International Union for the Scientific Study of Population
XXV International Population Conference
Tours, France, July 18-23, 2005

Floods and poverty dynamics among Bangladeshi households

Anuja Jayaraman and Jill L. Findeis
Population Research Institute, Pennsylvania State University

Introduction

South Asia has the largest concentration of the worlds' poor, with over half a billion people surviving on less than a dollar a day. One of the Millennium Development Goals (MDG) is halving the proportion of the world's people whose income is less than one dollar a day and the proportion of people who suffer from hunger by the year 2015 (OECD 2001). The success of poverty alleviation programs in South Asia is critical if this MDG is to be met. Within South Asia, Bangladesh has the highest incidence of poverty and only India and China have larger numbers of poor people. Given that poverty alleviation is one of the most important challenges faced by the international community today (ILO 2003), an understanding of the dynamics of poverty is critical to the formulation of appropriate policy[1]. Further, households in most developing countries face a high level of income variability due to factors beyond their control, and their poverty makes them particularly vulnerable to shocks, such as floods.

The poor can be divided into those who remain poor continuously over time and those who enter and exit poverty from time to time. A large proportion of the poor include people moving into and out of poverty (Baulch and Hoddinott 2000). The poor are the most vulnerable to health hazards, economic downturns, natural catastrophes, and even man-made violence (World Bank 2001). The World Bank defines vulnerability as the likelihood of being affected by shocks, which have negative impacts on the income and consumption levels of poor households (World Bank 2001). Depending on how well households are able to cope, they could remain in poverty or may be able to move out of poverty following the

[1] Poverty dynamics is defined as the movement into and out of poverty (Baulch and Hoddinott 2000).

shock (Baulch and Hoddinott 2000). The coping strategies that result in consumption smoothing in response to a shock reflect poverty dynamics. Recent advances in computation coupled with the more frequent collection of panel data at the household level have contributed to the study of both the dynamics of poverty and the coping strategies that households use over time as they attempt to escape poverty. Recent studies of poverty, a topic widely covered in the literature, have focused on the dynamics of poverty, including what it means to be in poverty for the long term versus in the transient poverty state (see Baulch and Hoddinott 2000 for literature).

Given this perspective, this paper analyzes issues relating to chronic and transient poverty following a negative income shock resulting from a major flooding event in 1998 in Bangladesh, using a short panel of household data coupled with qualitative data collected recently in Bangladesh. The first objective of this research is to identify those who experienced poverty following the 1998 flood and those who did not. The second objective is to determine differences between those poor households who are able to eventually escape poverty following the flood (the transient poor) versus those unable to leave poverty (the chronic poor). That is, the paper examines the determinants of chronic and transient poverty, assessing factors that enable some households to cope better than others. It is anticipated that the analysis will help broaden knowledge of as to why some households perform better than others in terms of recovering from a significant shock.

In 1998, Bangladesh experienced one of the largest floods of the century. The flood covered more than two-thirds of the country and caused a loss of 2.04 million metric tons of rice crop (del Ninno et al. 2001). While the overall economic impact of the 1998 flood was less severe than previous flood occurrences and caused less damage than anticipated (Benson and Clay 2002), the flood significantly damaged crops and other productive assets and further contributed to underemployment. Fortunately, trade liberalization in the early 1990s made

large-scale private food imports possible, and government food transfers and non-governmental organization activities averted a major food crisis in Bangladesh (del Ninno et al. 2001, Benson and Clay 2002). As table 1.1 shows that the most severely affected thanas included Madaripur, Muladi and Shahrasti.

Table 1.1: Flood Severity by Thanas

Flood Index	Derai	Madaripur	Mohammadpur	Muladi	Saturia	Shibpur	Shahrasti
Not Exposed	27.84	0	60.95	1.9	48.89	52.78	4.85
Moderate	26.8	3.85	10.48	13.33	31.11	9.26	10.68
Severe	34.02	53.85	26.67	73.33	15.56	25.93	65.05
Very Severe	11.34	42.31	1.9	11.43	4.44	12.04	19.42
Total	100	100	100	100	100	100	100

In Bangladesh, the agricultural sector and the labor market were the most negatively affected after the 1998 flood. Households coped by growing alternative crops and feeding alternative feed to livestock, and by finding alternative employment opportunities. Private borrowing, used mainly for buying food, was the most widely used coping mechanism relied on by Bangladeshi households (del Ninno et al. 2001). Subsequent food insecurity resulted in households buying food on credit, reducing food consumption, and borrowing money to buy food. The resulting changes in food consumption had health implications, especially among children; an increase in stunting and wasting among Bangladeshi preschoolers was observed (del Ninno et al. 2003).

Shocks are an integral part of a developing economy and policies should be geared towards equipping the poor to cope. The standard policy prescriptions aimed at poverty reduction typically focus on ways to improve the mean utility of a poor household. In contrast, policies that reduce the variance of households' well-being over time are becoming increasingly popular. The World Bank (2002a) recommends a social protection strategy that extends ‘beyond the traditional poverty reduction measures, to focus on creating

opportunities for households to manage risk better, primarily through a variety of instruments that perform the role of safety nets' (World Bank 2002a, p. vi).

Poverty in Bangladesh

Bangladesh is the eighth most populous country in the world with a total population of 135.7 million persons and a population growth rate of 1.7 percent per annum in 2002 (World Bank 2004). It is a small country covering 144 thousand square kilometers (as of 2001) with a population density of 1024 per square kilometer (as of 2002). Table 1.1 shows that Bangladesh has a higher population growth rate and total fertility rate than India.

Table 1.1: Country Profile

Country	Total Population	Population Growth Rate (annual %)	Fertility (births per woman)
Bangladesh	135.7 million	1.7	3
India	1 billion	1.6	2.9
Pakistan	144.9 million	2.4	4.5

Source: World Development Indicators database, April 2004.

