — Distribution of Working Individuals by Main Occupation and Age Category (Percentages)**

Age	Dependent worker	Daily labor	Own business	Own farm	Unpaid family worker	Beggar	Total	Persons
<b>November - December 1998</b>								
10-14	25.00	14.29	16.07	17.86	23.21	3.57	100	56
15-24	25.00	14.29	16.07	17.86	23.21	0.00	100	211
25-34	18.91	35.64	24.00	12.73	8.73	0.00	100	275
35-54	12.85	36.62	24.63	19.27	6.21	0.43	100	467
55-60	6.17	24.69	19.75	38.27	8.64	2.47	100	81
61-65	0.00	18.18	21.21	54.55	3.03	3.03	100	33
Total	16.65	32.24	21.64	19.15	9.71	0.62	100	1123
<b>April - May 1999</b>								
10-14	22.41	32.76	17.24	17.24	5.17	5.17	100	58
15-24	20.67	37.5	14.9	16.83	10.1	0	100	208
25-34	14.93	43.66	25.75	11.19	4.1	0.37	100	268
35-54	9.52	42.86	29.44	15.8	2.38	0	100	462
55-60	5.19	27.27	18.18	40.26	5.19	3.9	100	77
61-65	0	13.33	26.67	53.33	6.67	0	100	30
Total	13.06	39.62	24.3	17.68	4.71	0.63	100	1103
<b>October - November 1999</b>								
10-14	20.69	22.41	29.31	6.9	18.97	1.72	100	58
15-24	25.13	27.64	23.62	14.07	9.55	0	100	199
25-34	17.19	33.2	36.72	10.16	2.73	0	100	256
35-54	12.11	36.1	37.44	13.45	0.9	0	100	446
55-60	6.76	24.32	28.38	37.84	1.35	1.35	100	74
61-65	0	12.12	30.3	54.55	0	3.03	100	33
Total	15.48	31.52	33.4	15.38	3.94	0.28	100	1066

Table 5.3 — Distribution of Working Males by Main Occupation and Period

Age	Dependent worker	Daily labor	Own business	Own farm	Unpaid family worker	Beggar	Total	Persons
<b>November - December 1998</b>								
10-14	30.00	15.00	15.00	22.50	15.00	2.50	100	40
15-24	26.38	32.52	13.50	17.18	10.43	0.00	100	163
25-34	20.00	37.83	24.78	14.35	3.04	0.00	100	230
35-54	12.75	38.75	25.50	21.75	1.00	0.25	100	400
55-60	7.04	26.76	21.13	43.66	1.41	0.00	100	71
61-65	0.00	16.13	22.58	58.06	0.00	3.23	100	31
Total	16.79	34.76	22.35	22.03	3.74	0.32	100	935
<b>April - May 1999</b>								
10-14	20.41	34.69	16.33	20.41	4.08	4.08	100	49
15-24	18.34	42.60	14.79	18.93	5.33	0.00	100	169
25-34	14.41	45.41	26.64	12.23	1.31	0.00	100	229
35-54	9.09	44.23	28.99	17.44	0.25	0.00	100	407
55-60	5.56	29.17	19.44	43.06	2.78	0.00	100	72
61-65	0.00	13.33	26.67	53.33	6.67	0.00	100	30
Total	12.03	41.63	24.48	19.67	1.99	0.21	100	956
<b>October - November 1999</b>								
10-14	21.74	28.26	21.74	8.70	19.57	0.00	100	46
15-24	22.91	29.05	22.35	15.08	10.61	0.00	100	179
25-34	15.32	35.14	36.94	10.36	2.25	0.00	100	222
35-54	10.20	37.81	36.57	14.68	0.75	0.00	100	402
55-60	7.04	25.35	26.76	39.44	1.41	0.00	100	71
61-65	0.00	12.50	31.25	56.25	0.00	0.00	100	32
Total	13.76	33.30	32.35	16.70	3.89	0.00	100	952

Table 5.4 — Distribution of Working Females by Main Occupation and Period

Age	Dependent worker	Daily labor	Own business	Own farm	Unpaid family worker	Beggar	Total	Persons
<b>November - December 1998</b>								
10-14	12.50	12.50	18.75	6.25	43.75	6.25	100	16
15-24	27.08	12.50	16.67	6.25	37.50	0.00	100	48
25-34	13.33	24.44	20.00	4.44	37.78	0.00	100	45
35-54	13.43	23.88	19.40	4.48	37.31	1.49	100	67
55-60	0.00	10.00	10.00	0.00	60.00	20.00	100	10
61-65	0.00	50.00	0.00	0.00	50.00	0.00	100	2
Total	15.96	19.68	18.09	4.79	39.36	2.13	100	188
<b>April - May 1999</b>								
10-14	33.33	22.22	22.22	0.00	11.11	11.11	100	9
15-24	30.77	15.38	15.38	7.69	30.77	0.00	100	39
25-34	17.95	33.33	20.51	5.13	20.51	2.56	100	39
35-54	12.73	32.73	32.73	3.64	18.18	0.00	100	55
55-60	0.00	0.00	0.00	0.00	2.00	3.00	100	5
61-65	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Total	19.73	26.53	23.13	4.76	22.45	3.40	100	147
<b>October - November 1999</b>								
10-14	16.67	0.00	58.33	0.00	16.67	8.33	100	12
15-24	45.00	15.00	35.00	5.00	0.00	0.00	100	20
25-34	29.41	20.59	35.29	8.82	5.88	0.00	100	34
35-54	29.55	20.45	45.45	2.27	2.27	0.00	100	44
55-60	0.00	0.00	66.67	0.00	0.00	33.33	100	3
61-65	0.00	0.00	0.00	0.00	0.00	100.00	100	1
Total	29.82	16.67	42.11	4.39	4.39	2.63	100	114

several types of occupations, both in agriculture and non-farm activities. The percentage of daily laborers (both male and female together) was higher by seven percent in round two, compared to rounds one and three.

About 44 percent of rural male workers were self-employed in own business and own farm in round one. This percentage increased from round one to round three by five percent. More than one-fifth of total rural employed persons were engaged in own business activities and this percentage increased from round one to round two by two percent and by about nine percent from round two to round three. These findings confirm the trend in the increase in the percentage of individuals engaged in self-employment from 1995-96. The percentage increase in female self-employed in own businesses is even higher than that of males.

The proportion of unpaid family workers was found to be lower than in the labor force survey of 1995-96, and declined between round one and round two. This means that when jobs are available, people are willing to participate in the labor market. As agricultural income increases, the demand for activities such as poultry rearing, shop-keeping, etc. around the homestead in which poor women can find employment may also increase. Similar patterns were observed, when households supplied workers to various occupations (Table 5.5). The percentage and the number of households supplying daily labor increased from round one to round two by about 10 percent and then dropped by 11 percent in round three. On the contrary, the number of households supplying self-employed workers declines in round two compared to round one and then reaches the same level in round three as in round one. The percentage of households and average persons per household involved in business and cottage activities increased from round one to round two to round three. As mentioned earlier, round two refers to the period five months after the flood, when a bumper *boro* crop was harvested.

Table 5.5 — Household Labor Supply by Occupation, Farm Land and Periods

Farming Land Category	N. Hhs	Period					
		Oct-Nov '98		Apr-May '99		Oct-Nov '99	
		Hh	Av. Person	Hh	Av. Person	Hh	Av. Person
<b>Salaried Worker</b>							
0-4.9	300	50	1.22	52	1.31	62	1.21
5-49	160	22	1.23	19	1.16	26	1.19
50-149	188	39	1.23	34	1.24	33	1.21
150-249	68	11	1	8	1.13	11	1.09
250 +	41	12	1.42	11	1.18	10	1.2
Total	757	134	1.22	124	1.24	142	1.2
<b>Daily Labor</b>							
0-4.9	300	144	1.2	145	1.28	113	1.16
5-49	160	74	1.14	81	1.19	66	1.14
50-149	188	56	1.16	68	1.16	61	1.25
150-249	68	19	1.21	29	1.14	23	1.52
250 +	41	9	1.33	8	1.38	5	1.2
Total	757	302	1.18	331	1.22	268	1.21
<b>Self Employed</b>							
0-4.9	300	102	1.2	97	1.26	154	1.19
5-49	160	53	1.09	55	1.18	71	1.24
50-149	188	48	1.2	58	1.22	77	1.3
150-249	68	12	1.33	14	1.29	21	1.19
250 +	41	8	1.37	7	1.29	12	1.33
Total	757	223	1.19	231	1.23	335	1.23

## DEPENDENT WORKERS

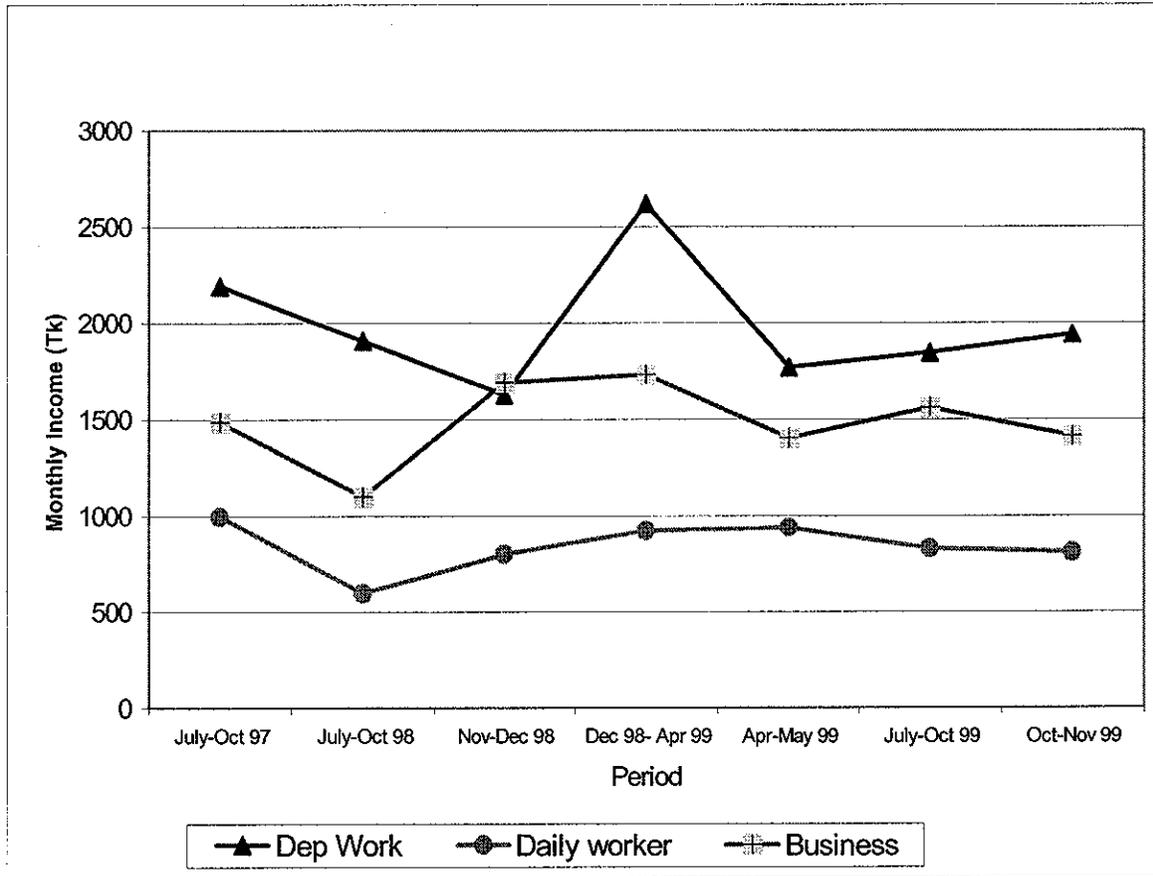
As stated earlier, dependent workers represent 15 percent of total rural employment. Dependent workers have relatively higher levels of education. More than 14 percent have completed 11 or more years of schooling, compared to about 5 percent for those engaged in business and cottage activities. More than half of dependent workers were hired in the private sector in the period between July-October, 1997 to April-May, 1999. Afterwards, the proportion increased to more than two-thirds. Non-government projects, along with the private sector, employed 73.3 percent of all dependent workers in July-October, 1997 (Figure 5.4).

The percentage of employment increased over the years from July-October, 1997 to July-October, 1999 (Table 5.6). The rate of increase was much higher during 1998-99. Although the level of employment in the government sector remained almost the same, the percentage of workers employed in this sector declined from 26.7 percent in July-October, 1997, to 15.5 percent in July-October, 1999. On average, more than two-thirds of dependent workers were casual and this proportion increased from year to year. The proportion of permanent employment in the government sector was the highest (90 percent) and that in the private sector is the lowest (less than 10 percent).

