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**IMPACT OF THE 1998 FLOOD ON
HOUSEHOLD FOOD SECURITY**

**CARLO DEL NINNO
DILIP K. ROY**

JUNE 2001

FMRSP Synthesis Report No. 6

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

International Food Policy Research Institute

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

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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.*

FMRSP Bangladesh

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



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1. INTRODUCTION

The 1998 flood affected the Bangladesh economy and the people of Bangladesh in many ways. During the flood, more than 30 million people were marooned while 68 percent of the country was under flood waters and according to some estimates, six percent of Gross Domestic product (GDP) was lost.

The flood reduced household food security in two major ways. First, it hampered the ability of households to acquire food because of a loss of income (lack of jobs and/or loss of output). Second, it reduced the access of households to food: prices of grain and other essentials increased, reflecting both reduced production and disruptions in transport and markets. To maintain the same level of consumption, people had to sell their assets and borrow money, especially to purchase food. The poor were hit especially hard by the flood because they had less cash reserves and less access to credit and assets that would enable them to offset sharp declines in income.

MAIN OBJECTIVE OF THE STUDY

The main purpose of this report is to compare the situation across three time periods: after the flood (November, 1998), approximately five months after the flood (April, 1999), and a year after the flood (November, 1999). Through this analysis there is an attempt to determine if, and by how much, the level of consumption and welfare changed in the period after the flood. This can help us to understand how different groups of households recovered from the shock of the flood.

Another important objective of the study is to find out how different people coped with the direct and indirect effects of the flood and the loss of income. Many households had to find additional sources of finance to maintain a minimum level of consumption. Topics explored in this paper include selling assets and borrowing money, especially to buy food.

Finally, we wanted to determine if there were any groups of people who were still suffering from the aftershock of the flood a year after the flood and therefore if there were any programs that could be designed to help them to finally recover from their losses and pay off some of the outstanding debts they contracted because of the flood.

2. DATA AND METHODOLOGY

DATA COLLECTION METHODOLOGY AND SAMPLING FRAME

The data set used for the study is based on an in-depth household survey of 757 households in seven flood-affected *thanas*, which have been selected using three main criteria: (i) the severity of flood as determined by the Bangladesh Water Development Board; (ii) the percentage of poor people in the district in which the *thana* is located; and (iii) the inclusion of *thanas* in other studies. We also made sure that the sites selected would give a good regional and geographical balance throughout the six administrative divisions of the country. Individual households in each *thana* were randomly selected using a multiple stage probability sampling technique. The list of *thana* selected is reported in Table 2.1.

Table 2.1 — List of Thanans in the Sample

	Non Poor Thanans	Poor Thanans	Total
Severely affected	Muladi BARISAL (BA)	Mohammadpur MAGURA (KH) ^{BINP}	...
	Shibpur NARSHINGDI (DH) ^{BINP}	Saturia MANIKGANJ (DH) Micro	4
Moderately affected	Shahrasti CHANDPUR (CI) ^{BINP}	Madaripur MADARIPUR (DH) BINP	...
		Derai SUNAMGANJ (SY) ^{HKI}	3
All Total	3	4	7

Source: Authors calculations using Household Expenditure Survey (HES) and Water Development Board (WDB) reports

- Notes:
1. BINP: denotes thanans where the Bangladesh Integrated Nutrition project was active
 2. Micro: Denotes thanans where IFPRI collected data for the micro-nutrient analysis
 3. HKI: Denotes survey areas for the nutritional surveillance conducted by Hellen Keller International

The household survey was administered at three different periods in time to capture the difference in labor participation and food security in the period following the flood and to understand the coping mechanisms households used to recover from the shock of the flood. The first round of data collection took place between the 3rd week of November and the 3rd week of December, 1998. The second round of data collection was carried out between April and May, 1999. The third round of data collection was carried out in November, 1999, exactly a year after the first round.

DEFINITION OF HOUSEHOLD FLOOD EXPOSURE

While measures of the flood at the macro level, such as height of water above danger level at some points of the river basin area, the duration of the flood, the amount of damages to roads, submersion of highways, losses to agricultural output and so on provide a general indication of the severity of the flood, they do not measure the extent of

Table 2.2 — Construction of the Flood Exposure Index

Variable	Original Variable		Created Categorical Variable	
	Range	Unit of Measure	Range	Categories
Depth of Flood in the Homestead	0-12	Feet	0-5	0 to 4: same as original variable 5 : 4 feet or more
Depth of Flood in the Home	0-45	Feet	0-6	0 to 5: same as original variable 6 : 5 feet or more
Days Water in the Home	0-120	Days	0-5	0 : 0 1 : one week 2 : two weeks 3 : one month 4 : two months 5 : more than two months
Index				0-16
Flood Exposed Category			0-4	Not Exposed: 0 Moderate: 1-6 Severe: 7-9 Very Severe: 10 plus

Source: Authors' calculations using the FMRSP-IFPRI Household Survey 1998-99

the exposure to the flood of individual households. It was quite possible that households living in the same village, but across the same road, could have been exposed to the flood in very different ways.

To take into account these differences, in this study, households have been classified according to their level of direct exposure to the flood using a household's flood exposure index, which includes the depth of water in the homestead and in the house, and also the duration (number of days) of water in the house (see Table 2.2 for a description of the indices used in the construction of the household flood exposure index).

MEASURE OF POVERTY: PER CAPITA HOUSEHOLD EXPENDITURE

In this report, we used a relative concept of poverty that allowed us to compare the characteristics of households in different expenditure categories at different points in time, even though it does not give the correct percentage of poor people at a specific point in time. For this purpose, households were ranked according to their level of per capita expenditure at the time of the first round and they were classified into three main categories: those in the bottom 40 percentile (the poorest), the next 40 percentile and the top 20 percentile (the richest).

The average monthly per capita expenditure of rural households in the villages under study, reported in Table 2.3, was estimated to be Taka 750 in round one, Taka 683 in round two and Taka 677 in round three, compared to the national average of Taka 662 in 1995/96 (Household Expenditure Survey, 1995/96).

Table 2.3 — Mean Consumption Values, by Welfare Categories and Round of Data Collection

	Round1				Round2				Round3			
	Bot 40%	Mid 40%	To 20%	All	Bot 40%	Mid 40%	To 20%	All	Bot 40%	Mid 40%	To 20%	All
PC Expenditure	422.04	744.96	1,422.51	750.86	503.34	694.63	1,012.50	682.59	503.56	667.88	1,038.34	676.95
Std PC Exp.	100.14	111.75	403.41	418.01	238.20	281.55	470.85	365.48	227.73	292.93	549.99	391.98
Food Share	74.27	71.07	62.37	70.61	80.12	78.30	72.81	77.92	80.17	77.36	74.06	77.81
Food Price index	1.01	1.01	1.04	1.02	1.02	1.04	1.07	1.04	1.00	1.01	1.04	1.02
PC Daily Calories	1,638.27	2,428.48	3,113.65	2,248.86	2,207.78	2,613.45	2,943.00	2,518.36	2,199.50	2,577.25	3,070.52	2,526.14
Number	303.00	303.00	151.00	757.00	298.00	299.00	151.00	748.00	291.00	293.00	147.00	731.00

Source: FMRSP-IFPRI Household Survey 1998-99

3. HOUSEHOLD COMPOSITION AND SCHOOL ATTENDANCE

HOUSEHOLD COMPOSITION

We only noticed a slight decline in household size across rounds, but this may be due more to the definition of the membership criteria than to anything else (Table 3.1). At the time of the third round of data collection, 93 percent of all households had a male head, little more than 4 percent a female head and 2.3 percent had an absent household head, and half a percent had no household head at all. In general, it does not appear that there have been any dramatic changes to the household size and composition. This means that there has not been any increase or decrease in the migration pattern after the flood.

Table 3.1— Household Size, by Welfare Categories Round of Data Collection and Flood Exposure

Welfare category	Round 1			Round 2			Round 3		
	Not exposed	Exposed	All	Not exposed	Exposed	all	Not exposed	Exposed	All
Bottom 40%	5.00	5.72	5.54	4.79	5.54	5.35	4.83	5.48	5.31
Mid 40%	5.09	5.40	5.30	5.21	5.42	5.36	4.99	5.33	5.22
Top 20%	5.00	5.47	5.33	5.14	5.54	5.42	4.88	5.36	5.22
Total	5.04	5.55	5.40	5.05	5.50	5.37	4.91	5.40	5.26

Source: FMRSP-IFPRI Household Survey

SCHOOL PARTICIPATION

There are no apparent differences between school attendance and education attainment by flood exposure and rounds. Instead, the difference across welfare categories is quite clear for males and females. Only 1.1 males are not educated in the top 20 percentile of expenditure, compared to 1.7 in the bottom 40 percentile (Table 3.2a). The same pattern is observed for females, where 1.2 (these are number of people)

females have no education in the top 20 percentile, compared to 2.0 females in the bottom 40 percentile (Table 3.2b).