Further, Bangladesh is recognized as one of the most disaster-prone countries in the world (Benson and Clay 2002). These factors make Bangladesh one of the most vulnerable societies in the world. From the time of its independence in 1971, Bangladesh has made considerable progress on all fronts (World Bank 2003). The country has achieved commendable reductions in population growth rates, child mortality and child malnutrition (World Bank 2002b). There has also been successful disaster management, increasing emancipation of women and growth of grass-root activism through Non-government Organizations (NGOs) and Community-based Organizations (CBOs) (World Bank 2003).

Since independence, there has been a reduction in both 'income poverty' and 'human poverty' in Bangladesh. Human poverty in Bangladesh has declined at a faster rate than income poverty in the past two decades but income poverty reduction has occurred at a more

rapid rate in the 1990s compared to the 1980s. Overall income poverty has declined at a rate of 1 percent per annum. Despite this progress, there has also been an increase in inequality, both income and gender, during this period (World Bank 2003). The difference in poverty between the poor and the poorest group is stark, where 45 percent of the poor live in extreme poverty. Further, extreme poverty is higher among female-headed or female-managed households. Table 1.2 shows that while all poverty measures declined from 1991/92 to 2000, the Gini index of inequality index shows an increase in income inequality in Bangladesh (World Bank 2003).

Table 1.2: Trends in Poverty and Inequality in the 1990s in Bangladesh

	1991/92	2000	Change per year (%)
Head Count Rate			
National	58.8	49.8	-1.8
Rural	44.9	36.6	-2.2
Urban	61.2	53.0	-1.6
Poverty Gap			
National	17.2	12.9	-2.9
Rural	12.0	9.5	-2.5
Urban	18.1	13.8	-2.8
Squared Poverty Gap			
National	6.8	4.6	-3.8
Rural	4.4	3.4	-2.7
Urban	7.2	4.9	-3.8
Gini Index of Inequality			
National	0.259	0.306	2.1
Rural	0.307	0.368	2.3
Urban	0.243	0.271	1.4

Source: BBS, Preliminary Report of Household Income and Expenditure Survey 2000, Dhaka, 2001 and World Bank, op.cit. (World Bank 2003).

Roughly half of Bangladesh's population still lives in extreme poverty (World Bank 2002b). Poverty declined by 9 percent over 1990-2000 but the absolute number of poor remained stable due to population growth. There have also been changes in the structural composition of the Bangladeshi economy. During the 1990s, the share of agriculture in the

Gross Domestic Product (GDP) declined and that of the service and manufacturing industry sectors increased. Structural adjustments in terms of trade liberalization since the 1980s brought about macroeconomic stability, improved fiscal and monetary management, and encouraged private sector investment in the economy (Benson and Clay 2002). The question becomes, given these important changes in Bangladesh, how the vulnerability of these households can be reduced so as to better adjust to exogenous shocks. Among Bangladesh's poor, this is a critical question.

Poverty dynamics

The traditional method of measuring poverty is to use the consumption or income concept (defined as income poverty). An individual is deemed poor if his/her consumption or income falls below the set minimum. The poverty line sets this minimum standard specific to each society (Lipton and Ravallion 1995). According to Hulme and Shepherd (2003), policymakers often define the poor as those individuals who have not been integrated into the market economy and policy goals often tend to view the poor as belonging to a single homogeneous category. Further, policymakers tend to focus on only those poor whom the market can help (Hulme and Shepherd 2003). Poverty measures such as the head count ratio[2] are static measures that are useful for gauging the prevalence of poverty but do not indicate the severity of poverty or fluctuations in economic welfare indicators over time including (but not limited to) income and consumption.

[2] The most basic measure of poverty is the head count, which is the count of the poor below the poverty line. The head count index is the head count of those in poverty as the fraction of the total population. Other measures are the poverty gap index and the squared poverty gap index (Ray 1998). The depth of poverty is measured by the poverty gap index that calculates the average income shortfall from the poverty line. The squared poverty gap index measures the severity of poverty taking into account both distance separating the poor from the poverty line and income inequality (Ray 1998). These measures can be represented using the following equation where z is the poverty line, y is per capita expenditure and N is population size (World Bank 2002b):
$P_\alpha = \Sigma\, [(z-y)/z]^\alpha / N$ with $\alpha = 0$, 1 or 2, where $\alpha = 0$ gives the head count index, $\alpha = 1$ gives the poverty gap index and $\alpha = 2$ gives the squared poverty gap index.

A large proportion of the poor include people moving into and out of poverty (Baulch and Hoddinott 2000). The coping strategies that result in consumption smoothing in response to a shock reflect poverty dynamics. It is important to disaggregate the poor to understand their circumstances and dynamics. It is important to understand the differences among the different types of households and individuals within households who are classified as 'poor'. One potentially salient difference is the difference between those households who move into and out of poverty versus those who fail to move out of poverty over time. This calls for incorporating a dynamic perspective in poverty analysis, with differentiation between the chronic and transient poor.

Households who experience poverty and deprivation for prolonged periods are often defined as the *chronically poor* and those who move into and out of poverty are the *transient poor* (Hulme and Shepherd 2003). These two types of poverty require different policy measures. Chronic poverty eradication measures include long-term investments such as increasing human and physical capital and the returns to assets. On the other hand, policies to help the poor cope with idiosyncratic shocks are appropriate to tackle the problem of transient poverty. Understanding factors affecting poverty dynamics help in designing safety net policies and, most importantly, help to target the vulnerable (Baulch and Hoddinott 2000).

Data

This paper is based on data from the International Food Policy Research Institute's Food Management and Research Support Project (IFPRI-FMRSP) longitudinal household survey of Bangladesh for the years 1998-99. Households were interviewed in three waves, resulting in approximately 750 households in seven rural flood-affected thanas being surveyed over time. The fact that these data were collected immediately after the 1998 floods makes the dataset unique for analyzing the effects of a major flood as a shock event. The

first round of the survey was administered between the 3rd week of November to the 3rd week of December 1998, and the second round between April and May 1999. Finally, the third round of the survey was conducted exactly a year after the first round (November-December 1999). A multiple-stage probability sampling technique was used to randomly choose the households to be included in the survey. Detailed household-level data were collected on household expenditures, land use at the plot level, the household's labor market participation, the ownership and loss of assets, and borrowing strategies of the household. Anthropometric measurements were also taken. Retrospective questions on situations before and during the flood were asked. The community-level questionnaire focused on agricultural production, labor market and other economic conditions at the union and village levels, during and after the flood (del Ninno 2001).