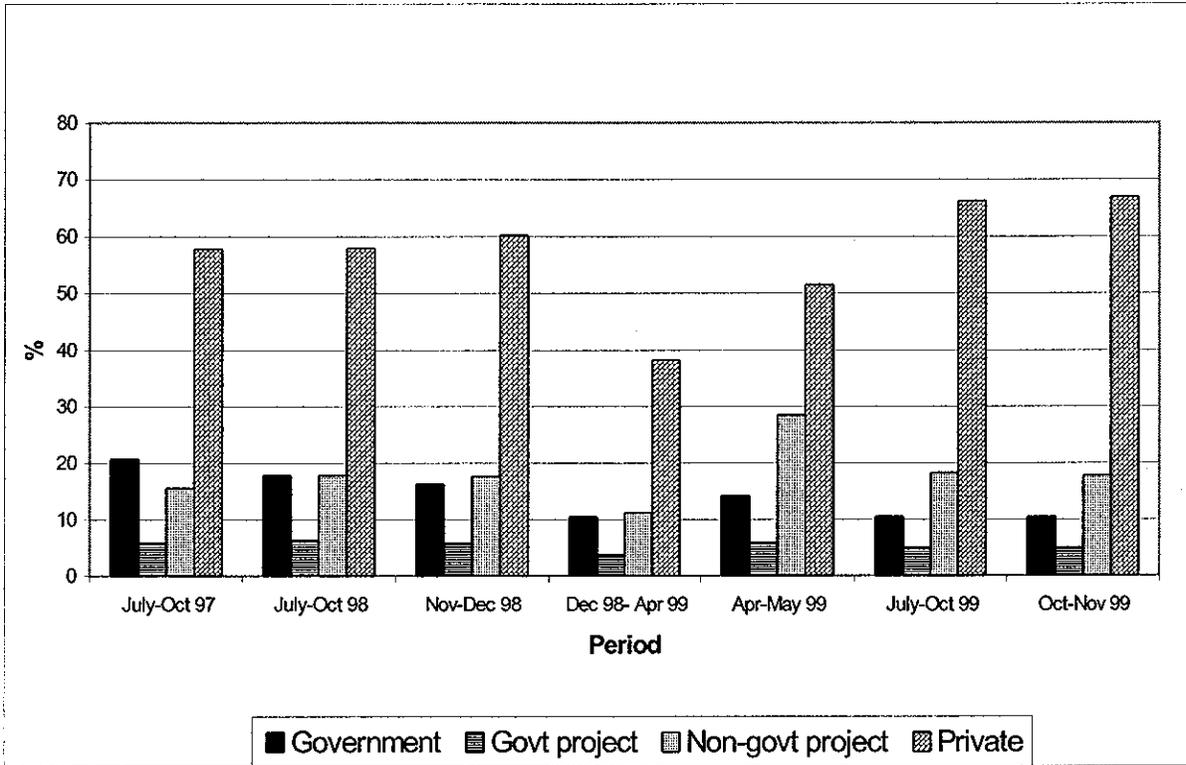
For more than half of dependent workers, their job was located outside their home district (Table 5.7). A year after the flood, in July-October, 1999, the proportion of dependent workers working outside their home district decreased to 30 percent, indicating a change towards locations closer to their village, thana and union.

Tables 5.8 and 5.9 and figure 5.5a show the monthly average hours worked and wage earnings of dependent workers for seven periods from July-October, 1997 to October-November, 1999 and by sectors of employment as well. The average monthly wage earnings declined in the periods following July-October, 1997, except in the period of December, 1998-April, 1999 when earnings were higher by about 12 percent. The service, trade, transport and rural manufacturing sectors paid higher monthly earnings

**Figure 5.3 — Average Monthly Earnings by Main Occupation and Period**



**Figure 5.4 — Distribution of Dependent Workers by Type of Employers**



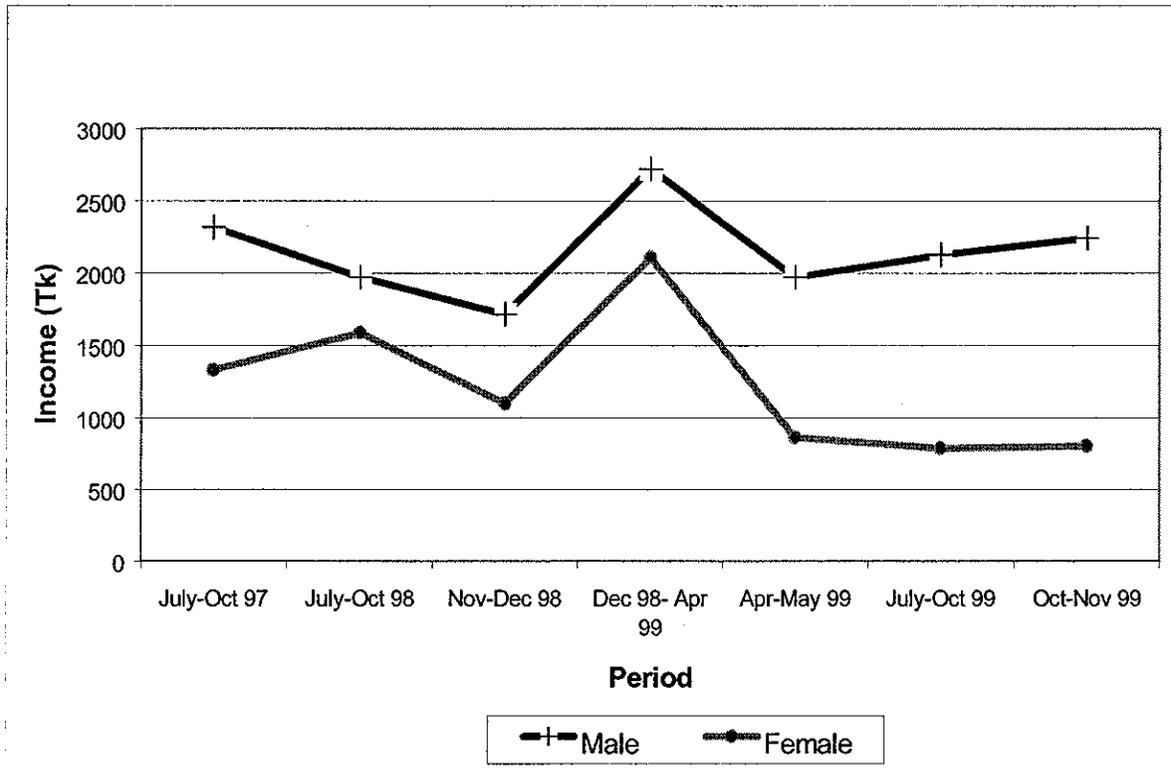
**Figure 5.5a — Average Monthly Earnings of Dependent Worker by Gender**