Table 3.2a — Number of Household Members by Education Level, Welfare Category, Round of Data Collection and Flood Exposure - Males

Welfare category	Educational status	Round 1			Round 2			Round 3		
		Not exposed	Exposed	All	Not exposed	Exposed	All	Not exposed	Exposed	All
Bottom 40%	N. males: no education	1.51	1.81	1.74	1.39	1.74	1.65	1.37	1.74	1.64
	N. males: primary education class 1-5	0.37	0.56	0.51	0.39	0.57	0.52	0.47	0.56	0.53
	N. males: primary education class 5-8	0.27	0.32	0.30	0.29	0.30	0.30	0.28	0.27	0.27
	N. males: secondary education class 8-11	0.10	0.15	0.14	0.09	0.13	0.12	0.09	0.15	0.13
	N. males: secondary education beyond class 12	0.00	0.03	0.02	0.00	0.03	0.02	0.00	0.02	0.01
Mid 40%	N. males: no education	1.38	1.27	1.31	1.38	1.29	1.32	1.32	1.25	1.27
	N. males: primary education class 1-5	0.72	0.69	0.70	0.71	0.67	0.69	0.71	0.69	0.69
	N. males: primary education class 5-8	0.36	0.38	0.37	0.39	0.39	0.39	0.39	0.38	0.38
	N. males: secondary education class 8-11	0.25	0.29	0.28	0.23	0.30	0.28	0.20	0.27	0.25
	N. males: secondary education beyond class 12	0.01	0.10	0.07	0.02	0.07	0.06	0.01	0.08	0.06
Top 20%	N. males: no education	1.00	1.10	1.07	1.02	1.06	1.05	0.91	1.04	1.00
	N. males: primary education class 1-5	0.55	0.60	0.58	0.52	0.55	0.54	0.47	0.54	0.52
	N. males: primary education class 5-8	0.45	0.42	0.43	0.48	0.48	0.48	0.49	0.45	0.46
	N. males: secondary education class 8-11	0.75	0.49	0.56	0.75	0.49	0.56	0.70	0.43	0.51
	N. males: secondary education beyond class 12	0.09	0.21	0.17	0.09	0.21	0.17	0.07	0.19	0.16
Total	N. males: no education	1.35	1.46	1.43	1.31	1.43	1.39	1.25	1.41	1.36
	N. males: primary education class 1-5	0.56	0.62	0.60	0.56	0.60	0.59	0.58	0.60	0.60
	N. males: primary education class 5-8	0.35	0.36	0.36	0.37	0.37	0.37	0.37	0.35	0.36
	N. males: secondary education class 8-11	0.30	0.27	0.28	0.29	0.27	0.27	0.26	0.25	0.25
	N. males: secondary education beyond class 12	0.02	0.09	0.07	0.03	0.08	0.07	0.02	0.08	0.06

Source: FMRSP-IFPRI Household Survey 1998-99

Table 3.2b — Number of Household Members by Education Level, Welfare Category, Round of Data Collection and Flood Exposure - Females

Welfare category	Educational status	Round 1			Round 2			Round 3		
		Not exposed	Exposed	All	Not exposed	Exposed	All	Not exposed	Exposed	All
Bottom 40%	N. females: no education	1.88	2.01	1.98	1.87	1.95	1.93	1.79	1.90	1.87
	N. females: primary education class 1-5	0.59	0.53	0.54	0.55	0.52	0.53	0.62	0.56	0.58
	N. females: primary education class 5-8	0.24	0.22	0.23	0.20	0.24	0.23	0.18	0.23	0.22
	N. females: secondary education class 8-11	0.03	0.06	0.05	0.03	0.06	0.05	0.03	0.06	0.05
	N. females: secondary education beyond class 12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mid 40%	N. females: no education	1.43	1.54	1.51	1.46	1.60	1.55	1.43	1.58	1.53
	N. females: primary education class 1-5	0.54	0.62	0.60	0.54	0.56	0.56	0.52	0.58	0.56
	N. females: primary education class 5-8	0.29	0.35	0.33	0.32	0.37	0.36	0.27	0.37	0.34
	N. females: secondary education class 8-11	0.12	0.14	0.13	0.15	0.17	0.16	0.14	0.14	0.14
	N. females: secondary education beyond class 12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Top 20%	N. females: no education	1.05	1.30	1.23	1.07	1.30	1.23	1.02	1.23	1.17
	N. females: primary education class 1-5	0.43	0.44	0.44	0.41	0.47	0.45	0.44	0.48	0.47
	N. females: primary education class 5-8	0.30	0.48	0.42	0.30	0.48	0.42	0.33	0.48	0.44
	N. females: secondary education class 8-11	0.36	0.41	0.40	0.45	0.49	0.48	0.44	0.48	0.47
	N. females: secondary education beyond class 12	0.02	0.03	0.03	0.05	0.04	0.04	0.02	0.03	0.03
Total	N. females: no education	1.52	1.69	1.64	1.52	1.68	1.64	1.47	1.64	1.59
	N. females: primary education class 1-5	0.53	0.55	0.54	0.52	0.52	0.52	0.54	0.55	0.55
	N. females: primary education class 5-8	0.28	0.32	0.31	0.27	0.34	0.32	0.25	0.33	0.31
	N. females: secondary education class 8-11	0.13	0.16	0.15	0.17	0.19	0.18	0.16	0.17	0.17
	N. females: secondary education beyond class 12	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01

Source: FMRSP-IFPRI Household Survey 1998-99

4. HOUSEHOLD INCOME AND REVENUE

In rural Bangladesh, households derive income from farm activities, participation in the labor market (collecting wages from casual or dependent employment), self-employment in business and cottage activities, transfers, remittances, etc.

SOURCES OF HOUSEHOLD INCOME

Compared to round one, average monthly household income was 45 percent higher in round two and about 50 percent higher in round three. As it is reported in Table 4.1, the income level of flood-exposed households increased from round one to round two and round three by 35 percent and 49 percent respectively. Even though their income increased, the relative position of poor flood-exposed households with respect to other households deteriorated in round two and round three.

As the flood decreased the chances of planting and harvesting the *aman* crop and slowed the general level of economic activity, other activities such as fishing were more pronounced in round one, while and some business and livestock activities are more relevant in round three.

INCOME FROM AGRICULTURAL ACTIVITIES

About 50 percent of household income originated from agricultural activities except in round one and 10.5 percent from livestock and fishing. There was little variation in the share of agricultural income from round two to round three; the contribution of agricultural income increased from round one to round two and then remained at the same level in round three.

The large increase in income from agriculture was mostly due to the increase in the production of *boro* rice in the winter following the flood and to some extent due to the increase in the production of vegetables. About one-third of all households produced vegetables in round one, with an average income from vegetables of Taka 181 per month.

Table 4.1 — Average Monthly Share of HH Income by Source of Income, Round and Welfare Category

Source of income	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
ALL												
Dependent labour	15.11	14.55	23.39	17.29	13.46	8.95	16.04	12.39	11.40	9.80	12.18	11.00
Daily labour	26.12	13.46	4.71	14.72	26.91	14.57	5.82	15.38	16.84	11.30	3.58	10.30
Business	18.51	23.01	25.34	22.33	14.11	19.58	21.82	18.72	23.14	22.15	26.22	23.74
Agriculture	24.59	32.91	27.04	28.70	30.03	39.14	39.46	36.67	31.55	38.18	35.54	35.54
Livestock	4.00	4.12	4.14	4.09	9.27	9.11	8.36	8.93	8.04	9.23	7.72	8.42
Fish	6.76	6.00	4.47	5.78	1.28	1.72	1.98	1.67	3.78	2.42	1.43	2.47
Asset	2.47	1.32	0.91	1.55	2.33	2.13	1.50	1.99	0.37	0.32	0.53	0.40
Transfer	2.44	4.64	10.00	5.54	2.61	4.81	5.01	4.25	4.88	6.60	12.80	8.14
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Average Hh income	1,707.84	2,323.34	3,314.88	2,274.76	2,326.46	3,406.59	5,053.04	3,302.68	2,309.52	3,480.08	5,544.75	3,423.39
Av Per capita income	308.27	438.37	621.93	421.25	434.85	635.56	932.30	615.02	434.94	666.68	1,062.21	650.83
FLOOD												
Dependent labour	12.32	19.09	25.31	18.58	10.63	10.75	17.24	12.58	10.86	12.29	14.00	12.45
Daily labour	23.38	12.74	6.24	14.44	27.66	15.94	7.55	17.34	16.21	10.78	3.85	10.04
Business	21.14	21.89	18.42	20.70	13.86	22.39	23.52	19.94	22.70	25.18	23.23	23.80
Agriculture	26.61	28.49	27.73	27.67	31.83	30.79	30.63	31.08	33.45	31.91	38.88	34.71
Livestock	4.46	4.14	3.63	4.11	9.18	9.40	9.78	9.44	7.34	9.11	7.72	8.12
Fish	6.43	7.16	6.01	6.61	1.55	1.85	2.97	2.07	3.62	3.18	1.62	2.78
Asset	3.08	1.70	0.95	1.95	2.59	2.18	1.33	2.07	0.12	0.47	0.68	0.44
Transfer	2.57	4.78	11.71	5.95	2.69	6.68	6.97	5.47	5.70	7.07	10.01	7.66
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Average Hh income	1,705.94	2,289.87	3,003.34	2,186.86	2,295.18	2,987.22	4,293.92	2,956.51	2,279.55	3,148.33	5,522.11	3,255.09
Av Per capita income	298.24	424.05	549.06	394.03	414.29	552.17	775.08	538.53	416.74	591.79	1,030.25	603.91
NO FLOOD												
Dependent labour	23.27	5.18	19.93	14.48	21.34	6.25	14.23	12.04	12.91	5.76	7.81	7.95
Daily labour	34.13	14.93	1.98	15.32	24.80	12.52	3.20	11.92	18.59	12.15	2.94	10.85
Business	10.82	25.31	37.75	25.89	14.80	15.37	19.25	16.56	24.37	17.25	33.39	23.60
Agriculture	18.69	42.02	25.79	30.95	25.02	51.61	52.83	46.54	26.24	48.31	27.54	37.28
Livestock	2.65	4.06	5.07	4.05	9.50	8.68	6.22	8.02	9.99	9.43	7.70	9.04
Fish	7.72	3.60	1.73	3.98	0.54	1.52	0.48	0.96	4.23	1.20	0.97	1.80
Asset	0.69	0.54	0.83	0.67	1.60	2.04	1.76	1.85	1.07	0.07	0.17	0.32
Transfer	2.04	4.36	6.93	4.64	2.39	2.02	2.03	2.10	2.61	5.83	19.48	9.15
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Average Hh income	1,713.42	2,395.49	4,072.48	2,493.50	2,418.28	4,310.86	6,899.09	4,164.10	2,397.51	4,195.41	5,599.81	3,842.21
Av Per capita income	342.68	469.70	814.50	493.76	504.86	824.26	1,342.24	822.95	496.38	837.41	1,147.50	780.94

The number increased to 63 percent of households with Taka 506 in round two and to 83.3 percent households with Taka 320 in round three.