In addition, qualitative data from focus groups conducted in rural Bangladesh during February 2005 are used to better understand the quantitative survey data. The objective of conducting focus groups in selected thanas covered by the IFPRI survey was to understand the social and cultural context of household adjustments to the flood event. A total of six focus group interviews were conducted. Given that the larger study of which this study is a part concentrates on the experiences of women in poverty households, focus group discussions consisting of married women between the ages of 18 to 45 years were conducted and care was taken to ensure that participants experienced the 1998 floods.

Methodology

Definition of Chronic and Transient (Transitory) Poverty

It is widely accepted that the poor are a heterogeneous group. Studies of poverty dynamics generally treat a household as a single economic unit. Jalan and Ravallion (2000) define transient poverty as the poverty caused by variability in consumption over time. A household with mean consumption below the poverty line across all periods is defined to be

experiencing chronic poverty. Hulme and Shepherd (2003) define the chronically poor as those who experience poverty for a period of five years or more and transient poor as those who move into and out of poverty. They argue that five-year period is a significant length of time, and studies show that individuals who are poor for five years or more have a high probability of remaining poor for the rest of their lives The chronic poor suffer from persistent deprivation. The chronically poor are also those who need external help to get out of the poverty trap and they remain poor despite implementations of policies to tackle poverty (Aliber 2003). Chronic poverty also is transmitted from one generation to another, and children within chronically poor households are more likely to be caught in the poverty trap and likely to remain poor the rest of their lives (Aliber 2003).

Characteristics of the Chronically Poor

Education is a powerful and important predictor of chronic poverty. Studies have found that an increase in number of years of education decreases the probability of being chronically poor (McCulloch and Baulch 1999, Jalan and Ravallion 2000, Aliber 2003, McCulloch and Calandrino 2003). Human capital accumulation in Bangladesh is an important form of asset holding for the poor, which equips them to participate in the growth process (World Bank 2002b).

Larger households are generally more likely to experience chronic poverty. This is true among households that have limited access to resources and assets. McCulloch and Baulch (2000), Jalan and Ravallion (2000), Haddad and Ahmed (2003) and Aliber (2003) in studies of Pakistan, China, Egypt and South Africa, respectively, found this relationship. Older household heads and female-headed households are also more likely to be chronically poor (Aliber 2003). All things equal, the same is true for households with a greater number of children, more elderly household members above the age of 60 and for households with more disabled members.

Place of residence determines the opportunities and facilities available to households (McKay and Lawson 2002). Remote geographical locations are disadvantaged in terms of access to resources, with the likelihood of being persistently or chronically poor in such locations being higher. McKay and Lawson (2002) also report that chronic poverty is a major problem in rural areas because of lack of employment opportunities and resources.

Lack of physical assets is associated with chronic poverty (McCulloch and Baulch, 2000, Aliber 2003). Assets including livestock and land help poor households not only generate income but are also a form of investment. Poorer households commonly hold a greater share of their assets in the form of liquid assets such as livestock and financial assets (World Bank 2002a). The sector of occupation of the household head is found to be very important in most studies. Haddad and Ahmed (2003), in a study of chronic and transient poverty, report that being employed in the manufacturing, recreation or non-farm sectors decreases the likelihood of being chronically poor as compared to being engaged in the agricultural sector. Seasonal and casual farm workers are also vulnerable (Aliber 2003).

Characteristics of the Transient Poor

Some factors affect both chronic and transitory poverty but other factors differentiate the transient from the chronically poor. Poverty levels generally decline rapidly with increases in education of the household head (World Bank 2002a). There is also a strong negative association between transient poverty and educational attainment (Haddad and Ahmed 2003; Jalan and Ravallion 2000). Jalan and Ravallion (2000) document higher transitory poverty among smaller households in China. Adoption of new technology and adverse price fluctuations can result in temporary poverty (McKay and Lawson 2002). The adoption of new agricultural techniques involves risk taking on the part of farmers, which, in turn, causes variability in income. A study of Argentinean households by Cruces and Wondon (2003) found that the risk of operating a business made employers vulnerable to transient poverty,

whereas the provision of social security by the public sector made households engaged in this sector more resistant to transient poverty.

Measurement of Transient and Chronic Poverty

This research follows the McCulloch and Baulch (1999) approach to categorize the poor into three mutually-exclusive groups, based on average household consumption expenditures. The groups include the 1) never poor, 2) chronically poor, and 3) transitory poor:

Never poor	if $y_{it} > z$ for all time periods
Chronically poor	if $Et[y_{it}] < z$
Transitory poor	if $Et[y_{it}] > z$ but $y_{it} < z$ for some time periods

where y_{it} is the welfare measure such as per capita consumption expenditure of the household which is corrected for differences in demographics and prices, $E_t[y_{it}]$ is mean income over the time period and z is the poverty line. The study uses region-specific cost-of-basic-needs (CBN) poverty lines calculated by the World Bank for Bangladesh for the year 2000[3]. Two types of poverty lines are used in the analysis: upper and lower poverty lines.

Using definitions proposed by McCulloch and Baulch (1999), a household is chronically poor if its mean expenditure is below the poverty line for all periods and transitory poor if its mean expenditure is above the poverty line but total per capita expenditure is not above the poverty line for all periods. Households whose total per capita household expenditure is above the poverty line in all survey rounds are deemed 'never poor' (or nonpoor).