Figure 5.5b — Average Monthly Earnings of Daily Labor by Gender

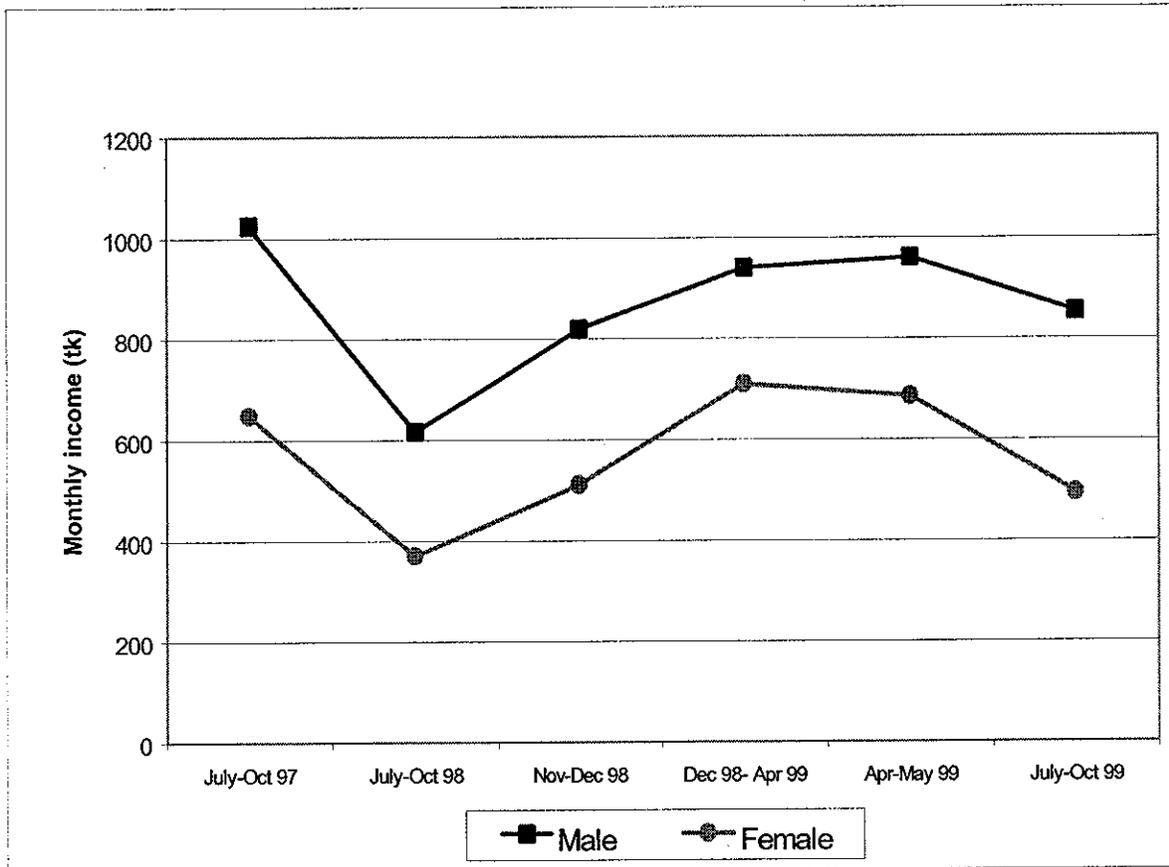


Figure 5.5c — Average Monthly Earnings of Business Income by Gender

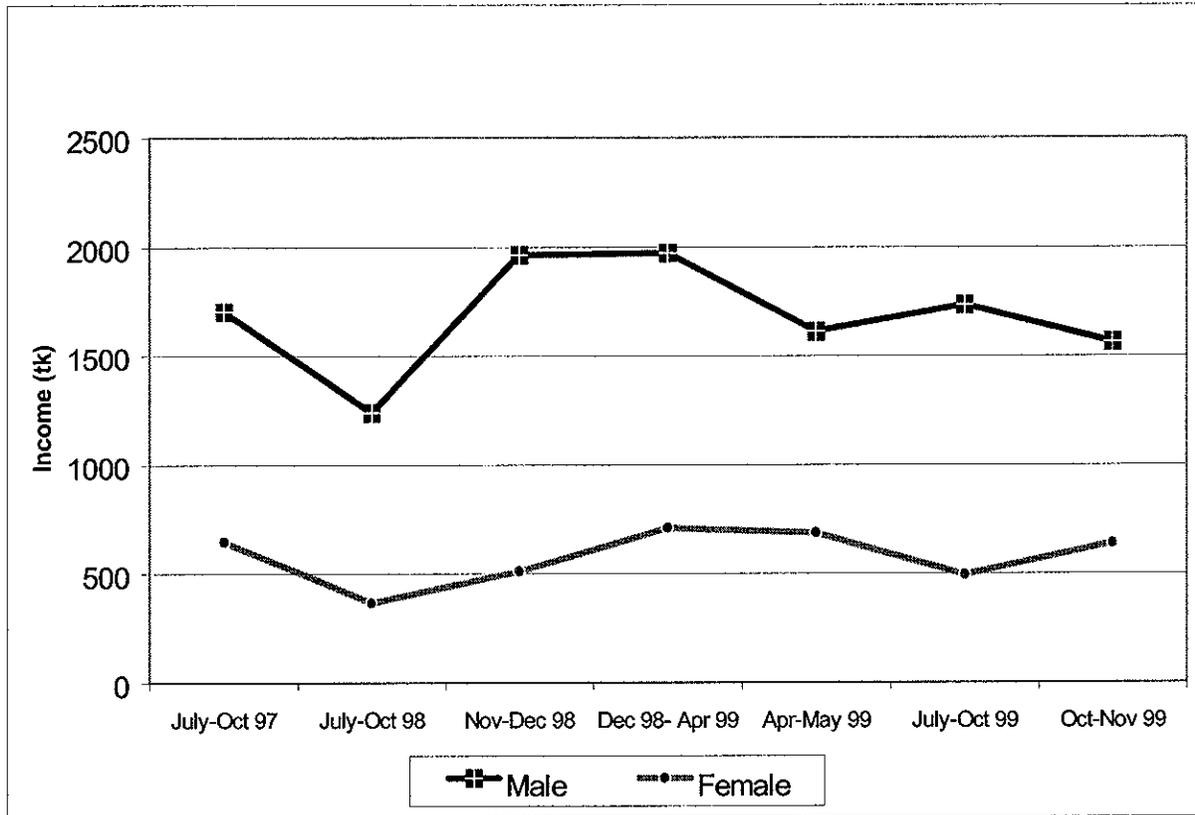


Figure 5.6a — Average Monthly Earnings of Dependent Workers by Economic Sector

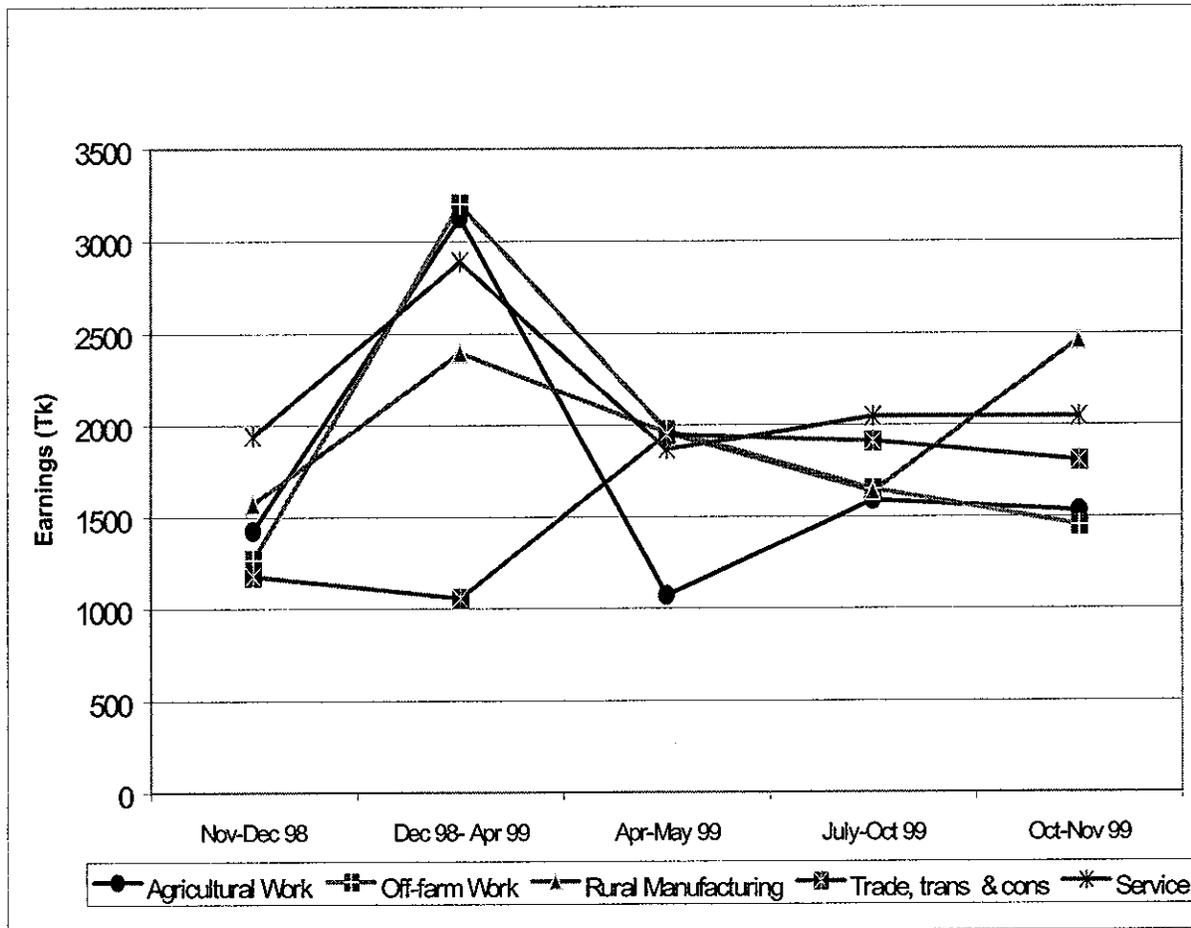


Figure 5.6b — Average Daily Wage Rate of Daily Labor by Economic Sector

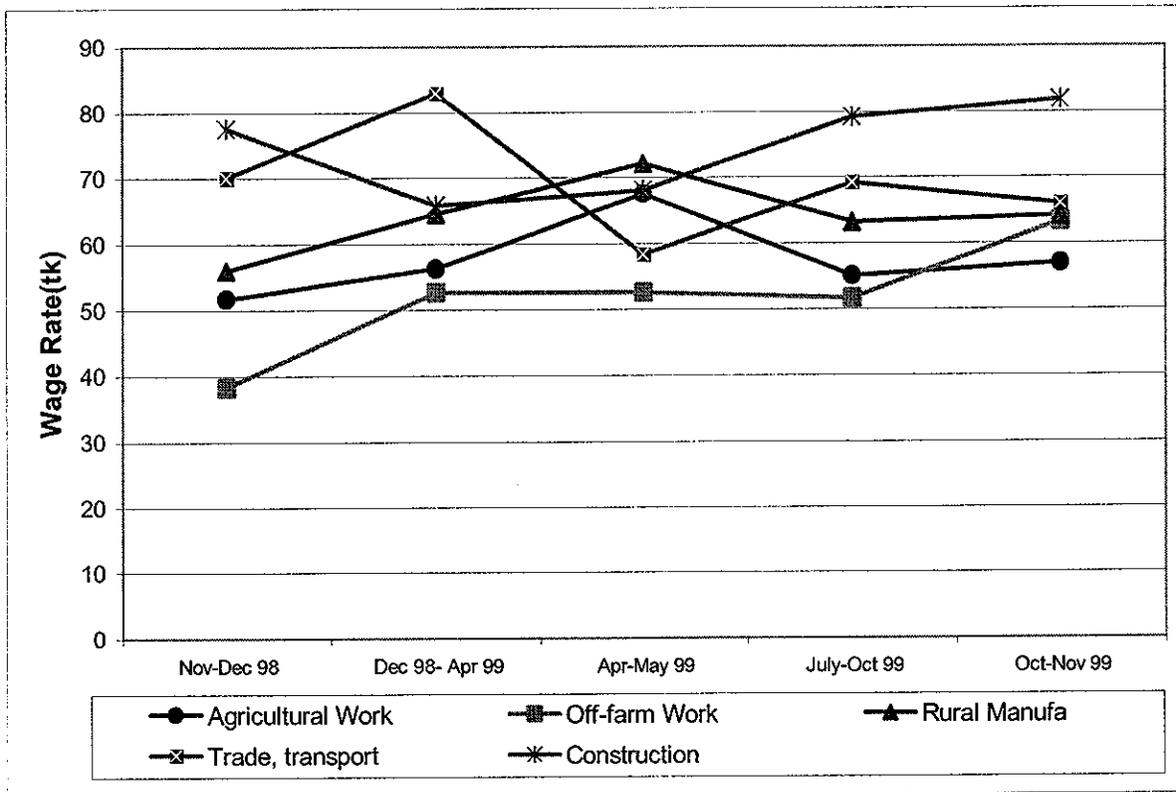


Figure 5.6c — Average Monthly Income of Daily Labor by Economic Sector

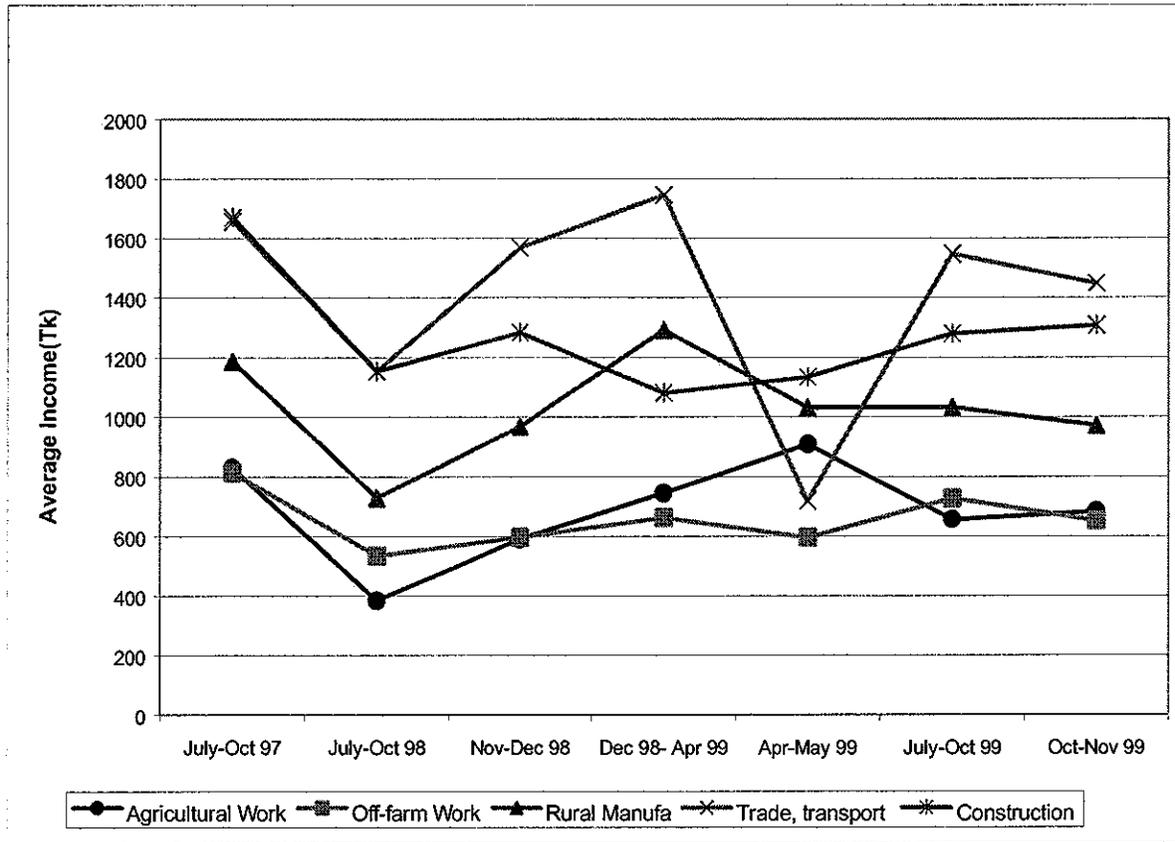


Figure 5.6d — Average Monthly Earnings of Business Income by Economic Sector

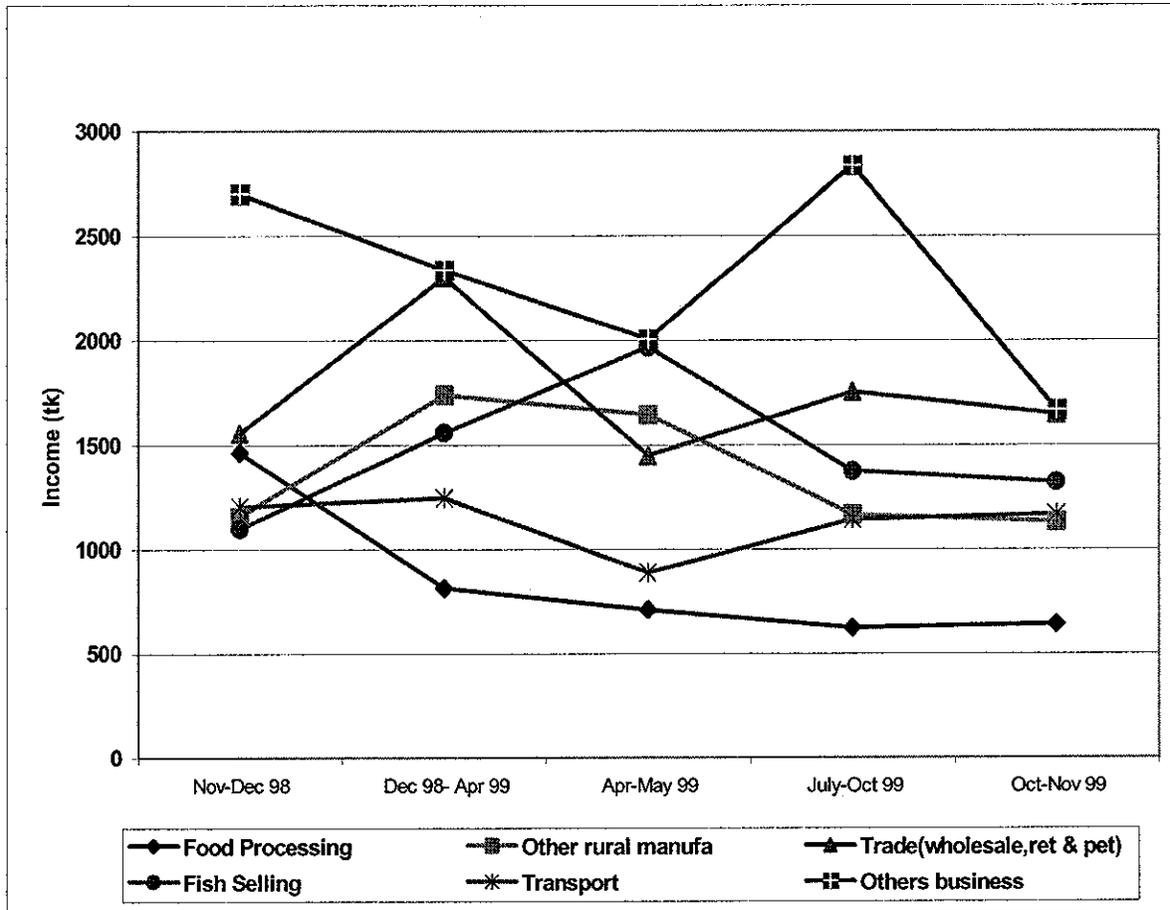
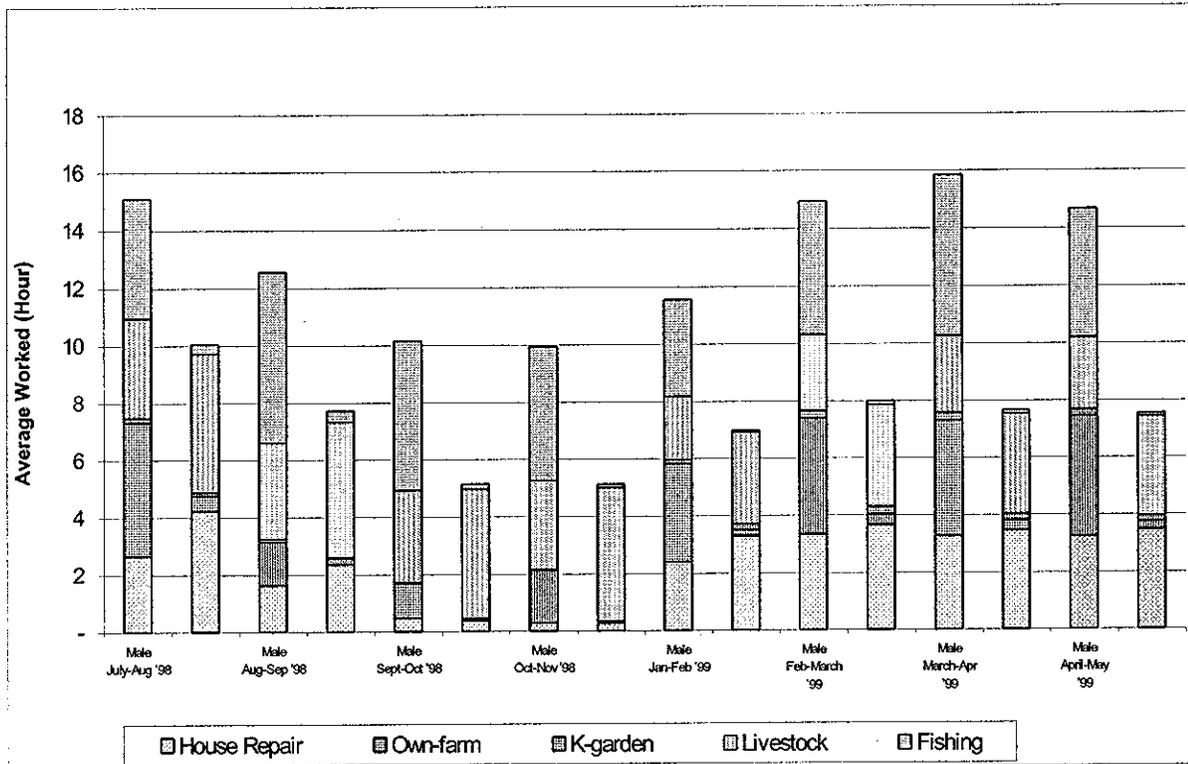