INCOME FROM HIRED LABOR AND SELF-EMPLOYMENT ACTIVITIES

The contribution of revenue from wage labor and self-employment (business and cottage activities) to total rural household income was quite significant and accounted for one-third of total rural income in all three periods taken together. Most important for the poor is the revenue from daily labor. The average monthly income of daily laborers was expected to increase in the period after the flood. Wage earnings of daily laborers in the flood period (July-October 1998) were 60 percent of those in July-October, 1997, and did not return to the same level even one year after flood in July-October, 1999. Only in the April-May, 1999 period, did the earnings of daily labor exceed those in the July-October, 1997 period.

DETERMINANTS OF RURAL INCOME

The income of rural household was estimated with a regression model, in which income is a function of endowments, household characteristics and the time periods. We found that the main determinants of rural household income were farmland and household size, indicating the number of workers in the family. The coefficients of dummy variables for round two and round three were found to be significant for household and agricultural income. Thus, it is evident that income increased by time period and that the flood had a lasting impact on the level of income.

Table 4.2 — Determinants of Rural Household Income

Random-effects: GLS regression. Group variable (i): cluvill				
R-sq: within	0.3453		0.2886	
between	0.4031		0.5677	
overall	0.3735		0.335	
Number of Observations	1219		1157	
Number of Groups	116		115	
Wald chi2(23)	668.68		570.78	
prob>chi2	0		0	
	Total Income		Agricultural Income	
ltotr (ln Natural Log)	Coefficient	z-statistics	Coefficient	z-statistics
lland (ln of Farm land)	0.3000453	12.026	0.8155423	18.116
lhhs (ln of household size)	1.089385	11.163	0.6414108	3.613
Dum(round2)	0.3432432	5.578	0.3285737	2.835
Dum(round3)	0.4082819	6.699	0.1108558	0.968
vfex2 (hh village flood exposure=1)	-0.2144784	-2.11	-0.3244009	-2.412
vfex3 (hh village flood exposure=2)	-0.2766344	-2.771	-0.4639403	-3.416
vfex4 (hh village flood exposure=3)	-0.4207947	-3.428	-0.6063329	-3.567
vfag2 (ag village flood exposure=1)	0.3214575	1.904	0.5521037	2.457
vfag3 (ag village flood exposure=2)	0.2692544	1.492	0.4765851	1.971
fheadr (female headed household)	-0.4248581	-1.488	0.1641242	0.293
aheadr (age of the household head)	-0.0015828	-0.513	0.0019541	0.347
pm04_r (proportion males: 0-4 years)	-0.0133081	-3.632	-0.0200961	-2.984
pm514_r (proportion males: 5-14 years)	-0.0044007	-1.627	-0.0022331	-0.442
pm15_r (proportion males: 15-19 years)	0.006529	1.962	0.0056876	0.934
pm20_r (proportion males: 20-34 years)	0.0155429	5.743	0.012955	2.571
pm35_r (proportion males: 35-54 years)	0.0150138	3.975	0.0141951	2.035
pm55_r (proportion males: 55+ years)	0.0092879	2.015	0.0017524	0.207
pf04_r (proportion females: 0-4 years)	-0.0087849	-2.597	-0.0208378	-3.312
pf514_r (proportion females: 5-14 years)	-0.0068251	-2.564	0.0001641	0.034
pf15_r (proportion females: 15-19 years)	-0.0034715	-1.004	-0.0008472	-0.131
pf20_r (proportion females: 20-34 years)	0.0040045	1.102	0.0035747	0.534
pf35_r (proportion females: 35-54 years)	0.0007054	0.187	-0.0021876	-0.307
pf55_r (proportion females: 55+ years)	0.0023939	0.507	-0.0088575	-1.043
constant	4.509345	14.683	1.836355	3.45
sigma_u	0.2294149		0	
sigma_e	0.81349639		1.4724151	
rho	0.07367111		0	

5. HOUSEHOLD EXPENDITURE AND FOOD SECURITY

The mean level of total household expenditure decreased from Taka 4,001 in the first round to Taka 3,663 in the second round and remained relatively stable at Taka 3,508 in the third round (Table 5.1). The main reason for this drop is the change in the level of

Table 5.1 — Mean Values by Welfare Categories, Round of Data Collection and the Flood Exposure

	Round 1		Round 2		Round 3				
	No Flood	Flood	All No Flood	Flood	All No Flood	Flood	All		
Household Food	2,628.6	2,739.8	2,707.98	2,686.9	2,874.5	2,820.8	2,520.6	2,707.1	2,652.8
Household Non Food	1,214.8	1,323.6	1,292.47	755.06	876.3	841.6	827.6	865.6	854.5
Household Repairs	366.9	423.6	407.43	255.08	212.6	224.8	142.4	128.7	132.7
Household Total*	3,843.4	4,063.5	4,000.46	3,442.0	3,750.9	3,662.5	3,348.2	3,572.7	3,507.4
Bot 40%									
PC Food	322.7	308.2	311.89	372.64	412.9	402.8	398.3	398.1	398.1
PC Non Food	92.3	116.2	110.15	92.6	103.15	100.5	101.5	106.7	105.3
PC Total	415.0	424.4	422.04	465.30	516.1	503.3	499.8	504.8	503.5
Mid 40%									
PC Food	545.4	519.2	527.57	538.50	545.0	542.9	497.0	515.4	509.4
PC Non Food	202.8	224.1	217.39	135.59	159.1	151.6	167.3	154.1	158.4
PC Total	748.2	743.4	744.96	674.09	704.2	694.6	664.4	669.5	667.8
Top 20%									
PC Food	805.8	901.9	873.97	783.89	719.8	738.5	780.6	749.6	758.7
PC Non Food	588.1	532.2	548.54	268.58	276.1	273.9	270.7	283.3	279.6
PC Total	1,393.9	1,434.2	1,422.51	1,052.4	996.0	1,012.5	1,051.4	1,032.9	1,038.3
All									
PC Food	519.2	506.7	510.34	530.82	524.9	526.6	519.5	513.5	515.2
PC Non Food	241.7	240.0	240.52	147.89	159.2	155.9	165.0	160.2	161.6
PC Total	760.9	746.8	750.86	678.71	684.1	682.5	684.5	673.8	676.9
PC D Calorie									
Bot 40%	1,744.6	1,602.0	1,638.27	2,142.7	2,229.6	2,207.7	2,218.4	2,192.9	2,199.5
Mid 40%	2,652.5	2,324.5	2,428.48	2,777.6	2,536.9	2,613.4	2,680.3	2,528.0	2,577.2
Top 40%	3,048.5	3,140.4	3,113.65	3,176.1	2,847.1	2,943.0	3,203.9	3,015.3	3,070.5
All	2,410.6	2,183.8	2,248.86	2,637.0	2,470.7	2,518.3	2,623.3	2,486.2	2,526.1
Household Size – r	5.0	5.5	5.4	5.06	5.49	5.37	4.9	5.4	5.2
Number	21	54	75	21	53	74	21	51	73

Source: FMRSP-IFPRI Households Survey 1998-99

* Not Included Repairs

Table 5.2 — Average Prices of Rice, Wheat and Atta by Welfare Category, Round of Data Collection and The Flood Exposure

Categories	Round 1			Round 2			Round 3		
	No Flood	Flood	All	No Flood	Flood	All	No Flood	Flood	All
Prices of Rice									
Bot 40%	15.63	16.19	16.04	12.12	13.35	13.04	11.57	12.15	12.00
Mid 40%	15.55	16.29	16.05	12.37	13.47	13.12	11.37	12.00	11.79
Top 20%	15.59	16.20	16.04	12.38	13.49	13.18	11.84	12.19	12.09
Total	15.59	16.23	16.05	12.29	13.42	13.10	11.52	12.10	11.93
Prices of Wheat									
Bot 40%	11.21	11.90	11.79	7.93	8.56	8.27	11.00	11.75	11.43
Mid 40%	9.73	11.12	10.71	8.28	8.18	8.23	0.00	12.00	12.00
Top 20%	0.00	12.12	12.12	8.71	8.71	8.71	0.00	0.00	0.00
Total	10.22	11.62	11.35	8.23	8.41	8.32	11.00	11.83	11.56
Prices of Atta									
Bot 40%	12.13	12.69	12.58	10.09	10.70	10.58	10.55	11.41	11.20
Mid 40%	11.98	12.60	12.45	10.46	10.68	10.60	11.79	11.74	11.75
Top 20%	13.29	12.54	12.74	10.50	10.80	10.74	11.00	11.83	11.56
Total	12.34	12.63	12.56	10.34	10.71	10.62	11.18	11.61	11.49

Source: FMRSP-IFPRI Households Survey 1998-99

non food expenditure that decreased from Taka 1,293 in the first round to Taka 842 in the second round and remained relatively stable at Taka 855 in the third round. In fact, on average, households spent 71 percent of their budget on food in the first round, compared to 78 percent in the second and third rounds.