Poverty Lines

The present study uses cost-of-basic-needs (CBN) poverty lines calculated by the World Bank for Bangladesh for the year 2000. Upper and lower poverty lines were

[3] The poverty lines were calculated by analyzing various Household Expenditure Surveys (HES) conducted by Bangladesh Bureau of Statistics (BBS) for the 1990s (World Bank 2002b) and will be corrected for price changes between 1998 and 2000.

calculated by dividing the entire country into 14 geographical regions (nine urban and five rural). The lower poverty line allows for only a minimum allowance for nonfood goods as opposed to the upper poverty line where greater allowance is made for nonfood goods in the calculation of the poverty line (World Bank 2002b).

Real total per capita household expenditure per month is the welfare indicator used in this study. The data used for the analysis were collected from the following seven rural regions: Derai, Madaripur, Mohammadpur, Muladi, Saturia, Shahrasti and Shibpur. Each of these areas belonged to one of the regions for which the poverty line for 2000 was available. CBN poverty lines are available for the year 2000 and the data being used in this research were collected in 1998. Therefore, the poverty lines need to be corrected for price changes over the period 1998 to 2000 using the consumer price index. Table 1.3 provides the region-specific poverty line corrected for changes in prices using both upper and lower poverty lines. Once the poverty line is determined, poverty measures such as the head count ratio, poverty gap and squared poverty gap are calculated as measures of the extent of deprivation.

Table 1.3 : CBN Region Poverty Lines

Region	Lower Poverty Line (2000)	Corrected for Price Change	Upper Poverty Line (2000)	Corrected for Price Change
Rural Dhaka	548	503.73	659	605.76
Rural Sylhet Comilla	572	525.79	738	678.38
Rural Noakhali Chhitagong	582	534.98	719	660.91
Rural Barishal Pathuakali	546	501.89	616	566.23
Rural Khulna Jessore Kushtia	527	484.42	624	573.59

Source: BBS and World Bank staff estimates. Amounts are in Tk. (taka) per person per month.

Poverty levels as measured by various poverty measures indicate that poverty rates changed across all time periods. In Table 1.4, we present the mean real per capita household

expenditure for the three rounds of data and Foster, Greer and Thorbecke poverty measures are also presented. The average per capita expenditure is falling each round and poverty levels are increasing each round compared to first round. These fluctuations may be due to seasonal fluctuations and also dwindling help from the government and NGOs after the floods. Comparing round 1 to round 3 (table 1.4), it can be seen that the poverty situation worsened. The poverty gap index increased from 0.142 in the first round to 0.195 in the third round of the survey and the squared poverty gap index increased from 0.058 to 0.084 over the same time period. These trends hold for both lower and upper poverty lines.

Table 1.4: Consumption Expenditure and Poverty

	Round 1	Round 2	Round 3
Real per capita household expenditure			
Mean	776.91	706.25	678.03
Change over the previous period (%)		-9.10	-12.73
Poverty	34.83	40.45	44.66
Headcount index (%) using Lower poverty Line		16.14	28.22
Change (%)			
	48.31	57.72	59.97
Headcount index (%) using Upper poverty Line		19.48	24.14
Change (%)			
	8.6	10.3	12.6
Poverty gap index (%) using Lower poverty Line		19.77	46.51
Change (%)			
Poverty gap (%) using Upper poverty Line	14.2	17.0	19.5
Change (%)		19.72	37.32
Squared poverty gap index (%) using Lower poverty Line	3.2	3.8	4.8
Change (%)		18.75	50.00
Squared poverty gap (%) using Upper poverty Line	5.8	6.9	8.4
Change (%)		18.97	44.83

Estimation Techniques

Following a discussion of the prevalence of the chronically poor, transitory (or transient) poor and the nonpoor populations in Bangladesh following the flood event, the initial step in the estimation strategy is to estimate logit models to differentiate the poor from the nonpoor for each of the three time periods represented in the panel data. Then, given the nominal categorization of the poor into the three categories of interest, a multinomial logit model is estimated to study the determinants of the chronically and transient poor in relation to the nonpoor. We use the values of the variables in the initial time period (round 1) for the analysis, because the exogenous variables are time invariant. Households are categorized into three alternative categories (no poverty, chronic poverty and transient poverty), where the categories are numbered 1 to 3. Pr (y = m|x) is the probability of observing m given x (Long 1997):

$$\Pr(\ y_i\ =\ m\ \mid\ x_i\ )\ =\ \frac{\exp(\ \ x_i \beta_m\ )}{\sum_{j=1}^{3} \exp(\ \ x_i \beta_j\ )}, \qquad j\ =\ 1, 2, 3$$

where x is the vector of individual, household and community variables, and β is a vector of coefficients. Exogenous variables used in both the round-specific logit and multinomial logit analyses include household size and composition, mean years of education of household members and occupation of the household head[4], household asset ownership (land; other

[4] There are nine occupation categories including on-farm work (agricultural work on farm, supervising agricultural work, agricultural wage labor, share cropper), off-farm work (fisherman, fish culture, livestock, poultry, growing fruits, off-farm wage activity), industrial enterprise (processing crops, tailoring, sewing, pottery, blacksmith, goldsmith, repairing manufactured products, carpenter, mechanic, other wage labor), trade (small retail shop, wholesale trader, contractor, employee, employer), transport (rickshaw pulling, boat, wage labor in transport, other transport work, driver, helper), construction work (mason, helper, construction worker, helper, house repairing), self-employed profession (doctor, kabiraj, advocate, barber, washerman, house tutor, deed writer, Purohit, Dhatri, handicrafts), miscellaneous services (service, pension, working in NGO, servant), other (income from hats, income rent, household work, child, student, beggar, unemployed, disabled).

assets) and geographical location of the household[5]. Finally, following the multinomial logit estimation, a logit model to explore differences between transient poor households and the chronically poor is estimated.

Results

Table 1.5 shows that there is a large 'sometimes poor group'. Approximately 41 percent of the households are poor either for one or two periods. Only 39.6 (33) percent of the households were not poor over the 1998-99 period using the lower poverty line (upper poverty line). Remaining households experience poverty at some point or the other.