Figure 5.7 — Average Monthly Working Hour for All Members by Period and Gender



**Table 5.6 — Distribution of Dependent Workers by Type of Employers and Agreement**

<b>July-Oct 1997</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>AllNumber</b>	<b>%</b>		
Government	89.29	10.71	0.00	100	28	20.74	
Government project	37.50	62.50	0.00	100	8	5.93	
Non-government project	47.62	52.38	0.00	100	21	15.56	
Private	10.26	84.62	5.13	100	78	57.78	
<b>Total</b>	<b>34.07</b>	<b>62.96</b>	<b>2.96</b>	<b>100</b>	<b>135</b>	<b>100</b>	
<b>July-Oct 1998</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>AllNumber</b>	<b>%</b>		
Government	92.86	7.14	0.00	100	28	17.83	
Government project	40.00	60.00	0.00	100	10	6.37	
Non-government project	35.71	64.29	0.00	100	28	17.83	
Private	7.69	86.81	5.49	100	91	57.96	
<b>Total</b>	<b>29.94</b>	<b>66.88</b>	<b>3.18</b>	<b>100</b>	<b>157</b>	<b>100</b>	
<b>Nov - Dec 1998</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>All</b>	<b>Number</b>	<b>%</b>	
Government	92.86	7.14	0.00	100	28	16.37	
Government project	40.00	60.00	0.00	100	10	5.85	
Non-government project	33.33	66.67	0.00	100	30	17.54	
Private	7.77	85.44	6.80	100	103	60.23	
<b>Total</b>	<b>28.07</b>	<b>67.87</b>	<b>4.09</b>	<b>100</b>	<b>171</b>	<b>100</b>	
<b>December 98- April 1999</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>AllNumber</b>	<b>%</b>		
Government	88.46	11.54	0.00	100	26	16.46	
Government project	45.45	54.55	0.00	100	11	6.96	
Non-government project	32.50	67.50	0.00	100	40	25.32	
Private	12.35	86.42	1.23	100	81	51.27	
<b>Total</b>	<b>32.28</b>	<b>67.09</b>	<b>0.63</b>	<b>100</b>	<b>158</b>	<b>100.00</b>	
<b>April - May 1999</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>All</b>	<b>Number</b>	<b>%</b>	
Government	87.50	12.50	0.00	100	24	14.20	
Government project	50.00	50.00	0.00	100	10	5.92	
Non-government project	31.25	68.75	0.00	100	48	28.40	
Private	9.20	89.66	1.15	100	87	51.48	
<b>Total</b>	<b>28.99</b>	<b>70.41</b>	<b>0.59</b>	<b>100</b>	<b>169</b>	<b>100.00</b>	
<b>July-October 1999</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>All</b>	<b>Number</b>	<b>%</b>	
Government	91.30	8.70	0.00	100	23	10.50	
Government project	27.27	72.73	0.00	100	11	5.02	
Non-government project	32.50	67.50	0.00	100	40	18.26	
Private	8.97	84.14	6.90	100	145	66.21	
<b>Total</b>	<b>22.83</b>	<b>72.60</b>	<b>4.57</b>	<b>100</b>	<b>219</b>	<b>100.00</b>	
<b>October - Nov 1999</b>		<b>Type of Agreement</b>					
<b>Type of Employer</b>	<b>Permanent</b>	<b>Casual</b>	<b>Exchange</b>	<b>All</b>	<b>Number</b>	<b>%</b>	
Government	91.30	8.70	0.00	100	23	10.41	
Government project	27.27	72.73	0.00	100	11	4.98	
Non-government project	35.90	64.10	0.00	100	39	17.65	
Private	8.78	84.46	6.76	100	148	66.97	
<b>Total</b>	<b>23.08</b>	<b>72.40</b>	<b>4.52</b>	<b>100</b>	<b>221</b>	<b>100.00</b>	

**Table 5.7 — Distribution of Dependent Workers by Location of Work**

<b>Location of Job</b>	<b>July-Oct 97</b>	<b>July-Oct 98</b>	<b>Nov-Dec 98</b>	<b>Dec 98-Apr 99</b>
Same Village	18.80	19.61	22.94	26.58
Same Upazila	15.79	13.07	15.29	18.35
Same Thana	6.77	6.54	7.65	10.76
Same District	8.27	8.50	7.65	6.33
Outside District	50.38	52.29	46.47	37.97
All	100	100	100	100
Persons	133	153	170	158

<b>Location of Job</b>	<b>Apr-May 99</b>	<b>July-Oct 99</b>	<b>Oct-Nov 99</b>
Same Village	30.36	37.79	38.36
Same Upazila	17.26	17.51	17.35
Same Thana	10.12	8.29	7.31
Same District	7.14	6.45	6.39
Outside District	35.12	29.95	30.59
All	100	100	100
Persons	168	217	219

**Table 5.8 — Monthly Average Earnings, Average Monthly Days and Hours Worked of Dependent Workers**

<b>Period</b>	<b>Monthly Earnings</b>	<b>Monthly Hours Worked</b>	<b>Persons</b>
<b>ALL</b>			
July-Oct 97	2191	173	132
July-Oct 98	1908	137	153
Nov-Dec 98	1627	169	167
Dec 98-Apr 99	2616	256	155
Apr-May 99	1770	163	165
July-Oct 99	1845	193	161
Oct-Nov 99	1941	183	168
<b>Male</b>			
July-Oct 97	2319	176	115
July-Oct 98	1971	137	127
Nov-Dec 98	1716	168	143
Dec 98-Apr 99	2722	261	128
Apr-May 99	1972	159	135
July-Oct 99	2129	206	126
Oct-Nov 99	2244	194	133
<b>Female</b>			
July-Oct 97	1331	152	17
July-Oct 98	1588	135	26
Nov-Dec 98	1099	175	24
Dec 98-Apr 99	2108	232	27
Apr-May 99	859	179	30
July-Oct 99	784	146	35
Oct-Nov 99	801	140	35

**Table 5.9 — Monthly Average Earnings, Average Monthly Days and Hours Worked of Dependent Workers in Each Type of Job in Different Periods**

<b>Agricultural Work</b>	<b>July-Oct 97</b>	<b>July-Oct 98</b>	<b>Nov-Dec 98</b>	<b>Dec 98-Apr 99</b>	<b>Apr-May 99</b>	<b>July-Oct 99</b>	<b>Oct-Nov 99</b>
Earnings per Month (Tk.)	4550	2296.26	1425.43	3128.71	1072.06	1588.00	1532.50
Hours Worked per Month	141	97.89	296.00	372.53	150.76	230.22	257.25
No. of persons Engaged	5	6	10	10	17	5	8
<b>Off-farm Work</b>							
Earnings per Month (Tk.)	2413	1679.24	1264.77	3200.25	1972.00	1650.07	1455.06
Hours Worked per Month	224	209.52	211.33	273.25	208.53	212.19	197.72
No. of persons Engaged	24	23	25	16	15	16	18
<b>Rural Manufacturing</b>							
Earnings per Month (Tk.)	1339	1727.95	1570.69	2393.52	1956.78	1637.89	2460.74
Hours Worked per Month	153	131.40	175.50	303.91	205.91	243.65	187.33
No. of persons Engaged	21	22	24	23	23	25	27
<b>Trade, transport &amp; construction</b>							
Earnings per Month (Tk.)	1221	1852.29	1178.19	1057.5	1948.33	1911.38	1806.44
Hours Worked per Month	164	140.77	154.69	210.09	129.81	177.33	177.33
No. of persons Engaged	11	13	16	18	21	8	9
<b>Service</b>							
Earnings per Month (Tk.)	2555	2079.92	1939.39	2887.45	1866.99	2044.72	2045.67
Hours Worked per Month	159	117.21	137.40	220.33	150.32	182.85	180.26
No. of persons Engaged	62	72	74	79	79	98	97
<b>Other</b>							
Earnings per Month (Tk.)	980	1557.98	1431.44	1093.33	1083.2	807.14	740.56
Hours Worked per Month	207.41	142.1	177.89	370.3	181.2	103.25	102.11
No. of persons Engaged	9	17	18	9	10	8	9
<b>All</b>							
Earnings per Month (Tk.)	2191	1908.98	1626.96	2616.2	1770.01	1845.27	1941.31
Hours Worked per Month	173	136.82	169.4	255.53	162.67	192.87	182.62
No. of persons Engaged	132	153	167	155	165	161	168

than other sectors. Monthly average earnings from the agriculture sector were relatively higher in December, 1998-April, 1999 (Figure 5.6). About 60 percent of the dependent workers were employed in the service sector in July-November, 1999. The rural manufacturing sector absorbed about 16 percent of workers, followed by off-farm work (10.7 percent).

#### DAILY LABORERS

Tables 5.10 to 5.12 and Figures 5.5b and 5.7 contain information about the number of individuals working as daily laborers, number of days worked, average monthly earnings, hours worked per month and daily wage rate over seven periods by sector of activity. It emerges that daily laborers were mostly males (90 percent) aged between 25 to 54 years (75 percent), with the females more concentrated in the of 35-54 age group (more than 50 percent of them).

Average monthly earnings, size of employment, and hours worked were higher in December, 1998-May, 1999, compared to the other five periods. These two periods correspond to area and production intensive activities for the *boro* crop. Apparently, after the flood, more agricultural land was used for *boro* cultivation, because of the reduction of the area used for *aman* cultivation and the losses incurred in the cultivation of *aman* because of the flood. The daily wage rate varied from Tk. 55 to Tk. 60 including meals. They never exceeded US \$20 a month and dropped to an even lower amount at the time of the peak of the flood, in August, 1998.

Agriculture is the single largest source of employment for daily laborers. Labor absorption in agriculture varies from month to month, going from 42 percent in the pre-flood and flood period (July-October, 1998) to a high of 61 percent in October-November, 1999. The second most important source of use of daily laborers is the rural manufacturing sector, absorbing 20-24 percent of all daily laborers in July-December, followed by the construction sector in the months of April-May and January-April.