As a consequence, the resulting consumption of calories per capita per day increased across the three rounds from 2,249 to 2,518 and 2,526 respectively. This increase has been more evident for poorer households, especially for those exposed to the

flood. In fact, the caloric consumption of poorer households went from 1,638 calories per capita per day in round one to 2,208 in round two and 2,200 in round three. The main reason why this has been possible has been the decrease in the price of rice, which went from Taka 16.1 per Kg in the first round to Taka 13.1 per Kg. in the second and to Taka 11.9 per Kg. in the third round. On the other hand, the price of wheat and atta decreased only slightly in the year after the flood (Table 5.2).

FOOD EXPENDITURE PATTERNS

Households which were more exposed to the flood spent less on rice, more on wheat and more on prepared foods in the first round. In the following rounds, they reduced the budget share for rice expenditure and increased the budget shares for milk and fruits. This is partly due to the changes in price between rice and wheat and also because the consumption of wheat was mostly driven by the larger distribution of wheat transfer programs that took place in the winter of 1999. As a result, poor households were able to increase their level of per capita daily consumption from the period immediately following the flood in round one. This trend is clear in the distribution of per capita daily consumption of food categories reported in Tables 5.3a, 5.3b and 5.3c.

In particular, the amount spent on rice decreased over time for almost all households, with the exception of poor households and flood exposed households, in which case the amount actually increased. Nevertheless, the per capita daily quantities of rice consumed increased substantially for poor households exposed to the flood from 324 grams in the first round to 392 grams in the second round and 405 grams in the third round.

The percentage of households consuming wheat increased from 58 percent in the first round to 70 percent in the second round and decreased to 36 percent in the third round. At the same time, the amount spent on wheat remained constant for all households in round one and two and decreased in round three. As a result, the per capita daily

Table 5.3a — Average per Capita Daily Consumption of Food Categories by Welfare Categories and Round of Data Collection (grams) - All

Categories	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Rice	323.99	463.69	517.14	418.44	392.47	441.50	472.84	428.29	404.57	463.05	470.09	441.21
Wheat	51.28	52.74	47.44	51.10	64.69	72.09	50.68	64.81	23.24	18.25	19.30	20.44
Bread and Other Cereals	0.59	2.38	3.24	1.83	2.96	4.99	5.29	4.25	4.13	4.56	8.75	5.22
Pulses	13.96	16.86	23.92	17.11	21.42	23.64	27.85	23.61	20.69	22.04	26.83	22.46
Oil	5.07	8.26	13.16	7.96	5.84	8.69	12.63	8.35	6.78	8.89	12.93	8.86
Vegetables	123.11	200.09	293.06	187.82	203.14	280.07	333.26	260.16	147.92	193.43	254.56	187.53
Meat	3.10	8.89	23.32	9.45	5.32	9.54	17.52	9.47	6.23	9.63	17.96	9.94
Egg	1.55	3.90	7.65	3.71	2.53	4.16	6.43	3.97	2.17	3.81	5.37	3.46
Milk	5.00	16.90	31.53	15.05	23.35	33.20	52.38	33.14	9.43	18.28	25.90	16.28
Fruits	10.89	28.17	58.67	27.34	40.02	79.22	118.80	71.59	49.87	69.17	97.55	67.16
Fish	19.67	43.84	81.84	41.75	15.08	28.45	43.32	26.12	43.46	51.41	75.26	53.01
Spices	21.63	24.95	29.42	24.51	21.46	24.20	28.88	24.04	22.96	23.87	27.81	24.29
Sugar and Snacks	11.25	24.15	49.57	24.06	19.64	28.61	46.32	28.61	20.02	31.98	45.55	29.94
Drinks and Others	6.85	9.04	15.57	9.47	7.94	9.10	12.76	9.38	9.30	11.60	18.81	12.13
Prepared Foods	11.40	11.85	33.71	16.03	7.02	6.13	8.49	6.96	7.05	7.31	11.26	7.99
N	303	303	151	757	298	299	151	748	291	295	146	732

Source: FMRSP-IFPRI Households Survey 1998-99

Table 5.3b — Average per Capita Daily Consumption of Food Categories by Welfare Categories and Round of Data Collection (grams) - Households not Exposed to the Flood

Categories	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Rice	380.23	539.97	547.36	481.77	400.23	500.59	538.43	470.97	416.41	522.03	505.16	479.61
Wheat	40.92	42.66	37.35	40.98	54.63	86.66	47.66	67.18	22.46	13.75	25.97	19.33
Bread and Other Cereals	0.51	2.56	4.07	2.09	4.10	4.40	6.77	4.76	3.02	3.52	7.93	4.18
Pulses	8.05	16.11	20.76	14.00	11.32	21.85	26.06	18.79	13.40	15.96	22.36	16.24
Oil	4.50	8.10	14.41	7.98	5.34	8.79	13.78	8.50	6.46	8.68	14.10	8.90
Vegetables	152.84	258.23	311.62	229.23	190.63	301.87	372.32	274.63	179.12	224.95	286.73	219.84
Meat	2.15	8.54	23.72	9.09	3.34	9.57	24.36	10.17	5.64	10.66	19.33	10.47
Egg	2.21	3.82	7.75	3.98	2.99	3.90	7.34	4.24	3.19	3.85	6.30	4.08
Milk	7.82	21.34	44.27	20.73	20.32	30.61	59.23	32.43	15.11	19.14	35.06	20.71
Fruits	12.25	34.01	57.00	30.34	39.80	82.52	132.67	76.59	47.97	69.57	90.15	65.52
Fish	20.75	38.49	71.30	38.21	13.20	31.27	50.23	28.31	41.79	49.30	74.54	51.37
Spices	20.90	24.91	27.31	23.88	20.15	24.09	28.93	23.59	22.61	25.50	28.87	25.08
Sugar and Snacks	10.63	25.07	48.20	24.15	19.57	28.21	44.52	28.22	18.00	27.89	51.08	28.68
Drinks and Others	3.61	5.72	9.09	5.59	4.99	7.83	10.92	7.38	5.26	9.69	13.78	8.83
Prepared Foods	2.33	5.83	13.39	5.99	1.41	2.06	6.33	2.66	0.96	5.45	2.53	3.22
N	81	94	42	217	79	93	42	214	79	93	41	213

Source: FMRSP-IFPRI Households Survey 1998-99

Table 5.3c — Average per Capita Daily Consumption of Food Categories by Welfare Categories and Round of Data Collection (grams) - Households Exposed to the Flood

Categories	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Rice	303.47	429.39	505.50	392.99	389.67	414.82	447.57	411.19	400.16	435.91	456.39	425.45
Wheat	55.07	57.27	51.32	55.17	68.32	65.50	51.84	63.87	23.52	20.32	16.69	20.90
Bread and Other Cereals	0.61	2.29	2.91	1.73	2.56	5.26	4.72	4.04	4.54	5.04	9.06	5.65
Pulses	16.12	17.19	25.13	18.35	25.07	24.45	28.53	25.54	23.41	24.85	28.59	25.01
Oil	5.29	8.33	12.68	7.96	6.03	8.65	12.17	8.29	6.91	8.99	12.47	8.84
Vegetables	112.26	173.95	285.91	171.18	207.66	270.22	318.22	254.36	136.29	178.92	242.00	174.27
Meat	3.45	9.04	23.17	9.60	6.03	9.53	14.89	9.19	6.45	9.16	17.43	9.72
Egg	1.31	3.94	7.61	3.60	2.36	4.27	6.08	3.86	1.79	3.78	5.00	3.22
Milk	3.96	14.90	26.63	12.77	24.44	34.37	49.74	33.43	7.31	17.88	22.33	14.46
Fruits	10.39	25.54	59.32	26.13	40.10	77.72	113.45	69.59	50.59	68.99	100.43	67.83
Fish	19.28	46.26	85.90	43.17	15.75	27.17	40.65	25.24	44.08	52.39	75.54	53.68
Spices	21.90	24.98	30.24	24.78	21.92	24.24	28.85	24.23	23.10	23.12	27.40	23.98
Sugar and Snacks	11.48	23.74	50.10	24.02	19.66	28.78	47.00	28.76	20.78	33.87	43.38	30.44
Drinks and Others	8.03	10.54	18.06	11.03	9.01	9.67	13.46	10.17	10.82	12.48	20.78	13.48
Prepared Foods	14.72	14.55	41.54	20.07	9.05	7.97	9.32	8.69	9.32	8.16	14.67	9.95
N	222	209	109	540	219	206	109	534	212	202	105	519

Source: FMRSP-IFPRI Households Survey 1998-99

consumption of wheat (slightly higher for flood exposed households) increased from 51 grams to 65 grams in the second round and then dropped to 20 grams in the third round.

The percentage of households consuming milk increased between round one and two from 43 percent to 66 percent and then decreased to 47 percent. In the case of milk, though the percentage of households exposed to the flood which consumed milk was much lower at 38 percent. It appears that milk was more available in the non- flooded areas and in the dry season.

NON FOOD EXPENDITURE PATTERNS

The percentage of households spending money for house repairs increased from 29 percent in the first round to 48 percent in the second round and decreased again to 26 percent in the third round, while the amount spent for repairs in round one was much higher than in round two. This is most likely due to the fact most of the repairs made to the houses are carried out in the winter time (just before the second round of data collection) and some households could not afford to make them immediately after the flood.

The percentage of households purchasing clothes for adults and children was apparently depressed in the period after the flood (60 and 44 percent respectively); it increased to 90 and 78 percent respectively in the second round and to 95 and 80 percent respectively in the third round.