Table 1.5: Number of Periods Poor

No. of rounds in which poor	Never	1	2	Always	Total
% of households (number)					
Lower Poverty Line	39.6	19.8	21.6	18.9	100
	(282)	(141)	(154)	(135)	(712)
Upper Poverty Line	33.0	25.0	16.9	25.0	100
	(235)	(178)	(121)	(178)	(712)

Based on the McCulloch and Baulch (1999) approach, table 1.6 categorizes Bangladeshi households into three independent groups. The first group is comprised of households whose expected value of per capita consumption over time is always below the poverty line. This group is defined as chronically poor. The second group includes households whose expected value of income over time is above the poverty line but per capita consumption falls below the poverty line at least once during the three rounds (transient poor), and the final category includes households with per capita consumption above the poverty line in all three periods (nonpoor). It can be seen from the table that of the 731 households in the panel, 276 (37.76 percent) are classified as being chronically poor and 177 (24.21 percent) are among those classified as the transitory poor, when the lower poverty

[5] Geographical regions included in the analysis are Derai, Madaripur, Mohammadpur, Muladi, Saturia, Shahrasti, and Shibpur

line is considered. Using the upper poverty line, 402 (54.99 percent) and 161 (22.02 percent) of households are chronically poor and transitory poor, respectively.

Table 1.5: Number of Poor in Bangladesh by Poverty Categories

Poverty Status	Lower poverty line (ZL)	Upper poverty line (ZU)
Always poor	276 (37.76)	402 (54.99)
Sometimes poor	177 (24.21)	161 (22.02)
Never poor	278 (38.03)	168 (22.98)
Total	731	731

Percentages in parentheses.

Desegregation of poverty incidences by region (table 1.6) suggests that Derai thana has the highest incidence of chronically poor households (70.1 percent). This is followed by Muladi and Saturia thana where 60.95 percent and 55.56 percent of the households are chronically poor respectively. For each of the regions the number of chronically poor households is greater than transient poor. Table 1.6 also shows that among all the thanas included in the study, Madaripur (22.12 percent), Mohammadpur (31.43 percent) and Shahrasti (26.85 percent) have the highest incidences of temporary or transient poverty. Based on the data used for the analysis, it is also important to note that Derai has the lowest percentage of nonpoor households and Madaripur (26.9 percent), Shahrasti (33.33 percent) and Shibpur (27.2 percent) have the highest numbers of never poor households over the time period of study.

Table 1.6: Poverty levels by Regions

Upper Poverty Line	Chronically poor	%	Transient poor	%	Never Poor	%
Derai	68	70.1	19	19.59	10	10.3
Madaripur	53	50.96	23	22.12	28	26.9
Mohammadpur	52	49.52	33	31.43	20	19.1
Muladi	64	60.95	17	16.19	24	22.9
Saturia	50	55.56	19	21.11	21	23.3
Shahrasti	43	39.81	29	26.85	36	33.3
Shibpur	57	55.34	18	17.48	28	27.2

Descriptive Statistics

The means of the explanatory variables for each of the poverty categories are presented in table 1.7, based on use of the upper poverty line. Pair wise comparisons are also made between the means of the variables used in the analyses, to test if significant differences exist between the relevant means. The results based on use of the lower poverty

Table 1.7: Descriptive Statistics Using Upper Poverty Line

	Chronic Poverty		Transient Poverty		No Poverty	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Household size ***	5.65	1.79	5.46	2.25	5.83	2.53
Number household members below age 15 * / **	2.88	1.40	2.09	1.43	2.07	1.42
Number household members above age 60 ** /***	0.26	0.51	0.37	0.57	0.46	0.66
Age household head in years * / **/ ***	43.47	11.31	45.66	13.51	48.82	13.01
Log area cultivated land owned by household * / ** / ***	3.22	1.73	4.01	1.67	4.60	1.45
Log value assets other than land * / ** / ***	9.42	1.04	10.16	1.09	10.64	1.23
Household members, mean years of schooling * / ** / ***	2.32	2.16	3.81	2.60	5.30	3.11
Occupation						
On-farm work ***	0.48	0.50	0.54	0.50	0.48	0.50
Off-farm work ***	0.07	0.26	0.04	0.21	0.02	0.15
Industrial enterprise ** / ***	0.15	0.36	0.08	0.27	0.05	0.23
Trade ** / ***	0.08	0.27	0.14	0.35	0.16	0.37
Transport	0.07	0.26	0.04	0.19	0.04	0.19
Construction work ***	0.04	0.19	0.03	0.18	0.02	0.15
Self-employed profession ***	0.01	0.09	0.03	0.16	0.02	0.13
Miscellaneous services ** / ***	0.04	0.19	0.06	0.24	0.16	0.36
Other	0.06	0.25	0.04	0.19	0.04	0.20
Regions						
Derai ** / ***	0.18	0.38	0.12	0.33	0.06	0.24
Madaripur ***	0.14	0.34	0.15	0.35	0.17	0.37
Mohammadpur ***	0.13	0.34	0.21	0.41	0.12	0.33
Muladi ***	0.17	0.37	0.11	0.31	0.14	0.35
Saturia	0.13	0.34	0.12	0.33	0.13	0.33
Shahrasti ***	0.15	0.35	0.11	0.32	0.17	0.37
Shibpur ** / ***	0.11	0.31	0.18	0.39	0.22	0.41