**Table 5.10 — Monthly Average Earnings, Average Monthly Hours Worked and Daily Wage of Daily Labor**

<b>Period</b>	<b>Monthly earnings</b>	<b>Monthly hours worked</b>	<b>Daily wage With meal</b>	<b>Persons</b>
<b>All</b>				
July-Oct 97	995.84	151.6	54.59	382
July-Oct 98	597.81	97.19	53.14	318
Nov-Dec 98	798.81	125.62	54.27	364
Dec 98- Apr 99	921.04	130.39	59.59	424
Apr-May 99	935.76	125.75	66.39	394
July-Oct 99	826.98	121.58	59.15	326
Oct-Nov 99	808.76	115.06	60.82	317
<b>Male</b>				
July-Oct 97	1023.94	154.91	55.59	352
July-Oct 98	616.16	97.89	54.84	294
Nov-Dec 98	823.68	125.43	56.25	334
Dec 98- Apr 99	938.98	128.54	61.30	391
Apr-May 99	960.13	123.7	68.69	359
July-Oct 99	853.48	123.02	60.59	302
Oct-Nov 99	819.67	114.24	62.13	297
<b>Female</b>				
July-Oct 97	647.68	111.21	42.11	30
July-Oct 98	370.43	88.83	32.00	24
Nov-Dec 98	511.96	127.76	31.25	30
Dec 98- Apr 99	709.54	152.31	39.45	33
Apr-May 99	685.77	135.46	42.63	35
July-Oct 99	495.69	103.6	41.25	24
Oct-Nov 99	640.53	127.58	40.53	20

**Table 5.11 — Monthly Average Earnings, Average Monthly Hours Worked and Daily Wage of Daily Labor in Each Type of Job in Different Periods**

	July-Oct 97	July-Oct 98	Nov-Dec 98	Dec 98-Apr 99	Apr-May 99	July-Oct 99	Oct-Nov 99
<b>Agricultural Work</b>							
Earnings per Month (Tk.)	829.09	384.27	590.57	744.75	908.29	656.57	683.15
Hours Worked per Month	132.17	62.54	97.33	112.91	124.48	104.56	103.79
Daily Wage Rate (Tk.)	50.86	50.39	51.67	56.30	67.57	55.08	57.01
Persons	206	134	175	212	231	192	193
<b>Off-farm Work</b>							
Earnings per Month (Tk.)	812.79	534.32	597.31	663.21	595.48	726.44	652.00
Hours Worked per Month	166.83	124.55	133.18	100.43	91.59	106.07	83.53
Daily Wage Rate (Tk.)	46.76	43.50	38.33	52.57	52.62	51.67	63.25
Persons	34	47	31	30	29	16	21
<b>Rural Manufacturing</b>							
Earnings per Month (Tk.)	1186.39	729.21	966.84	1292.50	1030.36	1031.37	970.90
Hours Worked per Month	169.06	114.02	152.81	173.95	123.45	147.03	136.52
Daily Wage Rate (Tk.)	59.92	56.46	56.00	64.57	72.15	63.15	64.10
Persons	82	83	98	58	47	73	63
<b>Trade, transport</b>							
Earnings per Month (Tk.)	1655.26	1153.81	1568.33	1744.17	718.33	1547.22	1448.00
Hours Worked per Month	233.42	178.27	220.67	226.52	113.33	241.67	224.00
Daily Wage Rate (Tk.)	70.26	63.47	70.00	83.00	58.33	69.17	66.00
Persons	20	20	18	11	6	6	5
<b>Construction</b>							
Earnings per Month (Tk.)	1670.17	1153.41	1284.52	1080.26	1134.46	1279.90	1308.10
Hours Worked per Month	181.31	118.93	135.94	132.53	133.19	143.34	136.28
Daily Wage Rate (Tk.)	76.03	78.48	77.58	65.83	68.12	79.26	81.90
Persons	29	23	31	102	74	34	30
<b>Other Service</b>							
Earnings per Month (Tk.)	386.21	317.12	414.09	822.39	702.86	710.00	746.00
Hours Worked per Month	104.85	77.85	132	203.39	200.29	154.67	171.60
Daily Wage Rate (Tk.)	26.36	29.55	27.27	36.45	33.57	30.00	30.00
Persons	11	11	11	11	7	5	5
<b>All</b>							
Earnings per Month (Tk.)	995.8	597.81	798.81	921.04	935.76	826.98	808.76
Hours Worked per Month	151.6	97.19	125.62	130.39	124.75	121.58	115.06
Daily Wage Rate (Tk.)	54.59	53.14	54.27	59.59	66.38	59.15	60.82
No. of Persons	382	318	364	424	394	326	317

**Table 5.12 — Monthly Average Earnings, Average Monthly Hours Worked and Wage Rate of Male Daily Labor in Each Type of Job in Different Periods - MALES**

	July-Oct 97	July-Oct 98	Nov-Dec 98	Dec 98-Apr 99	Apr-May 99	July-Oct 99	Oct-Nov 99
<b>Agricultural Work</b>							
Earnings per Month (Tk.)	834.58	389.55	582.39	751.17	916.06	660.33	678.21
Hours Worked per Month	133.78	63.1	95.27	114.28	124.77	105.29	103.07
Daily Wage Rate (Tk.)	50.72	50.88	51.86	56.42	68.43	55.22	57.13
No. of Persons	201	130	170	204	219	187	188
<b>Off-farm Work</b>							
Earnings per Month (Tk.)	823.83	525.67	603.2	676.90	670.58	833.61	752.94
Hours Worked per Month	167.94	124.06	134.77	96.53	97.17	112.72	95.81
Daily Wage Rate (Tk.)	46.67	43.85	38.65	53.96	56.29	58.75	69.71
No. of Persons	30	42	29	27.00	24	13	18
<b>Rural Manufacturing</b>							
Earnings per Month (Tk.)	1204.11	743.82	1027.62	1347.81	1063.34	1096.82	995.88
Hours Worked per Month	175.09	114.06	157.65	178.6	124.59	151.11	134.35
Daily Wage Rate (Tk.)	60.52	57.78	59.40	66.76	74.23	65.53	65.7
No. of Persons	73	79	87	54	44	66	59
<b>Trade, transport</b>							
Earnings per Month (Tk.)	1655.26	1153.81	1568.33	1871.3	820.00	1547.22	1448.00
Hours Worked per Month	233.42	178.27	220.67	225.17	113.60	241.67	224.00
Daily Wage Rate (Tk.)	70.26	63.47	70.00	90.00	67.00	69.17	66.00
No. of Persons	20	20	18	10	5	6	5
<b>Constructio</b>							
Earnings per Month (Tk.)	1698.87	1190.68	1324.67	1097.98	1150.60	1384.89	1379.04
Hours Worked per Month	181.6	121.3	139.93	129.98	129.90	151.52	140.77
Daily Wage Rate (Tk.)	77.32	80.23	78.83	68.19	70.46	82	84.81
No. of Persons	28	22	30	94	67	30	27
<b>Other Service</b>							
Earnings per Month (Tk.)	0	458.33		833.33	0	0	0
Hours Worked per Month	0	66.67		113.33	0	0	0
Daily Wage Rate (Tk.)	0	55		55.00	0	0	0
No. of Persons	0	1	0	2	0	0	0
<b>All</b>							
Earnings per Month (Tk.)	1023.94	616.16	823.68	938.98	960.13	853.48	819.67
Hours Worked per Month	154.91	97.89	125.43	128.54	123.70	123.02	114.24
Daily Wage Rate (Tk.)	55.59	54.84	56.25	61.30	68.69	60.59	62.13
No. of Persons	352	294	334	391	359	302	297

*Estimation of Supply of Daily Laborers in Rural Bangladesh*

We estimated a simple model in which the total number of hours worked by daily laborers in a month is a function of the daily wage rate and other individual and household characteristics. In particular:

$$\text{Log(Hours per Month)} = f[\log(\text{daily wage}), \text{gender}, \text{age}, \text{age squared}, \text{categories of educational achievement}, \text{household size and dummies for location (thanas)}]$$

To take into account any bias with respect to the participation in the market, we used the standard Heckman correction procedure. Here the probability of all the individuals over the age of 15 participating in the labor market during the period under consideration is a function of gender, marital status, number of individuals in different age groups, categories of educational achievement, age and categories of farm ownership.

The household data set used for the estimation, described above, contains detailed information about the participation and wage of daily laborers at seven different points of time. The number of daily workers and the monthly means of the amount of time worked and wages earned for each period are reported in Table 5.13. Notice that the lowest number of workers was found to be in the period of July-October, 1998, that coincides with the flood period. After that period, the demand for labor increased due to the cultivation of several crops and the tending of rice cultivation and reached the peak in January-April, 1999. This is the time when the demand for labor is highest because of the preparation of the cultivation of the *boro* rice crop and the cultivation and harvest of wheat, potatoes and other vegetable crops.

In the period between July and October, 1999, the demand was higher than in the previous year, but still lower than in the winter months because of the natural slowing down of economic activities due to a normal flood. In the following month, the level of activity appears to be higher than in the previous year, but still not very high, probably due to the increase of alternative job opportunities. Daily wages remained stagnant

Table 5.13 — Summary Statistics by Period

	Jul-Oct '97	Jul-Oct '98	Oct-Nov '98	Jan-Apr '99	Apr-May '99	Jul-Oct '99	Oct-Nov '99
Observations	373	309	356	432	405	334	321
Hours worked per month	153.3	98.3	127.9	129.1	124.0	120.9	114.7
Days worked per month	17.8	11.0	14.8	15.1	13.8	13.9	13.2
Hours worked per day	8.5	8.6	8.5	8.6	9.0	8.7	8.6
Daily wage	55.6	56.6	57.4	59.4	66.2	59.1	60.9
Hourly wage	6.7	6.9	6.9	7.1	7.6	6.9	7.2

Source: FMRSP-IFPRI Household Survey 1998-1999

Table 5.14 — Summary of Estimation Results by Period

	Jul-Oct '97	Jul-Oct '98	Oct-Nov '98	Jan-Apr '99	Apr-May '99	Jul-Oct '99	Oct-Nov '99
Wage coefficient	0.46	0.35	0.12	0.26	0.26	0.22	0.10
t test	5.42	2.19	1.27	2.01	2.76	1.49	0.71
Lambda	-0.36	-0.46	-0.23	-0.43	0.10	-0.23	-0.54
t test	-1.90	-1.99	-1.19	-1.92	0.47	-0.93	-2.09
Rho	-0.48	-0.50	-0.31	-0.52	0.14	-0.31	-0.62
Sigma	0.75	0.92	0.73	0.83	0.69	0.72	0.88
Number of obs	2251	2248	2247	2256	2258	2258	2258
Censored obs	1898	1956	1909	1850	1886	1947	1963
Uncensored obs	353	292	338	406	372	311	295
Wald chi2(19)	379.96	312.55	348.65	401.8	409.77	323.26	322.35

Source: Author's estimation using the FMRSP-IFPRI Household Survey 1998-1999

between 1997 and 1998, but registered an increase after the flood, especially in the wintertime, when the demand for labor appeared to be high due to the increase of labor activities.

A summary of the results of the model presented above is reported in Table 5.14. The coefficient of the wage variable represents the elasticity of the number of hours worked with respect to the daily wage earned by daily laborers in rural Bangladesh. The values of this elasticity vary from a high value of 49 percent in the first period (July-October, 1997) to a minimum of 10 percent, two years later. In the majority of the estimates, the coefficients of the Inverse Mills ratio ( $\lambda$ ) are significant. This means that it was necessary to correct for the participation bias.

#### RURAL NON-FARM EMPLOYMENT

The rural non-farm sector is an important heterogeneous sector covering both low productive and large-scale commercially viable operations. Business and cottage activities, for example, are self-employment non-farm activities, which employed more than one-third of total employment in October-November, 1999. As it has been indicated by various micro-studies, rural households depend significantly on income from non-farm employment, and this dependence has increased over time and that the rapid growth of the rural non-farm sector indicates an increase in low productivity activities in a sluggish rural economy (Hossain, reprinted in Varma & Kumar 1996).