Tables 5.4a, 5.4b and 5.4c show the average level of household non food expenditure by welfare category and flood exposure. The expenses for health care and medicines and for fuel were much higher in the first period than in the following periods, especially for flood exposed households. The expenses for health were 332 Taka (349 Taka for flood exposed households) in the first round, 116 Taka in the second round and 154 Taka in the third round. Similarly, the expenses for fuel were 137 Taka (158 Taka for flood exposed households) in the first round, 89 Taka in the second round and 86 Taka in the third round. As a result, the budget shares for health expenses decreased from

Table 5.4a — Average Households Expenditure of Non Food Categories by Welfare Categories and Round of Data Collection - All

Categories	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Repairs	217.20	498.29	606.82	407.43	139.91	205.25	428.83	224.22	61.18	185.75	166.68	132.37
Clothes for Adults	80.36	194.78	506.04	211.07	70.11	132.20	242.57	129.67	79.37	139.16	233.33	134.24
Clothes for Children	39.50	80.30	199.71	87.79	34.06	59.54	100.61	57.65	25.54	42.70	65.06	40.35
Semi Durable Items	12.34	21.47	79.05	29.30	5.06	10.10	12.14	8.50	4.93	8.40	12.18	7.78
Health Care and Medicine	175.27	294.64	722.72	332.25	75.47	113.59	200.05	115.80	103.07	162.24	240.36	154.34
Education	43.44	93.69	220.24	98.81	41.31	114.74	190.25	100.67	44.15	91.42	180.59	90.47
Personal Items	58.10	93.17	147.03	89.88	62.36	99.07	146.44	93.97	65.98	89.41	135.04	89.23
Travel	34.42	86.43	222.81	92.82	48.05	82.70	207.46	94.00	52.57	85.79	135.10	82.45
Fuel	79.46	125.10	275.11	136.75	68.40	86.30	135.51	89.07	58.71	80.44	149.73	85.68
Cigarette and Others	74.53	104.83	185.34	108.76	86.77	107.02	177.16	113.07	78.50	103.38	151.83	103.19
Others	16.34	58.83	375.76	105.04	15.34	30.89	94.99	37.58	31.59	50.00	161.26	64.76
Total	830.96	1,651.52	3,540.63	1,699.90	646.84	1,041.39	1,935.92	1,064.21	605.08	1,038.70	1,631.16	984.86
Number	303	303	151	757	299	300	151	750	292	295	147	734

Source: FMRSP-IFPRI Households Survey 1998-99

Table 5.4b — Average Households Expenditure of Non Food Categories by Welfare Categories and Round of Data Collection - Households not Exposed to the Flood

Categories	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Repairs	140.91	421.21	644.32	366.99	126.33	130.19	744.17	255.07	25.98	246.77	115.05	142.44
Clothes For Adults	64.92	210.55	529.68	223.59	51.02	127.66	229.47	121.73	74.14	135.78	211.13	129.29
Clothes For Children	23.10	85.42	230.02	92.63	28.32	49.67	82.52	48.95	23.83	38.55	66.66	39.04
Semi Durable Items	5.34	25.88	94.10	32.43	3.97	10.22	12.70	8.54	3.67	5.37	9.28	5.56
Health Care and Medicine	121.57	208.99	761.04	289.91	70.81	88.16	173.07	99.54	92.72	254.76	127.71	172.05
Education	28.37	78.50	208.24	87.02	26.89	70.62	156.30	72.91	32.93	65.66	167.04	74.60
Personal Items	53.09	97.21	159.40	94.16	56.97	98.48	143.32	93.15	54.75	80.58	131.63	81.79
Travel	28.53	93.46	257.34	103.65	50.53	87.50	199.47	97.57	46.40	70.21	181.19	84.23
Fuel	45.87	81.04	155.27	83.61	43.83	64.74	129.72	70.77	42.08	71.93	174.42	82.11
Cigarette and Others	57.43	94.45	173.14	97.27	77.44	104.07	172.23	108.75	69.97	93.68	159.91	98.70
Others	26.40	47.81	394.64	110.54	16.73	19.19	91.27	33.15	5.53	65.24	144.52	60.22
Total	595.54	1,444.53	3,607.19	1,581.85	552.85	850.58	2,134.25	1,010.13	471.99	1,128.55	1,488.53	970.02
Number	77	96	44	217	75	95	44	214	75	95	43	213

Source: FMRSP-IFPRI Households Survey 1998-99

Table 5.4c — Average Households Expenditure of Non Food Categories by Welfare Categories and Round of Data Collection - Households Exposed to the Flood

Categories	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Repairs	243.20	534.03	591.40	423.68	144.45	240.04	299.16	211.90	73.34	156.77	188.03	128.26
Clothes for Adults	85.62	187.46	496.33	206.04	76.50	134.29	247.95	132.83	81.18	140.76	242.51	136.26
Clothes for Children	45.08	77.93	187.24	85.84	35.98	64.12	108.05	61.12	26.14	44.67	64.39	40.89
Semi Durable Items	14.73	19.42	72.86	28.04	5.43	10.04	11.91	8.48	5.37	9.84	13.39	8.68
Health Care and Medicine	193.57	334.37	706.97	349.27	77.04	125.37	211.14	122.29	106.64	118.29	286.93	147.11
Education	48.58	100.72	225.16	103.56	46.14	135.18	204.21	111.75	48.03	103.65	186.19	96.95
Personal Items	59.81	91.30	141.95	88.16	64.16	99.34	147.73	94.30	69.85	93.60	136.44	92.27
Travel	36.42	83.18	208.62	88.46	47.22	80.48	210.74	92.58	54.71	93.20	116.04	81.72
Fuel	90.91	145.52	324.38	158.10	76.63	96.29	137.89	96.38	64.46	84.48	139.52	87.13
Cigarette and Others	80.35	109.64	190.36	113.38	89.90	108.39	179.20	114.80	81.45	107.98	148.48	105.01
Others	12.19	63.94	368.00	102.83	14.87	36.31	96.39	39.34	39.93	42.75	168.18	66.61
Total	911.18	1,747.51	3,513.27	1,747.36	678.32	1,129.85	1,854.37	1,085.78	651.09	996.01	1,690.10	990.91
Number	226	207	107	540	224	205	107	536	217	200	104	521

Source: FMRSP-IFPRI Households Survey 1998-99

21 percent in the first round to 12 percent in the second round and went up again to 15 percent in the third round. This decrease has been reflected in a larger share of expenditure on cigarettes and other personal items.

In conclusion, the flood prompted larger expenses on housing, health and fuel. This appears to have been counterbalanced by reducing the expenses on food, clothing, travel, personal and other cheaper and unnecessary expenses and more importantly by an increase of purchases of food on credit. After the flood, households were able to spend less on non-food items and on rice and return to their long run pattern of expenditure.

HOUSEHOLD FOOD SECURITY

The impact of the flood on food security in round one was quite dramatic. More than half of flood-exposed households in the bottom 40 percentile in round one were food insecure (50.4 percent), compared to 40.1 percent of non flood-exposed households in the same category (Table 5.5). Overall, the percentage of flood-exposed households who were food insecure is 24 percent, compared to 15 percent of non flood-exposed households. The reverse is true for food secure households. The percentage of food secure people is much higher for richer households that were not exposed to the flood.

The data on households in the bottom 40 percentile shows that their level of food insecurity had decreased in the year after the flood. In fact, only 28.7 percent and 26.7 percent of flood-exposed and non flood-exposed households respectively were food insecure. Thus, poor households that were exposed to the flood were able to improve their level of food security with respect to non flood-exposed and non poor households.

Table 5.5 — Household Food Security by Round, Flood Exposure and Welfare Category

	Round 1				Round 2				Round 3			
	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total	Bot 40%	Mid 40%	Top 20%	Total
Not Exposed												
Food Ins	40.26	1.04	-	14.75	36.00	9.47	4.55	17.76	26.67	7.37	4.6	13.62
Vulnerab	50.65	86.46	50.00	66.36	61.33	84.21	90.91	77.57	69.33	87.37	88.3	81.22
Food Sec	-	10.42	47.73	14.29	1.33	4.21	2.27	2.80	2.67	5.26	6.9	4.69
Question	9.09	2.08	2.27	4.61	1.33	2.11	2.27	1.87	1.33	-	-	0.47
N	77	96	44	217	75	95	44	214	75	95	43	213
Expoused												
Food Ins	50.44	6.76	0.93	23.89	29.60	14.22	5.61	18.91	28.70	15.58	7.6	19.46
Vulnerab	33.63	71.01	60.75	53.33	67.71	79.90	77.57	74.34	65.28	77.89	80.7	73.22
Food Sec	1.33	10.14	31.78	10.74	0.90	2.94	12.15	3.93	3.24	3.02	8.6	4.24
Question	14.60	12.08	6.54	12.04	1.79	2.94	4.67	2.81	2.78	3.52	2.8	3.08
N	226	207	107	540	223	204	107	534	216	199	104	519
All												
Food Ins	47.8	4.95	0.66	21.27	31.21	12.7	5.30	18.58	28.18	12.93	6.8	17.76
Vulnerab	37.9	75.91	57.62	57.07	66.11	81.2	81.46	75.27	66.32	80.95	82.9	75.55
Food Sec	0.9	10.23	36.42	11.76	1.01	3.3	9.27	3.61	3.09	3.74	8.1	4.37
Question	13.2	8.91	5.30	9.91	1.68	2.68	3.97	2.54	2.41	2.38	2.0	2.32
N	303	303	151	757	298	299	151	748	291	294	147	732

6. INCIDENCE OF DISEASE AND NUTRITIONAL STATUS

The deterioration of household food security and caloric consumption and the increase in the incidence of diseases had a negative impact on the nutritional status of women and children.