Note: The following show significant differences in pair wise comparisons using a means test:
** for chronic poverty vs. transient poverty; ** for chronic poverty vs. no poverty; *** for transient poverty vs. no poverty.*

line is presented in Appendix A.2. Table 1.7 shows that compared to non poor, transient poor households have smaller family sizes and compared to both non poor and transient poor households, chronically poor households tend to have more household members below the age of 15. Non poor households are also found to be the households which have more household members aged 60 and above. The household heads of chronically poor households are more likely to be young, relative to both non poor and households that move into and out of poverty. The highest average age of the household head is observed among non poor households in Bangladesh. In terms of physical capital and human capital accumulation, transient poor households are better off than chronically poor households. As expected, households that were consistently above the poverty line have higher average asset holdings including land, non-land assets and education. Chronically poor households seem to be doing badly on all three counts. Descriptive statistics show that compared to a non-poor, households where the household head is engaged in farm work and off-farm work tend to move more in and out of poverty. Compared to both chronically poor household and transient poor household, fewer household heads are engaged in industrial enterprise and more are engaged in trade in non poor households. When only transient poor and non poor households are compared, fewer household heads are engaged in transport and construction work and more in self-employed profession. Involvement in miscellaneous services is also found to be characteristic of non poor households. Consistent with previous results, fewer households in Derai region are found to be non poor and fewer households in Madaripur and Muladi experience temporary poverty (compared to non poor households). Compared to non poor households, more households in Madaripur are found to be in transient poverty and fewer households in Shahrasti are poor in general.

Results: Multivariate Analyses

Logit estimates for the poor/non poor comparisons are presented in table 1.8. This table shows how the poor differ from the non poor in each round of the quantitative survey. The marginal effects are shown.

Table 1.8: Marginal Effects for Logit Models Using Upper Poverty Line

	Round 1		**Round 2**		**Round 3**	
	Marginal effects	**P-values**	**Marginal effects**	**P-values**	**Marginal effects**	**P-values**
Number household members below age 15	0.102	**6.12**	0.085	**5.19**	0.125	**7.35**
Number household members above age 60	-0.040	-0.85	0.018	0.41	0.056	1.29
Age of household head in years	0.002	0.7	0.000	-0.01	-0.001	-0.59
Log area cultivated land owned by household	-0.068	**-3.78**	-0.082	**-4.42**	-0.049	**-2.73**
Log value assets other than land	-0.087	**-3.14**	-0.077	**-2.83**	-0.099	**-3.68**
Household members, mean years of schooling	-0.033	**-3.15**	-0.044	**-4.3**	-0.033	**-3.32**
Occupation (reference: on-farm work)						
Off-farm work	-0.056	-0.57	-0.145	-1.41	0.031	0.3
Industrial enterprise	0.036	0.47	-0.061	-0.77	0.050	0.67
Trade	-0.208	**-3.18**	-0.215	**-2.99**	-0.191	**-2.61**
Transport	-0.051	-0.53	-0.093	-0.91	-0.010	-0.1
Construction work	-0.027	-0.22	0.036	0.3	-0.022	-0.18
Self-employed profession	-0.063	-0.36	-0.209	-1.19	-0.334	**-2.02**
Miscellaneous services	-0.122	-1.33	-0.217	**-2.24**	-0.184	**-1.89**
Other	0.193	**1.98**	0.034	0.33	-0.006	-0.06
Region dummies (reference Derai)						
Madaripur	0.069	0.81	-0.141	-1.6	-0.292	**-3.29**
Mohammadpur	0.101	1.2	0.038	0.45	-0.134	-1.42
Muladi	0.188	**2.31**	-0.017	-0.19	-0.219	**-2.29**
Saturia	0.138	1.58	0.105	1.27	-0.042	-0.45
Shahrasti	-0.105	-1.29	-0.312	**-3.81**	-0.307	**-3.53**
Shibpur	0.265	**3.42**	-0.018	-0.2	-0.072	-0.74

Note: Non poor is the base category for the estimated logit models.

The results are consistent across all time periods following the flood event. Compared to the non poor, poor households are more likely to have more young children (i.e., below the age of 15) in the household and are less likely to hold both physical assets.

Poor households also generally have lower levels of average human capital. Differences across thanas are also apparent.

The multinomial results using the upper poverty line are then presented in table 1.9. Only the marginal effects (and p-values) of the multinomial logit model are reported and the never poor household is used as the base category. Households containing more members in the age category of 15 are more likely to be chronically poor, as compared to non poor

Table 1.9: Marginal Effects for Multinomial Logit Model Using Upper Poverty Line

	Chronic Poor		**Transient Poor**	
	Marginal effects	**P-values**	**Marginal effects**	**P-values**
Number household members below age 15	0.154	8.04	-0.086	-5.73
Number household members above age 60	0.027	0.54	-0.013	-0.33
Age of household head in years	0.000	0.07	-0.001	-0.54
Log area cultivated land owned by household	-0.084	-4.22	0.020	1.26
Log value assets other than land	-0.143	-4.58	0.075	3.05
Household members, mean years of schooling	-0.040	-3.52	0.013	1.41
Occupation (reference: on-farm work)				
Off-farm work	-0.018	-0.16	-0.025	-0.29
Industrial enterprise	0.017	0.21	-0.066	-1.09
Trade	-0.268	-3.58	0.057	0.89
Transport	-0.011	-0.1	-0.076	-1.01
Construction work	0.034	0.26	-0.073	-0.84
Self- employed profession	-0.286	-1.66	0.105	0.65
Miscellaneous services	-0.217	-2.02	-0.026	-0.34
Other	0.151	1.56	-0.119	-1.79
Region dummies (reference: Derai)				
Madaripur	-0.165	-1.72	-0.014	-0.19
Mohammadpur	-0.035	-0.38	0.043	0.57
Muladi	0.019	0.2	-0.071	-1.08
Saturia	0.190	2.31	-0.143	-2.63
Shahrasti	-0.304	-3.4	0.015	0.21
Shibpur	0.124	1.34	-0.118	-1.94

households. However, in contrast there is a negative association between number of children in the household and transient poverty. The results also indicate that greater land ownership, asset ownership and mean years of education of household members reduce chronic poverty**.** With reference to those engaged in on-farm activities, the results show that, along with self-employment, those involved in trade sector and miscellaneous services have a greater probability of being chronically poor. None of the occupations show any significant association with transient poverty except the others category which has negative association. Compared to being in the Derai thana, being located in the Madaripur and Shahrasti thanas decreases the probability of being chronically poor whereas the likelihood of experiencing transient poor is lower in Saturia and Shibpur.