The RNF<sup>1</sup> sector's potential for providing sustainable employment (part-time/full-time) is dependent on the returns to labor relative to the agricultural wage rate, etc. (Varma 1996). Table 5.15 and Figures 5.5c and 5.8 present estimates of monthly hours worked, average monthly income, and fixed capital of self-employed persons in various non-farm activities by gender for seven periods from July-October, 1997 to November-December, 1999. We found that the average monthly income from rural non-farm activities was much higher than earnings from daily labor and during the July-October, 1999 period, the average monthly earnings were reported to be 89 percent higher. The

**Table 5.15 — Monthly Average Earnings, Average Monthly Hours Worked and Days Worked, Average Capital Employed of a Non-Farm Labor**

Period	Monthly profit	Monthly hours worked	Working capital Tk.	Fixed capital Tk.	No. of persons
All					
July-Oct 97	1488.43	173.32	7048.69	6192.67	263
July-Oct 98	1099.04	128.74	6942.7	5820.42	272
Nov-Dec 98	1692.14	177.29	6831.63	5557.09	286
Dec 98- Apr 99	1732.19	173.74	8027.82	9690.42	306
Apr-May 99	1403.49	137.31	8616.65	5710.09	292
July-Oct 99	1562.81	180.40	6354.19	5937.79	415
Oct-Nov 99	1412.99	161.49	6125.63	5843.98	417
Male					
July-Oct 97	1701.87	186.55	8195.32	7147.30	224
July-Oct 98	1240.21	137.20	7996.09	6571.58	234
Nov-Dec 98	1963.28	189.01	8100.45	6472.07	240
Dec 98- Apr 99	1973.05	180.49	9310.98	11235.33	249
Apr-May 99	1612.06	143.16	10,088.44	6645.67	263
July-Oct 99	1735.93	188.27	7249.96	6734.91	362
Oct-Nov 99	1564.34	166.61	6978.83	6618.08	366
Female					
July-Oct 97	242.36	96.73	101.47	175.61	39
July-Oct 98	152.35	75.18	79.70	585.78	38
Nov-Dec 98	294.24	117.65	125.00	513.34	46
Dec 98- Apr 99	287.03	132.58	391.46	494.52	43
Apr-May 99	239.37	104.28	324.39	542.14	43
July-Oct 99	337.13	124.22	156.94	260.41	53
Oct-Nov 99	346.33	170.61	125.10	341.38	51

**Table 5.16 — Non-farm Labor- Monthly Average Earnings, Average Monthly Hours Worked, and Days Worked, Capital Requirement of Non-farm Labor in Each Type of Job in Different Periods**

	July- Oct 97	July- Oct 98	Nov- Dec 98	Dec 98- Apr 99	Apr- May 99	July- Oct 99	Oct- Nov 99
<b>Food Processing</b>							
Earnings per Month (Tk.)	5196.67	1058.79	1463.00	812.92	710.00	622.19	639.27
Hours Worked per Month	123.83	102.45	161.30	130.92	79.40	204.11	91.36
Working capital	616.67	1450.00	1250.00	1020.83	630.00	696.88	745.45
Fixed Capital	1200.00	1575.00	2025.00	7829.17	8530.00	1287.5	618.18
No. of Persons	6	12	11	13	15	22	16
<b>Other rural manufacturing</b>							
Earnings per Month (Tk.)	1368.66	933.48	1157.67	1739.73	1645.33	1166.55	1131.49
Hours Worked per Month	155.38	107.17	183.12	186.73	153.1	166.99	144.6
Working capital	11634.83	12740.87	11225.00	8657.67	8971.72	6871.17	6437.5
Fixed Capital	6296.72	6801.96	2025.00	4979.71	5238.67	5660.43	5962.22
No. of Persons	33	25	32	35	30	48	47
<b>Trade(wholesale, retail &amp; petty)</b>							
Earnings per Month (Tk.)	1602.51	1117.15	1555.59	2302.99	1450.53	1754.05	1648.83
Hours Worked per Month	180.93	136.94	183.66	180.26	137.79	179.84	170.79
Working capital	11110.78	10432.54	9418.57	13684.03	14572.30	11714.88	11878.31
Fixed Capital	7948.25	7643.00	6814.55	23455.38	6956.01	10381.94	10488.98
No. of Persons	62	67	73	75	77	87	85
<b>Fish Selling</b>							
Earnings per Month (Tk.)	1387.89	1163.03	1095.67	1559.8	1968.18	1374.51	1321.66
Hours Worked per Month	210.48	182.31	191.80	168.95	134.59	203.57	183.05
Working capital	1240.74	941.38	946.43	537.5	604.76	1201.06	1098.19
Fixed Capital	3341.03	3129.70	4025	3842.4	5211.36	3147.07	2435.82
No. of Persons	30	33	30	25	23	72	77
<b>Transport</b>							
Earnings per Month (Tk.)	1306.34	822.15	1204.02	1246.96	886.22	1141.72	1169.29
Hours Worked per Month	196.29	118.99	185.52	185.83	140.31	207.43	163.41
Working capital	36.36	16.19	208.82	167.71	348.78	159.07	150.18
Fixed Capital	2750.00	2292.11	2414.63	2878.85	2750.00	2352.54	2011.67
No. of Persons	38	41	41	55	45	61	65
<b>Others business</b>							
Earnings per Month (Tk.)	1829.89	1997.97	2700.53	2336.09	2007.02	2836.79	1668.01
Hours Worked per Month	183.52	145.76	194.29	183.88	159.83	178.52	164.86
Working capital	8865.96	7774.49	8831.91	11675	11928.00	9391.72	8210.99
Fixed Capital	10868.93	9832.56	11821.89	8830.94	8510.41	7357.06	6815.14
No. of Persons	50	50	50		53	66	71
<b>All Others</b>							
Earnings per Month (Tk.)	741.25	297.9	2078.25	1039.7	905.98	1105.47	1518.62
Hours Worked per Month	125.19	82.12	135.22	140.89	112.84	130.07	138.78
Working capital	6368.75	8705.00	7695.56	8428.89	7989.36	8041.23	8436.98
Fixed Capital	4472.5	4023.03	3891.56	4160.22	3408.51	6463.16	7515.28
No. of Persons	44	44	49	47	49	59	56
<b>Total</b>							
Earnings per Month (Tk.)	1488.43	1099.04	1692.14	1732.19	1403.49	1562.81	1412.99
Hours Worked per Month	173.32	128.79	177.29	173.74	137.31	180.40	161.49
Working capital	7048.69	6942.70	6831.63	8027.82	8616.65	6354.19	6125.63
Fixed Capital	6192.67	5820.42	5557.09	9690.42	5710.09	5937.79	5843.98
No. of Persons	263	272	286	306	292	415	417

**Table 5.17 — Non-farm Labor - Monthly Average Earnings, Average Monthly Hours Worked, and Days Worked, Capital Requirement of Non-farm Labor in Each Type of Job in Different Periods**

<b>MALE NON-FARM WORKER</b>							
	July- Oct 97	July- Oct 98	Nov- Dec 98	Dec 98- Apr 99	Apr- May 99	July- Oct 99	Oct- Nov 99
<b>Food Processing</b>							
Earnings per Month (Tk.)	6216.00	1154.67	1766.25	975.00	788.89	698.93	746.67
Hours Worked per Month	145.60	111.20	192.25	134.60	88.22	226.94	104.67
Working capital	740.00	1611.11	1562.50	1210.00	700.00	796.43	911.11
Fixed Capital	1440.00	1750.00	2218.75	9185.00	9477.78	1471.43	755.56
No. of Persons	5	11	9	11	14	19	13
<b>Other rural manufacturing</b>							
Earnings per Month (Tk.)	1939.60	1290.44	1729.47	2372.89	2340.50	1513.28	1484.84
Hours Worked per Month	191.53	128.33	215.00	212.93	168.60	195.32	168.19
Working capital	16793.00	19457.33	17552.63	12070.48	12689.00	9427.79	9054.84
Fixed Capital	8970.75	10247.67	4735.00	6368.33	7022.00	7560.88	7990.00
No. of Persons	22	16	20	24	20	34	34
<b>Trade(wholesale, retail &amp; petty)</b>							
Earnings per Month (Tk.)	1602.51	1117.15	1555.59	2337.83	1453.92	1762.33	1660.75
Hours Worked per Month	180.93	136.94	183.66	180.54	136.97	178.43	170.19
Working capital	11110.78	10432.54	9418.57	14010.71	14751.37	11819.88	11986.59
Fixed Capital	7948.25	7643.00	6814.55	24122.93	7041.71	10503.15	10608.35
No. of Persons	62	67	73	73	76	86	84
<b>Fish Selling</b>							
Earnings per Month (Tk.)	1429.43	1193.12	1121.38	1624.38	1968.18	1374.51	1321.66
Hours Worked per Month	212.56	184.26	188.07	164.88	134.59	203.57	183.05
Working capital	1288.46	975.00	981.48	560.87	604.76	1201.06	1098.19
Fixed Capital	3460.36	3227.50	4163.79	4002.50	5211.36	3147.07	2435.82
No. of Persons	29	32	29	24	23	72	77
<b>Transport</b>							
Earnings per Month (Tk.)	1306.34	822.15	1204.02	1246.96	894.55	1135.69	1159.11
Hours Worked per Month	196.29	118.99	185.52	185.83	140.55	206.33	161.21
Working capital	36.36	16.18	208.82	167.71	357.50	162.08	152.86
Fixed Capital	2750.00	2292.11	2414.63	2878.85	2719.51	2393.1	2045.76
No. of Persons	38	41	41	55	44	60	64
<b>Others business</b>							
Earnings per Month (Tk.)	1988.41	2202.75	2922.38	2452.50	2150.73	3191.4	1825.87
Hours Worked per Month	192.30	156.56	202.33	183.75	162.63	180.45	167.41
Working capital	9667.44	8453.33	16433.33	12358.82	12680.85	10535.61	9100.62
Fixed Capital	11914.58	10382.34	7914.77	9357.80	9062.17	8274.02	7582.18
No. of Persons	45	45	45	53	49	58	64
<b>All Others</b>							
Earnings per Month (Tk.)	1210.76	435.76	4246.36	1895.71	1717.39	1692.17	2564.14
Hours Worked per Month	144.12	79.21	164.13	162.45	134.70	135.55	140.59
Working capital	12088.10	16538.10	9634.88	17823.81	17642.86	14268.75	15888.93
Fixed Capital	8450.00	7600.00	12613.08	8857.62	7571.43	11405.00	14100.36
No. of Persons	23	22	23	23	23	33	30
<b>Total</b>							
Earnings per Month (Tk.)	1701.87	1240.21	1963.28	1973.05	1612.06	1735.93	1564.34
Hours Worked per Month	186.55	137.20	189.01	180.49	143.16	188.27	166.61
Working capital	8195.32	7996.09	8100.45	9310.98	10088.44	7249.96	6978.83
Fixed Capital	7147.30	6571.58	6472.07	11235.33	6645.67	6734.91	6618.08
No. of Persons	224	234	240	263	249	362	366

**Table 5.18 — Non-farm Labor- Monthly Average Earnings, Average Monthly Hours Worked, and Days Worked, Capital Requirement of Non-farm Labor in Each Type of Job in Different Periods**

<b>FEMALE NON-FARM WORKER</b>							
	July- Oct 97	July- Oct 98	Nov- Dec 98	Dec 98- Apr 99	Apr- May 99	July- Oct 99	Oct- Nov 99
<b>Food Processing</b>							
Earnings per Month (Tk.)	100.00	100.00	250.00	2.5	0.00	85.00	156
Hours Worked per Month	15.00	15.00	37.50	112.5	0	21.50	31.5
Working capital	0	0.00	0.00	75	0	0	0
Fixed Capital	0.00	0.00	1250.00	1050	0	0	0
No. of Persons	1	1	2	2	1	3	3
<b>Other rural manufacturing</b>							
Earnings per Month (Tk.)	169.67	168.57	170.00	358.30	255.00	259.69	261.69
Hours Worked per Month	75.83	67.50	130.00	129.58	122.10	92.87	86.54
Working capital	172.22	147.50	295.45	694.44	711.11	184.62	196.15
Fixed Capital	354.44	341.25	174.55	1647	1672.00	690.00	970.77
No. of Persons	11	9	12	11	10	14	13
<b>Trade(wholesale, retail &amp; petty)</b>							
Earnings per Month (Tk.)	..	*	-	1083.33	1200.00	1050.00	660
Hours Worked per Month	..	..	-	170.00	200.00	300.00	220
Working capital	..	..	-	2250	1500.00	3000.00	3000
Fixed Capital	..	..	-	425	700.00	200.00	700
No. of Persons	..	..	-	2	1	1	1
<b>Fish Selling</b>							
Earnings per Month (Tk.)	183.33	200.00	350.00	10	0	0	0
Hours Worked per Month	150.00	120.00	300.00	266.67	0	0	0
Working capital	0	0	0	0	0	0	0
Fixed Capital	0	0.00	0	0	0	0	0
No. of Persons	1	1	1	1	0	0	0
<b>Transport</b>							
Earnings per Month (Tk.)	..	.	-	0	520	1503.33	1800
Hours Worked per Month	..	.	-	0	130	273.33	300
Working capital	..	.	-	0	0	0	0
Fixed Capital	..	.	-	0	4000	0	0
No. of Persons	..	.	-	0	1	1	1
<b>Others business</b>							
Earnings per Month (Tk.)	498.33	155.00	837.00	318.33	282.5	310.21	247.29
Hours Worked per Month	108.00	48.53	125.00	186.11	125.5	164.5	141.57
Working capital	250.00	137.50	200.00	50	133.33	77.14	77.14
Fixed Capital	412.50	3785.00	3910.00	50	50.00	21.43	21.43
No. of Persons	5	5	5	3	4	8	7
<b>All Others</b>							
Earnings per Month (Tk.)	224.78	146.25	243.69	219.35	188.19	331.01	352.46
Hours Worked per Month	105.35	85.17	109.65	120.24	93.5	122.85	136.77
Working capital	47.37	47.37	50.00	208.33	192.31	70.00	90.8
Fixed Capital	53.06	48.61	43.26	50	46.15	21.43	140
No. of Persons	21	22	26	24	26	26	26
<b>Total</b>							
Earnings per Month (Tk.)	242.36	152.35	294.24	287.03	239.37	337.13	341.38
Hours Worked per Month	96.73	75.18	117.65	132.58	104.28	124.22	125.1
Working capital	101.47	79.70	125.00	391.46		156.94	170.61
Fixed Capital	175.61	585.78	513.54	494.52		260.41	346.33
No. of Persons	39	38	46	43	43	53	51

monthly income of self-employed persons in non-farm activities was lower than that for dependent workers except in the period of November-December, 1998 when the self-employed earned more than dependent workers by four percent.