INCIDENCE OF DISEASES

It is evident from Tables 6.1a, 6.1b and 6.1c that the overall incidence of disease was higher in the period after the flood than a year later. 30.8 percent of the individuals in the sample reported some illness in round one, lasting 15.8 days on average, compared to 24.9 percent for an average of 9.1 days in round three a year later. We also noticed a large difference between flood and non flood-exposed households. In fact, only 22.3 percent of individuals in non flood-exposed households reported any illness, compared to 33.6 percent of individuals in flood-exposed households.

NUTRITIONAL STATUS OF PRESCHOOL CHILDREN

We found a small improvement in the percentage of wasting of children across the three rounds of data collection. Overall, the percentage of wasted children went from 22.3 percent in the first round to 19.1 percent in the third round (Table 6.2). The largest improvement was noticed for children of non flood-exposed households, going from 19.3 percent to 12.9 percent.

We also found that the percentage of children stunted continued to increase from 53.4 percent in the period after the flood, to 60.9 percent six months later. It went down to 56.2 percent a year after the first measurement. This means that the effect of the flood was still felt by children several months after the flood itself. 57.6 percent of children of flood-exposed households were stunted a year after the flood, a percentage still higher than that of the fall of 1998, at the time of the first round of data collection. For poor flood-exposed families in the bottom 40 percentile, the situation was even worse. At least 68 percent of children in this category were stunted at the time of the second round of

Table 6.1a — Incidence of Diseases By Expenditure Category and Round of Data Collection - All

Sick		Round 1				Round 2				Round 3			
		Bot 40%	Mid 20%	Top 40%	Total	Bot 40%	Mid 20%	Top 40%	Total	Bot 40%	Mid 20%	Top 40%	Total
Fever	Incident	9.93	8.79	8.45	9.19	12.45	12.08	8.42	11.49	10.65	11.42	10.43	10.91
	Days(Av.)	6.98	5.96	5.34	6.30	5.57	5.39	5.64	5.50	5.68	5.74	5.70	5.71
	Cost(Av.)	25.47	43.66	101.12	46.03	52.78	106.00	92.36	80.92	47.60	63.03	86.60	61.46
Respiratory	Incident	5.39	3.99	4.72	4.71	1.36	1.31	1.83	1.44	2.77	3.31	4.43	3.32
	Days(Av.)	15.71	11.27	11.35	13.37	11.40	6.48	7.53	8.62	9.39	7.08	7.63	8.00
	Cost(Av.)	8.63	16.92	23.42	14.32	35.27	51.43	92.40	55.90	18.53	33.43	111.26	49.10
Diarrhea	Incident	9.28	9.98	9.57	9.61	5.02	4.23	3.30	4.36	3.23	2.53	2.22	2.75
	Days(Av.)	6.47	6.11	5.24	6.08	5.82	5.49	5.67	5.67	6.42	6.13	5.35	6.14
	Cost(Av.)	70.62	62.00	78.08	68.57	58.80	69.29	239.11	90.52	41.67	103.38	75.18	69.75
Others	Incident	9.46	12.34	11.80	11.05	7.24	8.16	11.11	8.39	8.58	8.63	10.95	9.07
	Days(Av.)	31.97	32.16	41.53	34.07	12.82	10.78	9.53	11.15	14.93	15.56	10.80	14.18
	Cost(Av.)	48.87	113.23	521.63	176.71	264.99	223.09	186.34	227.69	105.56	138.23	101.58	117.02
Total	Incident	30.64	30.99	30.68	30.78	24.83	24.91	23.44	24.58	24.13	24.66	26.99	24.91
	Days(Av.)	15.11	16.19	16.58	15.83	0.86	7.22	7.60	7.55	9.42	9.31	7.94	9.06
	Cost(Av.)	44.89	73.24	247.64	95.98	15.80	137.50	154.66	132.06	65.84	89.56	96.99	81.93
N		1,671	1,604	805	4,080	1,615	1,606	819	4,040	1,550	1,541	767	3,858

Table 6.1b — Incidence of Diseases by Expenditure Category and Round of Data Collection – Affected

Sick		Round 1				Round 2				Round 3			
		Bot 40%	Mid 20%	Top 40%	Total	Bot 40%	Mid 20%	Top 40%	Total	Bot 40%	Mid 20%	Top 40%	Total
Fever	Incident	11.12	9.78	8.55	10.12	12.36	13.89	9.61	12.38	10.69	11.64	10.05	10.93
	Days(Av.)	6.92	6.11	5.25	6.35	5.49	5.61	5.88	5.60	5.79	5.71	5.59	5.72
	Cost(Av.)	26.93	47.89	75.20	42.49	55.10	120.95	100.74	90.01	48.60	68.64	90.52	64.34
Respiratory	Incident	6.53	4.94	5.64	5.76	1.12	1.35	1.69	1.32	3.11	3.38	5.03	3.59
	Days(Av.)	16.23	11.25	11.33	13.70	10.13	7.00	7.60	8.28	8.92	7.53	7.94	8.15
	Cost(Av.)	8.93	15.27	22.15	13.49	34.71	61.00	97.20	60.85	18.89	42.53	123.50	56.32
Diarrhea	Incident	9.02	10.86	11.45	10.18	5.62	4.33	3.20	4.65	3.54	2.44	2.51	2.92
	Days(Av.)	6.82	6.26	4.91	6.18	5.85	5.08	6.26	5.64	6.33	5.96	5.64	6.09
	Cost(Av.)	77.97	64.96	62.12	69.30	62.97	71.13	245.58	91.15	40.92	103.65	89.86	69.16
Others	Incident	10.34	14.27	12.48	12.23	7.54	9.11	11.64	8.96	8.67	9.30	10.77	9.32
	Days(Av.)	34.34	33.79	50.53	37.34	13.48	11.09	10.09	11.68	13.71	13.11	11.68	13.02
	Cost(Av.)	54.04	126.76	456.66	166.24	281.13	265.81	161.81	244.08	96.85	140.43	98.40	113.68
Total	Incident	32.97	34.29	33.85	33.63	25.44	27.59	24.62	26.09	25.17	25.35	27.29	25.66
	Days(Av.)	16.08	16.97	22.32	17.65	8.05	7.43	7.95	7.78	8.95	8.56	8.30	8.67
	Cost(Av.)	45.80	82.16	204.02	90.84	24.03	159.47	149.28	142.93	61.50	96.53	100.95	82.94
N		1,286	1,114	585	2,985	1,246	1,109	593	2,948	1,188	1,065	557	2,810

Table 6.1c — Incidence of Diseases by Expenditure Category and Round of Data Collection – Not Affected

Sick		Round 1				Round 2				Round 3			
		Bot 40%	Mid 20%	Top 40%	Total	Bot 40%	Mid 20%	Top 40%	Total	Bot 40%	Mid 20%	Top 40%	Total
Fever	Incident	5.97	6.53	8.18	6.67	12.74	8.05	5.31	9.07	10.50	10.92	11.43	10.88
	Days(Av.)	7.39	5.42	5.61	6.09	5.81	4.57	4.50	5.15	5.32	5.83	5.96	5.68
	Cost(Av.)	16.39	29.25	173.11	60.67	45.17	48.45	52.54	47.39	44.26	49.65	77.46	53.71
Respiratory	Incident	1.56	1.84	2.27	1.83	2.17	1.21	2.21	1.74	1.66	3.15	2.86	2.58
	Days(Av.)	8.38	11.40	11.46	10.51	13.63	5.17	7.40	9.32	12.33	6.00	6.17	7.44
	Cost(Av.)	4.50	27.00	31.80	21.45	36.25	27.50	82.80	45.74	16.33	11.60	54.17	22.11
Diarrhea	Incident	10.13	7.96	4.55	8.04	2.98	4.02	3.54	3.57	2.21	2.73	1.43	2.29
	Days(Av.)	5.45	5.66	7.40	5.76	5.64	6.45	4.25	5.77	6.88	6.46	4.00	6.29
	Cost(Av.)	48.77	52.82	185.00	66.05	32.27	64.90	223.75	88.28	45.63	102.85	6.67	71.75
Others	Incident	6.49	7.96	10.00	7.85	6.23	6.04	9.73	6.87	8.29	7.14	11.43	8.40
	Days(Av.)	19.34	25.54	11.68	20.19	10.12	9.73	7.77	9.28	19.12	22.70	8.60	17.64
	Cost(Av.)	21.36	58.03	737.20	221.11	199.04	79.27	263.27	169.97	135.47	131.79	109.54	126.98
Total	Incident	22.86	23.47	22.27	23.01	22.76	18.91	20.35	20.51	20.72	23.11	26.19	22.90
	Days(Av.)	9.82	12.86	9.17	11.08	7.26	6.62	6.28	6.79	10.45	11.10	7.03	9.96
	Cost(Av.)	30.26	45.63	429.38	114.88	4.17	59.76	173.05	92.18	80.32	76.95	87.87	80.50
N		385	490	220	1,095	369	497	226	1,092	362	476	210	1,048