Table 1.9: Marginal Effects Based on Logit Model Comparing Poverty Categories (Upper Poverty Line)

	Marginal effects	**P-value**
Number household members below age 15	-0.108	**-6.84**
Number household members above age 60	-0.023	-0.55
Age household head in years	-0.001	-0.63
Log area cultivated land owned by household	0.036	**2.16**
Log value assets other than land	0.110	**3.98**
Household members, mean years of schooling	0.023	**2.41**
Occupation (reference: on-farm work)		
Off-farm work	-0.051	-0.63
Industrial enterprise	-0.051	-0.82
Trade	0.127	1.53
Transport	-0.044	-0.55
Construction work	-0.098	-1.29
Self employed profession	0.209	0.97
Miscellaneous services	0.039	0.36
Other	-0.129	**-2.2**
Region dummies (reference Derai)		
Madaripur	0.007	0.08
Mohammadpur	0.030	0.39
Muladi	-0.052	-0.74
Saturia	-0.160	**-3.38**
Shahrasti	0.148	1.58

Note: Chronically poor are the base category in the estimated logit model.

Finally, table 1.10 presents the marginal effects of the logit models comparing the chronic poor and transient poor Bangladeshi households. Households moving in and out of poverty are also households with fewer children compared to chronically poor households. They are also households who own more of both physical and human capital compared to a household that is chronically poor.

Conclusion

The United Nation's General Assembly declared 1996 as the International Year for the Eradication of Poverty. This was done 'recognizing that poverty is a complex and multi-dimensional problem with origins in both the national and international domains, and that its eradication in all countries, in particular in developing countries, has become one of the priority development objectives for the 1990s in order to promote sustainable development.' (United Nation's General Assembly Resolution 48/183 1993: p. 1). The World Bank Group defines poverty as a multidimensional phenomenon where to be poor not only means to be hungry and to lack access to shelter and resources but also means to be illiterate, have poor health, not receive adequate nutrition and be vulnerable to shocks, violence and crime. Not being in poverty entails individuals leading a life free from anxiety (World Bank 2001a, OECD 2001).

This paper attempts to identify those who experienced poverty following the 1998 flood and those who did not and then to examine the determinants of the chronically and transient poor. The paper uses data from the International Food Policy Research Institute's Food Management and Research Support Project (IFPRI-FMRSP) longitudinal household survey of Bangladesh for the years 1998-99. With reference to the lower poverty line (upper poverty line) 37.76 (54.99) percent of households are always poor and 24.21 (22.02) percent of households are found to be sometimes poor. Recent advances in computation coupled with the more frequent collection of panel data at the household level have contributed to the

study of chronic and temporary poverty. Some factors are observed to affect chronic poverty more and also to have different impacts on transitory poverty. The results show that there is a negative association between number of children in the household and transient poverty and in contrast there is a positive relation between number of children in the household and transient poverty. The results also indicate that greater land ownership, asset ownership and mean years of education of household members reduces chronic poverty and assets ownership by the household has positive impact on transient poverty. With reference to those engaged in on-farm activities, the results show that, along with self- employment, those involved in trade sector and miscellaneous services have a greater probability of being chronically poor.

High percentage of chronic poverty calls for designing safety net policies and, most importantly, helps to target the vulnerable especially after stressful times during and after the floods in Bangladesh. Continuous shocks as experienced in Bangladesh require setting up of consistent administrative approach to help the flood affected households to cope and not to fall into the poverty trap each year. Distinguishing the households as chronic and transitory poor would help the policy makers to target the households better and to establish coping mechanisms for the households.

References

Aliber, M. 2003. Chronic Poverty in South Africa: Incidence, Causes and Policies. World Development 31(3): 473-490.

Baulch, B. and J. Hoddinott. 2000. Economic Mobility and Poverty Dynamics in Developing Countries. Journal of Development Studies 36(6): 1-24.

Benson, C. and E. Clay. 2002. Bangladesh Disasters and Public Finance. Disaster Risk Management Working Paper Series No. 6. Washington, DC: The World Bank.

Cruces, G. and Q. Wodon, 2003. Transient and chronic poverty in turbulent times: Argentina 1995-2002. Economics Bulletin 9(3): 1-12

del Ninno, C. 2001. Coping Strategies in Bangladesh. Survey Documentation. (November 1998-December 1999). FMRSP data Documentation Report No.1. FMRSP Bangladesh. Washington, DC: International Food Policy Research Institute.

del Ninno, C., Del, P. Dorosh, L. Smith and D. Roy. 2001. The 1998 Floods in Bangladesh Disaster Impacts, Household Coping Strategies, and Response. Research Report 122. Washington, DC: International Food Policy Research Institute.

del Ninno, C., P. Dorosh and L. Smith. 2003. Public Policy, Markets and Household Coping Strategies in Bangladesh: Avoiding a Food Security Crisis Following the 1998 Floods. World Development 31(7): 1221-1238.

Haddad, L. and A. Ahmed. 2003. Chronic and Transitory Poverty: Evidence from Egypt, 1997-99. World Development 3(1): 71-85.

Hulme, D. and A. Shepherd. 2003. Conceptualizing Chronic Poverty. World Development 31(3): 403-23.

International Labour Organization (ILO). 2003. Working Out of Poverty. Report of the Director-General. International Labour Conference. 91st Session. Geneva: International Labour Office.

Jalan, J. and M. Ravallion. 2000. Is Transient Poverty Different? Evidence for Rural China. Journal of Development Studies 36(6): 83-99.

Lipton, M. and M. Ravallion. 1995. Poverty and Policy. In Jere Behrman and T.N. Srinivasan (Eds), Handbook of Development Economics, Volume 3, Amsterdam: North-Holland.

Long, J. Scott. 1997. Regression Models for Categorical and Limited Dependent Variables. Thousand Oaks: Sage Publications.