The hours worked were less in the period of the flood, from July-October, 1998 to October-November, 1998 and in April-May, 1998 when self-employed persons had to shift their time towards agricultural work. There are activities like harvesting of local *boro*, area-intensive activities in jute, *aus* crops and some vegetables in April-May. During October-November, there are few harvests of the local *aman* variety, open water fishing, house-repair work and some activities on *rabi* crop cultivation. In October-November, 1998 (flood period), more working hours were spent on transport activities, trade and open water fishing. These activities are basically one-person activities with abundant use of unpaid family workers and very little use of wage employment.

Tables 5.16 to 5.18 present the distribution of non-farm labor activities by sector of activity. Trade accounts for about one-fifth to one-fourth of rural employment in the non-farm sector, followed by rural manufacturing (14-17 percent), transport (14-15 percent) and fish sales (12-17 percent). Rural trade is dominated by retail trade, and together with other business, accounts for 35-43 percent of non-farm employment. Non-farm activities were performed for more than an average of 180 hours per person per month in July-October, 1997, November-April, 1999, and July-October, 1999.

Partial productivity of labor is estimated by average profit per unit of labor and partial productivity of capital is measured by fixed capital per unit of labor. These measures may indicate whether profits could be earned by employing hired labor or whether self-employment generates more income than alternate occupations. The productivity estimates show that other businesses provide the highest profit per unit of labor in the non-farm sector, followed by rural trade. Fish trade, other rural manufacturing and transport are also productive activities, though earnings vary among activities. In all the activities, monthly income per self-employed person was much

higher than the earnings of day laborers. This seems to indicate that there exists a dynamic component in the rural business and cottage activities sector (Tables 5.15 to 5.18).

#### PARTICIPATION IN HOUSEHOLD NON-MARKET ACTIVITIES

Besides participating in the formal labor market, individuals perform a large variety of tasks at home, ranging from repairs of their homes, working on their own farm, tending livestock, fishing, cleaning the house, etc. The time allocation among these activities is presented in Tables 5.19 to 5.22. During the flood (July–October, 1998), between one-fifth and one-third of family labor was engaged in fishing. Then the percentage declined. In fact, the percentage of family labor in fishing varied from six to nine percent in 1999. The other important activities performed by a large proportion of family labor were house-repairs and tending livestock. In January–May, 1999, more than one-third of family labor was involved in their own farms; they spent an average of 74 hours to 87 hours per month on this activity. Time allocation for livestock activities varies from one period to another ranging from one-third to half of family labor time.

**Table 5.19 — Average Hours and Days Worked and Number of Family Labor by Task Performed over Different Months**

Year	All family labor						Total
	House repair	Own farm	Kit-garden	Live-stock	Fish work	Other	
<b>July-Aug '98</b>							
Persons	87	64	6	334	122	38	651
% of people	13.36	9.83	0.92	51.31	18.74	5.84	100
% of time (hours)	2.97	11.52	0.13	45.56	28.57	11.24	100
total persons							
<b>Aug-Sep '98</b>							
Persons	111	49	12	337	157	41	707
% of people	15.7	6.93	1.7	47.67	22.21	5.8	100
% of time (hours)	4.81	7.51	0.2	44.46	31.54	11.35	100
<b>Sept-Oct '98</b>							
Persons	309	75	16	346	216	41	1003
% of people	30.81	7.48	1.6	34.5	21.54	4.09	100
% of time (hours)	17.6	7.8	0.63	36.03	28.67	9.3	100
<b>Oct-Nov '98</b>							
Persons	506	182	46	353	167	44	1298
% of people	38.98	14.02	3.54	27.2	12.87	3.39	100
% of time (hours)	25.03	19.53	0.92	30.51	16.86	7.16	100
<b>Jan-Feb '99</b>							
Persons	180	221	29	294	66	89	879
% of people	20.48	25.14	3.3	33.45	7.51	10.13	100
% of time (hours)	7.362	38.984	0.606	26.767	9.012	17.267	100
<b>Feb-March '99</b>							
Persons	193	230	44	295	69	93	924
% of people	20.89	24.89	4.76	31.93	7.47	10.06	100
% of time (hours)	7.74	37.11	1.41	24.87	9.03	19.83	100
<b>March-Apr '99</b>							
Persons	261	248	45	298	63	95	1010
% of people	25.84	24.55	4.46	29.5	6.24	9.41	100
% of time (hours)	10.94	37.23	0.78	26.3	6.82	17.95	100
<b>April-May '99</b>							
Persons	209	239	40	294	53	96	931
% of people	22.45	25.67	4.3	31.58	5.69	10.31	100
% of time (hours)	6.86	42.72	0.79	28.14	4	17.49	100
total persons	362	285	69	300	99	98	1213

**Table 5.20 — Average Hours and Days Worked and Number of Family Labor by Task Performed in October-November 1998**

Task in October-November 1998	Age Categories					Total
	15 -24	25 -34	35 -54	55 -60	61 -65	
<b>House Repair</b>						
Hours worked	27.14	25.31	30.41	31.84	34.36	28.57
Total Hours worked	2578.00	3594.00	6782.50	1019.00	481.00	14454.50
% of Hours	17.84	24.86	46.92	7.05	3.33	100.00
% of persons	18.77	28.06	44.07	6.32	2.77	100.00
Persons	95	142	223	32	14	506
<b>Own-farm</b>						
Hours worked	72.69	60.31	60.83	75.55	22.86	61.99
Total Hours worked	2108.00	3317.00	4866.00	831.00	160.00	11282.00
% of Hours	18.68	29.40	43.13	7.37	1.42	100.00
% of persons	15.93	30.22	43.96	6.04	3.85	100.00
Persons	29	55	80	11	7	182
<b>Kitchen-garden</b>						
Hours worked	11.80	9.83	15.56	5.00	8.00	11.58
Total Hours worked	59.00	196.50	249.00	20.00	8.00	532.50
% of Hours	11.08	36.90	46.76	3.76	1.50	100.00
% of persons	10.87	43.48	34.78	8.70	2.17	100.00
Persons	5	20	16	4	1	46
<b>Livestock</b>						
Hours worked	43.34	54.14	47.77	57.27	63.42	49.92
Total Hours worked	2904.00	4547.90	7404.90	2004.50	761.00	17622.30
% of Hours	16.48	25.81	42.02	11.37	4.32	100.00
% of persons	18.98	23.80	43.91	9.92	3.40	100.00
Persons	67	84	155	35	12	353
<b>Fishing work</b>						
Hours worked	43.78	84.63	62.56	55.33	35.40	58.33
Total Hours worked	2670.50	2285.00	4442.00	166.00	177.00	9740.50
% of Hours	27.42	23.46	45.60	1.70	1.82	100.00
% of persons	36.53	16.17	42.51	1.80	2.99	100.00
Persons	61	27	71	3	5	167
<b>Other</b>						
Hours worked	89.36	81.11	120.92	80.67		94.00
Total Hours worked	983.00	1460.00	1451.00	242.00		4136.00
% of Hours	23.77	35.30	35.08	5.85		100.00
% of persons	25.00	40.91	27.27	6.82	0.00	100.00
Persons	11	18	12	3	0	44
<b>Total</b>						
Hours worked	42.17	44.51	45.23	48.66	40.69	44.51
Total Hours worked	11302.50	15400.40	25195.40	4282.50	1587.00	57767.80
% of Hours	19.57	26.66	43.61	7.41	2.75	100.00
% of persons	20.65	26.66	42.91	6.78	3.00	100.00
Persons	268	346	557	88	39	1298

**Table 5.21 — Average Hours and Days Worked and Number of Family Labor by Task Performed in January-February 1999**

Task in January-February 1999	Age Categories					Total
	15 -24	25 -34	35 -54	55 -60	61 -65	
<b>House Repair</b>						
Hours worked	13.70	20.70	22.22	13.40	27.00	20.27
Total Hours worked	370.00	1304.00	1800.00	67.00	108.00	3649.00
% of Hours	10.14	35.74	49.33	1.84	2.96	100.00
% of persons	15.00	35.00	45.00	2.78	2.22	100.00
Persons	27	63	81	5	4	180
<b>Own Farm</b>						
Hours worked	87.33	93.66	86.73	75.68	92.00	87.42
Total Hours worked	3580.50	4964.00	8239.40	1892.00	644.00	19319.90
% of Hours	18.53	25.69	42.65	9.79	3.33	100.00
% of persons	18.55	23.98	42.99	11.31	3.17	100.00
Persons	41	53	95	25	7	221
<b>Kit-Garden</b>						
Hours worked	9.44	4.31	12.73	16.00		10.36
Total Hours worked	47.20	30.20	191.00	32.00		300.40
% of Hours	15.71	10.05	63.58	10.65		100.00
% of persons	17.24	24.14	51.72	6.90		100.00
Persons	5	7	15	2		29
<b>Livestock</b>						
Hours Worked	48.41	53.15	37.96	50.83	48.75	45.12
Total hours worked	2275.20	4464.50	5161.90	1169.00	195.00	13265.60
% of hours	17.15	33.65	38.91	8.81	1.47	100.00
% of persons	15.99	28.57	46.26	7.82	1.36	100.00
No. of persons	47	84	136	23	4	294
<b>Fish Work</b>						
Hours worked	53.36	33.00	86.93	80.00	48.00	67.67
Total hours worked	747.00	462.00	3129.50	80.00	48.00	4466.50
% of hours worked	16.72	10.34	70.07	1.79	1.07	100.00
% of persons	21.21	21.21	54.55	1.52	1.52	100.00
No. of persons	14	14	36	1	1	66
<b>House keeping</b>						
Hours worked	72.13	81.78	105.27	144.57	116.50	96.15
Total hours worked	1082.00	2208.10	3789.60	1012.00	466.00	8557.70
% of hours worked	12.64	25.80	44.28	11.83	5.45	100.00
% of persons	16.85	30.34	40.45	7.87	4.49	100.00
No. of persons	15	27	36	7	4	89
<b>Total</b>						
Hours worked	54.38	54.16	55.92	67.49	73.05	56.38
Total hours worked	8101.90	13432.80	22311.40	4252.00	1461.00	49559.10
% of hours worked	16.35	27.10	45.02	8.58	2.95	100.00
% of persons	16.95	28.21	45.39	7.17	2.28	100.00
No. of persons	149	248	399	63	20	879

**Table 5.22 — Average Hours and Days Worked and Number of Family Labor by Task Performed in April-May 1999**

Task in April-May 1999	Age Categories					Total
	15 -24	25 -34	35 -54	55 -60	61 -65	
<b>House Repair</b>						
hours worked	9.16	12.39	15.88	16.36	9.00	13.57
Total Hours worked	293.00	867.00	1461.00	180.00	36.00	2837.00
% of Hours	10.33	30.56	51.50	6.34	1.27	100.00
% of persons	15.31	33.49	44.02	5.26	1.91	100.00
persons	32	70	92	11	4	209
<b>Own Farm</b>						
Hours worked	69.74	79.93	75.15	58.12	85.63	73.92
Total Hours worked	2859.50	4795.50	7815.50	1511.00	685.00	17666.50
% of Hours	16.19	27.14	44.24	8.55	3.88	100.00
% of persons	17.15	25.10	43.51	10.88	3.35	100.00
persons	41	60	104	26	8	239
<b>Kit-Garden</b>						
Hours worked	3.88	8.50	8.09	15.50	6.00	8.15
Total Hours worked	15.50	136.00	137.50	31.00	6.00	326.00
% of Hours	4.75	41.72	42.18	9.51	1.84	100.00
% of persons	10.00	40.00	42.50	5.00	2.50	100.00
persons	4	16	17	2	1	40
<b>Livestock</b>						
hours Worked	40.55	47.15	32.80	46.61	55.10	39.58
total hours worked	1946.50	3961.00	4428.30	1025.50	275.50	11636.80
% of hours	16.73	34.04	38.05	8.81	2.37	100.00
% of persons	16.33	28.57	45.92	7.48	1.70	100.00
No. of persons	48	84	135	22	5	294
<b>Fish Work</b>						
hours worked	23.47	4.00	50.02	4.00	6.00	31.25
total hours worked	352.00	44.00	1250.50	4.00	6.00	1656.50
% of hours worked	1.42	0.24	3.02	0.24	0.36	1.89
% of persons	28.30	20.75	47.17	1.89	1.89	100.00
No. of persons	15	11	25	1	1	53
<b>House keeping</b>						
hours worked	55.38	80.53	78.82	93.75	52.75	75.34
total hours worked	941.50	2335.50	2995.00	750.00	211.00	7233.00
% of hours worked	13.02	32.29	41.41	10.37	2.92	100.00
% of persons	17.71	30.21	39.58	8.33	4.17	100.00
No. of persons	17	29	38	8	4	96
<b>Total</b>						
hours worked	40.82	44.96	44.01	50.02	53.02	44.42
total hours worked	6408.00	12139.00	18087.80	3501.50	1219.50	41355.80
% of hours worked	15.49	29.35	43.74	8.47	2.95	100.00
% of persons	16.86	29.00	44.15	7.52	2.47	100.00
No. of persons	157	270	411	70	23	931

## 6. LABOR DEMAND IN CROP PRODUCTION

The analysis of labor demand and the use of hired labor in agriculture add another dimension to the study of rural labor markets. As we have seen above, most households rely on agricultural labor. In this section, who is hiring and what are their needs and constraints are researched and the use of farm labor employed for farm related activities in two stages of the crop production cycle are described.