Table 6.2 — Wasting and Stunting by Sex, Flood and Round

Sex		Round 1			Exposed			All		
		Not flood	Flood	All	Not flood	Flood	All	Not flood	Flood	All
Male	Average Wasting	27.12	27.95	27.73	24.59	20.93	21.89	11.67	20	17.96
	N. Wasting	59	161	220	61	172	233	60	185	245
Female	Average Wasting	10	19.15	17.23	21.43	20.11	20.42	14.29	22.11	20.33
	N. Wasting	50	188	238	56	184	240	56	190	246
Total	Average Wasting	19.27	23.21	22.27	23.08	20.51	21.14	12.93	21.07	19.14
	N. Wasting	109	349	458	117	356	473	116	375	491
Male	Average Stunting	49.15	58.39	55.91	54.1	64.53	61.8	58.33	55.68	56.33
	N. Stunting	59	161	220	61	172	233	60	185	245
Female	Average Stunting	50	51.6	51.26	53.57	61.96	60	44.64	59.47	56.1
	N. Stunting	50	188	238	56	184	240	56	190	246
Total	Average Stunting	49.54	54.73	53.49	53.85	63.2	60.89	51.72	57.6	56.21
	N. Stunting	109	349	458	117	356	473	116	375	491

Table 6.3 — Wasting and Stunting by Category of Expenditure

Category of expenditure		Not exposed			Round 2			Round 3		
		Not exposed	Exposed	All	Not exposed	Exposed	All	Not exposed	Exposed	All
Bot 40%	Average Wasting	19.57	25.26	24.15	27.45	22.51	23.55	10.64	20.94	18.91
	N. Wasting	46	190	236	51	191	242	47	191	238
Mid 40%	Average Wasting	14.89	21.3	19.35	14.29	20.75	18.71	14.29	23.97	21.18
	N. Wasting	47	108	155	49	106	155	49	121	170
Top 20%	Average Wasting	31.25	19.61	22.39	35.29	13.56	18.42	15	15.87	15.66
	N. Wasting	16	51	67	17	59	76	20	63	83
Total	Average Wasting	19.27	23.21	22.27	23.08	20.51	21.14	12.93	21.07	19.14
	N. Wasting	109	349	458	117	356	473	116	375	491
Bot 40%	Average Stunting	52.17	63.16	61.02	52.94	68.06	64.88	46.81	64.4	60.92
	N. Stunting	46	190	236	51	191	242	47	191	238
Mid 40%	Average Stunting	46.81	43.52	44.52	55.1	56.6	56.13	57.14	47.93	50.59
	N. Stunting	47	108	155	49	106	155	49	121	170
Top 20%	Average Stunting	50	47.06	47.76	52.94	59.32	57.89	50	55.56	54.22
	N. Stunting	16	51	67	17	59	76	20	63	83
Total	Average Stunting	49.54	54.73	53.49	53.85	63.2	60.89	51.72	57.6	56.21
	N. Stunting	109	349	458	117	356	473	116	375	491

data collection and a year after the flood, 64.4 percent of them were still stunted (Table 6.3).

ENERGY DEFICIENCY OF WOMEN

There was a large improvement in the percentage of energy deficient young women between the first and the last round (from 66.3 percent to 56.4 percent). This improvement was not the same across expenditure categories. Even a year after the flood, 70.1 percent of poor women in the bottom 40 percentile were still energy deficient, compared to less than 50 percent of rich women in the top 20 percentile (Table 6.4).

The nutritional status of older women between the age of 19 and 49 years of age showed a less marked difference between rounds. Still, the percentage of energy deficient women decreased from 58.7 percent in the first round to 53.4 percent in the last round. In this case as well, there was a marked difference between richer and poorer women. Almost 60 percent of poor flood-exposed women were still energy deficient a year after the flood, compared to 48 percent of rich non flood-exposed households.

Table 6.4 — Chronic Energy Deficiency of Women 13-18 Years of Age by Category of Expenditure, Flood Exposure and Round

Category of expenditure	Round 1			Round 2			Round 3		
	Not exposed	Exposed	All	Not exposed	Exposed	All	Not exposed	Exposed	All
Bot 40% Average Deficiency	75	70	71.62	72.22	70.83	71.21	73.33	70	70.91
Number	24	50	74	18	48	66	15	40	55
Mid 40% Average Deficiency	80	58.7	65.15	78.26	60.47	66.67	69.57	43.4	51.32
Number	20	46	66	23	43	66	23	53	76
Top 20% Average Deficiency	44.44	63.64	60.38	40	68	63.33	33.33	52.08	49.12
Number	9	44	53	10	50	60	9	48	57
Total Average Deficiency	71.7	64.29	66.32	68.63	66.67	67.19	63.83	53.9	56.38
Number	53	140	193	51	141	192	47	141	188

7. ASSET OWNERSHIP AND DISPOSAL

Almost all households reported having at least one house (main house). More than 80 percent of the houses were roofed either with tiles, tin or concrete, and the roofs of the remaining houses (18 percent) were covered either with bamboo, chhan, leaves or jute sticks. Slightly less than half of the households owned trees, 40 percent owned some type of agricultural assets and several owned some type of livestock such as cattle (48.8 percent), goats and sheep (24.0 percent) and chicken (80.9 percent). Almost all households owned domestic assets and almost half had jewelry, but few of them had any form of transportation (15.9 percent) or other amenities like radios and clocks (24.8 percent).

The damage caused by the flood to houses and trees was quite extensive for flood-exposed households. Between the period before and after the flood, the value of the houses went down from Taka 26,476 to Taka 21,902 and the number of trees owned by the households went down from 43.0 to 24.4.

The losses suffered in terms of livestock were also significant, particularly for goats, sheep and chicken. The loss of cattle, however, was not very large. The average number of cattle owned by all the households in the seven flood affected areas went down slightly after the flood, and a year after the flood, it was almost the same as before the flood. It is not possible to say the same thing for goats, sheep and chicken. Households exposed to the flood did not have the same number of small livestock as before the flood. Before the flood, 25.4 percent of flood exposed households owned on average 1.8 goats or sheep, 20.9 percent owned 1.6 heads soon after the flood, and a year after the flood, only 21.9 percent owned 1.7 heads each. Similarly, 82.2 percent of flood exposed households each owned 7.1 chickens before the flood, 77.8 percent owned 4.9 chicken during the flood, while after the flood, 82.9 percent had still an average of only 4.8 chicken (Table 7.1).

Poor people were more affected by the flood because they owned a smaller stock before the flood and had a more difficult time to recover the same level of assets they had

before the flood. Only 38.9 percent of flood exposed households in the bottom 40 percentile owned any cattle. In this welfare category, many more owned chicken, but a year after the flood 78.8 percent owned an average of 4.3 chicken compared to 80.1 percent with 6.5 chicken before the flood (Table 7.2). In comparison, 48.8 percent of flood exposed households in the middle 40 percentile owned any cattle and a year after the flood were able to increase slightly the number of cattle. Also, the percentage of households in this category owning chicken marginally increased from 85.0 percent before the flood to 86.4 percent after the flood, rebounding from 80.7 percent during the flood, even though the number of chicken was still lower than before. The households in the top percentile that were exposed to the flood had more access to cattle and were able to rebound better from the low point of the flood.

Consumption and disposal of assets has been mentioned to be a very important coping strategy for households exposed to the flood. It is not uncommon for rural households to meet consumption requirements by selling off parts of their assets. The consumption of chicken increased a lot between round one and round two and between round two and three, compared to the period of the flood; 38.6 percent of the households consumed chicken and 24.25 sold chicken, compared to 7.0 percent and 6.5 percent respectively in the period of the flood (July to October, 1998). This is explained by the large percentage of households that suffered loss of chicken in the period of the flood (17.8 percent). Similar observations can be made for cattle; the percentage of households selling cattle increased after the end of the first round of the survey. In this case as well, only households that had cattle available were able to sell them, even though in this case cattle sales might be also an indication of a distress sale aimed at recuperating cash to pay off debts contracted in the period of the flood.

Our findings seem to indicate that while it is generally reported that households in periods of stress try to sell their assets to get enough cash to maintain the same level of expenditure, the loss of assets due to the flood constrained the households both in their consumption and sales of assets.

Table 7.1 — Ownership of Asset, Mean Quantity and Mean Estimated Value of Asset by Asset Category before the Flood, at Round 1, Round 2 and Round 3 -Households Exposed to the Flood

Asset Category	Pre-Flood			Round 1			Round 2			Round 3		
	Households (%)	Quantity	Value									
House	97.78	2.81	26,476.04	97.78	2.04	21,902.08	97.94	2.06	22,085.65	97.69	2.1	22,734.39
Large Tree	47.41	43.02	10,961.47	47.41	24.38	7,466.25	49.53	23.23	7,735.11	50.00	22.6	7,863.53
Cereal	39.63	204.62	2,737.22	32.22	63.85	949.27	56.64	226.09	3,340.36	56.35	144.6	3,408.73
Cattle	46.67	2.10	8,720.85	45.37	1.92	8,091.43	45.23	1.96	8,167.32	45.96	1.9	7,823.26
Goat/sheep	25.37	1.80	986.71	20.93	1.59	909.42	21.31	1.63	918.11	21.92	1.7	1,021.15
Chicken	82.22	7.14	441.70	77.78	4.85	307.35	80.37	4.75	316.15	82.88	4.7	308.37
Duck	43.52	6.35	485.95	34.07	4.20	277.39	35.14	3.52	241.52	43.27	3.5	216.34
Agricultural cheap assets	39.26	4.13	365.72	39.26	4.06	361.39	39.81	4.04	357.77	39.62	4.0	349.14
Agricultural valuable assets	3.15	2.32	17,648.18	3.15	2.29	16,764.71	3.18	2.29	16,764.71	3.27	2.2	16,611.77
Fishing	30.74	2.10	2,669.32	30.74	2.01	2,555.29	29.16	2.00	2,499.47	30.96	2.6	2,257.54
Motorcycle	0.74	1.06	20,262.50	0.74	1.00	19,950.00	0.75	1.00	19,950.00	0.77	1.0	21,234.66
Transport	14.07	1.29	2,811.18	14.07	1.29	2,791.45	14.39	1.25	2,712.34	14.42	1.2	2,841.13
Households cheap assets	93.89	16.64	1,969.62	93.89	16.15	1,894.72	95.33	16.57	1,866.24	95.58	17.4	1,816.98
Households Valuable assets	27.41	1.05	1,902.39	27.41	1.03	1,874.32	28.22	1.10	2,020.44	29.23	1.1	2,052.62
Radio/watch	24.26	1.49	713.40	24.26	1.49	713.40	24.67	1.55	718.95	25.00	1.5	713.58
TV	4.26	1.00	4,900.00	4.26	1.00	4,900.00	4.67	1.00	4,950.75	5.00	1.0	4,979.97
Jewelry	42.96	2.94	2,937.16	42.96	2.94	2,937.16	45.05	2.99	2,907.68	46.54	2.9	2,935.87
Others	12.59	3.16	1,249.21	12.59	2.74	1,188.53	16.07	2.77	1,864.90	19.23	2.9	1,839.45
All	100.00		43,594.49	100.00		35,831.27	100.00		37,894.89	100.00		38,668.50
Number	540			540			535			520		