McCulloch, N. and B. Baulch. 2000. Simulating the Impact of Policy upon Chronic and Transitory Poverty in Rural Pakistan. Journal of Development Studies, 36(6):100-130.

McCulloch, N. and B. Baulch. 1999. Distinguishing the Chronically from the Transitorily Poor: Evidence from Rural Pakistan. Working Paper No. 97, Institute of Development Studies, University of Sussex.

McCulloch, N and M. Calandrino. 2003. Vulnerability and Chronic Poverty in Rural Sichuan. World Development. 31(3): 611-628.

McKay, A. and D. Lawson. 2002. Chronic Poverty in Developing and Transition Countries: Concepts and Evidence. CREDIT Research Paper (No. 02/27). Centre for Research in Economic Development and International Trade, University of Nottingham.

OECD. 2001. In the Face of Poverty: Meeting the Global Challenge through Partnership. DAC Guidelines on Poverty Reduction. Available at: http://www.oecd.org/dataoecd/18/19/1849018.pdf

Ray, D. 1998. Development Economics. Princeton: Princeton University Press.

World Bank. 2001. World Development Report 2002. Building Institutions for Markets. Published for the World Bank. Oxford University Press.

World Bank. 2002a. Poverty and Vulnerability in South Asia. Washington DC: The World Bank.

World Bank. 2002b. Poverty in Bangladesh: Building on Progress. Poverty Reduction and Economic Management Sector Unit. South Asia Region, World Bank. Document of the World Bank and Asian Development Bank

World Bank. 2003. Bangladesh: A National Strategy for Economic Growth, Poverty Reduction and Social Development. Economic Relations Division, Ministry of Finance, Government of the People's Republic of Bangladesh. Available at: http://poverty.worldbank.org/files/14223_Bangladesh_IPRSP.pdf. Accessed on: July 2, 2004.

World Bank. 2004. World Development Indicators 2004. Available at: http://www.worldbank.org/data/wdi2002/

Appendix

Table A.1: Poverty levels by Regions

Lower Poverty Line	Chronically poor	%	Transient poor	%	Never Poor	%
Derai	49	50.52	25	25.77	23	23.7
Madaripur	35	33.65	26	25	43	41.4
Mohammadpur	38	36.19	27	25.71	40	38.1
Muladi	51	48.57	24	22.86	30	28.6
Saturia	31	34.44	24	26.67	35	38.9
Shahrasti	25	23.15	23	21.3	60	55.6
Shibpur	37	35.92	22	21.36	44	42.7

Table A.2: Descriptive Statistics Using Lower Poverty Line

	Chronic Poverty		Transient Poverty		No Poverty	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Household size	5.66	1.75	5.44	1.90	5.77	2.47
Number household members below age 15	3.03	1.41	2.33	1.32	2.12	1.46
Number household members above age 60	0.21	0.45	0.35	0.60	0.44	0.63
Age household head in years	42.90	11.05	44.32	12.49	48.00	13.09
Log area cultivated land owned by household	3.03	1.75	3.69	1.73	4.40	1.50
Log value assets other than land	9.29	1.05	9.77	1.05	10.49	1.17
Household members, mean years of schooling	1.98	1.97	3.24	2.54	4.74	2.95
Occupation						
On-farm work	0.45	0.50	0.52	0.50	0.52	0.50
Off-farm work	0.08	0.27	0.05	0.21	0.03	0.18
Industrial enterprise	0.17	0.37	0.12	0.33	0.05	0.22
Trade	0.07	0.26	0.11	0.32	0.15	0.36
Transport	0.07	0.26	0.06	0.25	0.03	0.18
Construction work	0.05	0.21	0.04	0.18	0.02	0.15
Self-employed profession	0.00	0.06	0.02	0.15	0.02	0.13
Miscellaneous services	0.03	0.18	0.05	0.21	0.12	0.33
Other	0.08	0.27	0.02	0.15	0.05	0.21
Region dummies						
Derai	0.18	0.39	0.15	0.35	0.08	0.28
Madaripur	0.13	0.34	0.15	0.36	0.16	0.36
Mohammadpur	0.14	0.35	0.16	0.37	0.15	0.35
Muladi	0.19	0.39	0.14	0.35	0.11	0.31
Saturia	0.12	0.32	0.14	0.35	0.13	0.33
Shahrasti	0.14	0.35	0.13	0.34	0.16	0.37
Shibpur	0.09	0.29	0.13	0.34	0.22	0.41

Table A.3: Marginal Effects for Multinomial Logit Model Using Lower Poverty Line

	Chronic Poor Marginal effects	P-values	Transient Poor Marginal effects	P-values
Number household members below age 15	0.131	7.64	-0.021	-1.42
Number household members above age 60	-0.057	-1.14	0.064	1.53
Age household head in years	0.001	0.38	-0.002	-0.91
Log area cultivated land owned by household	-0.072	-4.14	-0.003	-0.18
Log value assets other than land	-0.093	-3.46	-0.036	-1.46
Household members, mean years of schooling	-0.048	-4.37	0.010	1.07
Occupation (reference: on- farm work)				
Off-farm work	0.054	0.53	-0.072	-0.85
Industrial enterprise	0.084	1.13	0.013	0.19
Trade	-0.171	-3.03	-0.036	-0.56
Transport	0.014	0.16	0.025	0.28
Construction work	0.137	1.06	-0.005	-0.05
Self-employed profession	-0.214	-1.79	0.115	0.67
Miscellaneous services	-0.097	-1.03	-0.091	-1.16
Other	0.319	2.87	-0.211	-3.27
Region dummies (references: Derai)				
Madaripur	-0.073	-0.97	-0.044	-0.6
Mohammadpur	0.091	1.03	-0.045	-0.62
Muladi	0.173	1.88	-0.052	-0.72
Saturia	0.196	2.02	-0.044	-0.58
Shahrasti	-0.195	-3.23	-0.128	-1.92
Shibpur	0.138	1.44	-0.069	-0.95