The first thing that is evident in rural Bangladesh is that a very high proportion of farmers (more than 80 percent in our sample areas in either area-intensive or production related activities) depend on hired labor. There are three broad categories of farm workers prevalent in Bangladesh agriculture: family-labor, hired labor and hired permanent (attached) workers. Exchange and contract-labor are also found in the rural labor market.

There is no doubt that family labor constitutes the highest proportion of total labor used. Hired labor constitutes one-third of all labor (Table 6.1). Hired labor is employed on a day-to-day basis, sometimes for less than a day, sometimes for a consecutive number of days or on a contract basis for various crop operations. Within our study area, the use of contract labor is 17.37 percent (del Ninno & Roy, June 1999). Contract labor is sometimes very important, particularly for some crop operations such as harvesting, etc. Casual labor constitutes a large component of the formal and informal labor market. Sometimes 'personal contacts' also play a role in hiring casual laborers.

Hired labor is important for all categories of farms of various sizes. The distribution of hired labor by farm size is shown in Table 6.2. The use of hired labor was relatively higher in round two compared to the other rounds. The main crop cultivated and harvested in round three is *boro* (HYV). Larger farmers (150 decimal and above) used more hired laborers than small farmers (0-49 decimals). The average use of hired

**Table 6.1 — Percentage Distribution of Types of Labor-Use by Round**

<b>Categories of labor</b>	<b>Round 1</b>	<b>Round 2</b>	<b>Round 3</b>	<b>All Periods</b>
<b>Area intensive activities</b>				
Family labor	66.41	73.04	58.91	66.13
Hired labor	33.59	26.96	41.09	33.87
<b>Production activities</b>				
Family labor	67.07	74.02	60.39	67.37
Hired labor	32.93	25.98	39.61	32.63

**Table 6.2 — Percentage of Family and Hired Labor by Farm Land and Round in Two Stages of Production**

<b>Farm Land</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>All</b>
<b>Area Intensive Activities</b>				
0-4.9	27.87	30.36	33.05	31.10
5-49	27.24	21.56	33.42	27.51
50-149	35.68	32.01	47.95	38.37
150-249	34.51	22.30	34.59	30.31
250 +	48.37	25.04	56.96	42.74
Total	33.59	26.96	41.09	33.87
<b>Production Intensive Activities</b>				
0-4.9	28.34	24.85	31.04	27.96
5-49	26.87	19.96	30.59	25.86
50-149	32.88	30.78	44.12	35.53
150-249	38.39	23.15	39.49	33.49
250 +	47.67	28.41	56.53	43.32
Total	32.93	25.99	39.61	32.63

labor (person days per acre) in various crop-production shows a great variation under similar cultivation and production activities. The *boro* crop uses more labor than the *aus* and *aman* in both area-intensive and production-related activities. The *boro* (HYV) crop accounts for a larger share of paddy production in recent years, followed by *aman* paddy. However, the *aman* crop covers the bulk of the cropped acreage as well as total person days of employment in rice agriculture.

As is known, most of the *aman* crops were damaged due to 1998 flood and consequently, the area under *boro* increased to a great extent. The area under *boro* (HYV) increased significantly, while the area under *boro* (Local) declined marginally. This had a tremendous effect on the increase of the demand for hired labor in the agriculture sector. The area under *boro* (HYV) increased by 48 percent from 1998 to 1999, while that for *aman* (Local) by 97 percent, *aman* (HYV) by 64 percent, and jute by 23 percent (Table 6.3). The wage rate also increased from the *boro* 1998 to the *boro* 1999 period, both in area and production intensive activities. The use of labor per acre also increased from round one to round two. It appears that the loss of labor demand might have been offset, at least to some extent, by higher demand and higher earnings in the period after the flood.

Table 6.4 presents the results of the estimation of a labor demand function for different crops. In this model, labor demand in a season is a function of production (quantity), wage rate, family labor days, size of farmland, flood dummy variables relative to the village agriculture-flood exposure and percentage of irrigated-*boro* area. The results show that production was responsive to labor demand, and that family labor substitutes hired labor, as the coefficient of family labor is significantly negative. As expected, labor cost is negatively associated with labor demand. The flood had a negative impact on the production of *aman* in 1998. The impact on the production of *aman* in 1999 was very small and not significant. The impact on the *boro* production of 1999 was very large and significant. This means that in the areas where the fields were covered by

water in the flood, farmers expanded the production of *boro* there and, as a result, hired more people.

**Table 6.3 — Area under Boro and Aman 1998 and 1999**

Crops	1998		1999		% Increase	
	No. of household	Land (dec)	No. of household	Land (dec)	No. of household	Land (dec)
<b>Feb-March</b>						
Boro(L)	46	5166.0	48	4452.3	4.35	-13.81
Boro (HYV)	184	14145.3	332	20957.5	80.43	48.16
<b>Nov-Dec</b>						
Aman (L)	46	3631.5	104	7146.75	26.09	96.80
Aman (HYV)	55	3529.5	118	5793.65	114.54	64.15
<b>May-June</b>						
Jute	105	3290.0	115	4033.75	9.52	22.61

**Table 6.4 — Regressions Results on Labor Demand in Crop Production Dependent Variable: Hired Man-Days**

In hired man-days	Boro 98		Boro 99	
	Coefficient	t-statistics	Coefficient	t-statistics
Production(qty)	0.078	4.33	0.032	2.79
Wage Rate	-0.786	-10.82	-0.670	-10.33
Family labor(days)	-0.286	-8.51	-0.236	-8.32
Farm land	0.944	22.19	0.877	25.28
pboro (% irrigated-boro)	0.003	1.37	0.004	2.45
vfag2 (vill agricul flood:moderate)			0.245	2.57
vfag3 (village agricul flood: severe)			0.718	7.36
Constant	2.135	6.49	0.301	5.75
No. of Observations	949		1345	
Adj. R-square	0.435		0.447	
In hired man-days	Aman 98		Aman 99	
	Coefficient	t-statistics	Coefficient	t-statistics
Production(qty)	0.036	0.82	0.009	0.215
Wage Rate	-0.213	-1.23	-0.907	-4.755
Family labor(days)	-0.234	-3.42	-0.391	-4.368
Farm land	0.855	10.45	1.083	9.872
paman (% irrigated-aman)	-0.018	-1.95	0.007	1.74
vfag2 (vill agricul flood:moderate)	-0.557	-2.47	-0.080	-0.346
vfag3 (village agricul flood: severe)	-0.083	-0.37	-0.043	-0.182
Constant	0.726	0.90	2.733	3.049
No. of Observations	210		189	
Adj. R-square	0.421		0.446	

## 7. CONCLUDING OBSERVATIONS

The labor market in rural Bangladesh is characterized by a low participation rate and a low unemployment rate. The participation rate of women is even smaller than that of men. Most women are still working in the home and do not participate in the labor market.

The results of the model of determinants of labor participation are similar to those reported in the literature and show that land and other assets have a negative effect on labor participation. We also found that a small increase in education has a positive impact on male labor participation and that more years of schooling have a positive impact on female participation.

The impact of the 1998 flood on the labor market was severe and job opportunities for daily laborers decreased in the summer of 1998. The earnings of all workers decreased in the summer and fall of 1998 and one year after the flood, were still lower than in the same period a year before the flood. In the winter after the flood (April-May 1999), there was a significant expansion of the agricultural production of boro rice and other crops that spurred an increase in the demand for labor. The increase in economy activity resulted in an increase in labor participation and earnings. This trend of economic improvement continued after the flood, albeit with the usual seasonal variation.

The analysis of the activities performed by the people working show a predominance of male daily laborers followed by self-employment and cottage activities. Unfortunately, people working as daily laborers are paid lower wages than other workers and are subject to large seasonal variations and suffer reduced employment and lower salaries at the time of the flood.

The analysis of the demand for labor shows that all farmers of different landholdings rely on hired labor for their production needs, albeit in different proportions.

In the areas where the flood had a worse impact, we noticed an expansion in the production of boro rice and an increase in the demand for labor.

In conclusion, it appears that the labor market in rural areas of Bangladesh is dominated by male daily laborers that are subject to the seasonal variations of demand and that may be subject to further reductions in labor demand caused by disasters and other shocks. There is also a concern for the female workers. Their participation is small and often they participate in the production process as unpaid family labor.

The challenge of improving the labor participation of a growing active population can only be met by an increase in opportunities in off-farm and cottage activities, since off-farm activities grow at a faster rate and provide employment in the agricultural sector. These activities can include sericulture, horticulture, reforestation and watershed development for rainfed areas. This means that infrastructure, training and credit and opportunities need to be available and that literacy and education have to be expanded to provide a more efficient labor force.

## APPENDICES

## APPENDIX I — ACTIVITIES IN DIFFERENT PERIODS

Period	Bengali month	Activities
July-Oct 97 Period=A	Sraban, Bhadra & Aswin	Harvesting, separation of jute stick, drying of jute; Harvesting of Jute (Local & HYV); Harvesting of Aus (Local & HYV); Transplantation of <i>Aman</i> (HYV & Local) in some plots; In flood period, the transplantation activities are in non-flooded areas; Weeding of transplant <i>Aman</i> ; Open water fish catch & sale (self-employment)
July-Oct 98 Period=B	Sraban, Bhadra & Aswin	Harvesting, separation of jute stick, drying of jute; Harvesting of Jute (Local & HYV); Harvesting of Aus (Local & HYV); Transplantation of <i>Aman</i> (HYV & Local) in some plots; In flood period, the transplantation activities are in nonflooded areas; Weeding of transplant <i>Aman</i> ; Open water fish catch & sale (self-employment)
Oct-Nov 98 Period=C	Katrick  Activities more on <i>Rabi</i> cultivation	Few harvesting of <i>aman</i> (L); Month following flood; Cleaning, Ploughing of land for wheat, pulses, potato and oil seed & some vegetables; Pre-harvesting period of <i>Aman</i> (HYV); House repairing and home related work; Open water fish catch and sale (self-employment);
15 January- 14 April '99 Period=D	Magh, Falgun & Chaitra	Plantation of <i>Boro</i> (HYV): major activity; All harvest of wheat (peak); All harvest of pulses, oil seed, potatoes, onion (produced from onion); Vegetable harvest (peak period) of Sak, Cauliflower, Cabbage, Carrot, tomatoes, ladies finger etc.; Green chillies (harvest); Red Chillies (harvest);
April-May '99 Period=E	Baishak	Pre-harvesting of <i>Boro</i> (HYV); Ploughing, broadcast, weeding of Jute; Some <i>Boro</i> (Local) harvest; Ploughing, broadcast & weeding of Aus (Local) In Sauria & Narsindi, some vegetables (ladies finger, lal sak, data etc.) are cultivated and produced. Some harvest of onion (onion produced from seed onion)
July-Oct 99 Period=F	Sraban, Bhadra & Aswin	Same as in July-Oct '98 (Period=3)
Oct-Nov 99 Period=G	Katrick	In addition to work in first row, all local <i>aman</i> has been Harvested by some households since the interview period lasted for one month. Open water fish catch & sale (self-employment)

Sources: Discussions with FMRSP Field Officers

## APPENDIX II

**Rural Area**

In Bangladesh Bureau of Statistics (BBS) LFS, a rural area is defined as the areas of the country not included in the urban universe. Urban households are subtracted out of each thana to arrive at the rural household for each thana. Usually all areas other than municipal areas and city corporations are included in the rural areas. Obviously, the urban universe consists of the four statistical areas of Dhaka, Chittagong, Khulna and Rajshahi and other urban areas designated as pourshava (municipalities) by the Government of Bangladesh.

**Agricultural Labor**

Defined as a person who works in agriculture, forestry and fisheries to earn an income in cash or kind. If the person works more than one occupation, it is assumed that a greater portion of time is spent in this activity. If equal time is spent in two occupations, the main occupation will be that which yields a larger income.

**Unpaid Family Labor**

An Unpaid Family Worker is a person who works without pay or profit in a family operated firm/business/self-employed occupational activity.

## APPENDIX III

If household work (such as food processing, livestock activity, kitchen gardening, house repair, child care, etc.) is considered economic activity, female labor participation increased to a large extent, and was even higher than the male participation rate. In fact, overall participation rate, with the changed definition, was found to be 68 percent. This figure increased in round two (peak period of boro harvest activity) due to a higher female participation rate. Consequently, the percentage and number of unpaid family labor increased, and the distribution pattern of working individuals by main type of jobs changed. About 47 percent of rural workers were now unpaid family workers, and daily labor accounted for 17 to 22 percent of all rural workers in the three periods under study.

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## **FMRSP Bangladesh**

Food Management & Research Support Project  
Ministry of Food, Government of the People's Republic of Bangladesh



The FMRSP is a 3.5 year Project of the Ministry of Food, Government of the People's Republic of Bangladesh, providing advisory services, training and research, related to food policy. The FMRSP is funded by the USAID and is being implemented by the International Food Policy Research Institute (IFPRI) in collaboration with the Food Planning and Monitoring Unit (FPMU) of the Ministry of Food, the Bangladesh Institute of Development Studies (BIDS), the University of Minnesota and International Science & Technology Institute (ISTI).

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