Source: FMRSP-IFPRI Household Survey 1998-99

Table 7.2 — Ownership of Asset, Mean Quantity and Mean Estimated Value of Asset (taka) by Asset Category of Households in the Bottom 40 Percentile of per Capita Expenditure, Before the Flood, at Round 1, Round 2 and Round 3 - Households Exposed to the Flood

Asset Category	Pre-Flood			Round 1			Round 2			Round 3		
	Households	Quantity	Value									
	(%)			(%)			(%)			(%)		
House	97.35	2.54	14,643.58	97.35	1.76	11,658.64	97.32	1.79	11,744.03	96.7	1.83	11,870.08
Large Tree	42.48	42.23	7,127.63	42.48	25.40	4,754.27	45.09	24.13	4,950.81	44.2	22.76	5,084.53
Cereal	31.86	184.80	2,386.62	25.22	24.76	367.04	51.79	113.17	1,979.53	49.7	74.86	1,887.22
Cattle	38.94	1.97	7,901.22	38.05	1.78	7,213.95	36.61	1.80	7,294.18	37.7	1.78	6,789.21
Goat/sheep	25.66	1.78	1,031.43	19.91	1.64	947.22	20.98	1.70	929.96	23.5	1.74	1,089.42
Chicken	80.09	6.49	416.13	74.34	3.94	274.88	78.13	4.19	285.54	78.8	4.27	298.03
Duck	42.48	7.69	580.39	28.76	5.92	389.38	29.91	4.37	290.98	38.7	3.93	217.20
Agricultural cheap assets	34.96	4.02	337.43	34.96	3.94	330.82	35.27	3.91	326.96	35.0	4.11	306.45
Agricultural valuable assets	1.33	1.00	14,566.67	1.33	1.00	14,566.67	1.34	1.00	14,566.67	1.3	1.00	14,566.67
Fishing	26.99	2.61	1,883.16	26.99	2.48	1,824.15	25.89	2.47	1,778.84	27.1	3.75	1,856.09
Motorcycle	0.44	1.25	6,250.00	0.44	1.00	5,000.00	0.45	1.00	5,000.00	0.4	1.00	10,138.64
Transport	7.52	1.01	3,023.53	7.52	1.00	2,935.29	8.04	1.00	2,855.56	8.7	1.00	2,945.51
Households cheap assets	94.69	14.17	1,073.69	94.69	13.62	971.75	94.64	13.85	951.46	94.4	14.44	931.87
Households Valuable assets	18.58	1.06	1,965.55	18.58	1.02	1,923.81	19.20	1.02	1,918.60	19.3	1.02	1,928.57
Radio/watch	11.95	1.41	983.52	11.95	1.41	983.52	12.05	1.41	972.41	11.5	1.36	1,001.04
TV	0.44	1.00	5,200.00	0.44	1.00	5,200.00	0.45	1.00	5,200.00	0.4	1.00	5,200.00
Jewelry	37.61	2.04	737.94	37.61	2.04	737.94	38.84	2.10	781.51	40.0	2.10	788.59
Others	13.72	2.61	755.16	13.72	2.42	710.00	16.07	2.31	939.17	17.5	2.79	999.42
All	100.00		25,517.43	100.00		20,123.89	100.00		20,748.75	100.0		20,818.35
Number	226			226			224			21		

Note: Mean Values Refer to Households That Own Those Assets.

Source: FMRSP-IFPRI Household Survey 1998-99

Table 7.3 — Percentage of Household Disposing Assets and Average Quantity Disposed (Disposed Includes Consumption, Sell and Loss)

Asset Category	Round 1				Round 2		Round 3			
	January-June98		July-October		November		Households	Quantity	Households	Quantity
	Households	Quantity	Households	Quantity	Households	Quantity				
Consume										
Cereal (Kg)	25.76	358.73	24.83	202.37	22.32	76.46	28.13	316.05	43.19	176.63
Cattle (N.)	0.13	1.00	-		0.40	1.00	0.53	1.09	-	
Goat/sheep (N.)	-		0.26	0.75	-		0.27	0.63	0.14	1.00
Chicken (N.)	8.85	3.29	7.00	3.20	7.40	1.81	21.33	2.83	38.56	2.04
Duck (N.)	0.40	2.67	0.79	1.67	1.06	1.13	5.33	1.64	6.13	1.47
Sold										
House (N)	-		0.13	1.00	-		0.40	1.00	0.14	1.00
Large tree (N)	-		2.25	7.12	0.40	1.33	2.80	2.71	2.59	3.53
Cereal (Kg)	-		0.66	219.43	0.92	77.25	1.33	178.21	6.68	382.82
Cattle (N)	-		2.51	1.26	1.85	1.15	12.27	1.16	9.95	1.18
Goat/sheep (N)	0.13	1.00	1.85	2.02	1.32	1.33	5.33	1.48	6.68	1.38
Chicken (N)	0.26	11.25	6.47	4.44	7.13	3.24	11.73	3.57	24.25	2.49
Duck (N)	0.13	4.00	1.85	4.07	1.59	5.60	4.93	3.05	5.04	3.49
Fishing (Kg)	-		0.13	1.00	0.13	103.00	0.67	2.00	1.23	1.00
Households cheap Assets (N)	-		0.26	3.00	0.26	250.50	0.13	9.00	0.27	1.00
Jewelry (N)	-		0.26	1.50	-		-		0.54	1.50
Lost										
House (N)	-		0.53	1.00	-		1.20	2.11	0.27	1.50
Large tree (N)	-		7.27	14.00	1.59	126.75	0.53	1.75	0.54	2.25
Cereal (Kg)	0.13	33.00	0.53	110.48	-		-		-	
Cattle (N)	0.13	1.00	2.64	0.98	0.66	0.68	0.40	1.42	3.41	0.84
Goat/sheep (N)	0.13	0.25	3.30	1.26	0.40	1.00	0.27	2.63	1.77	0.92
Chicken (N)	0.40	4.50	17.83	4.64	0.79	3.54	2.80	2.98	25.34	2.17
Duck (N)	-		10.44	7.34	1.06	2.88	1.60	2.35	3.41	1.62
Fishing (Kg)	-		-		-		1.20	2.11	0.82	3.67
Number	757		757		757		757		757	

Source: FMRSP-IFPRI Household Survey 1998-99

8. BORROWING STRATEGY

Borrowing to purchase food and to fund other expenses (such as education and health, farming, business, repayment of loans, marriage and dowry, purchases and mortgage of land/agricultural equipment purchases, etc.) has been the most important coping strategy employed by households in Bangladesh after the flood. The percentage of households taking loans peaked at approximately 28 percent in October, 1998, declined after the *aman* harvest in December, increased again up to 22 percent in February and March, 1999, followed by a decrease at the time of the *boro* harvest in April and increased again to 16 percent in October, 1999 (Table 8.1). This means that while the initial increase in the borrowing was due to the flood, even though the economic conditions improved, households still had to borrow money in order to cover their needs, especially for food.

During the flood period, 51.3 percent of households surveyed in round one borrowed money, and 34.7 percent of those households borrowed money for food at the peak of the flood. Right after the flood (November-December, 1998), only 31.2 percent of households surveyed took a loan and 15.9 percent took a loan for food purposes. During the period January-June, 1999, there appears to be a rise in the percentage of households who took loans (58.8 percent), but this rise seems to be driven by an unprecedented surge in loans for farming purposes (14.3 percent), business purposes (7.5 percent) and for repaying loans (5.3 percent). Also, the average amount of loans taken out for farming, business, repayment of loans, purchase of land and agricultural equipment/mortgage of land exceeds the average amount of loan taken out for food. For instance, during January-June, 1999, the average amount of credit borrowed for food is 2,203 Taka, whereas for capital investments in farming it is 4,189 Taka, for business loans it is 7,245 Taka, for repayment of loan it is 8,277 Taka and for purchase for land and agricultural equipment, it is 10,344 Taka.

Table 8.1 — Percentage of Households Taking a Loan and Average Loan Amount by Welfare Category and Flood Exposure

Time of Loan Taken	Exposed to the flood in 1998	Bottom 40%		Mid 40%		Top 20%		All	
		Hh taking loan (%)	Average Amount (Taka)	Hh taking loans (%)	Average Amount (Taka)	Hh taking loan (%)	Average Amount (Taka)	Hh taking loans (%)	Average Amount (Taka)
Until Dec, 97	Not exposed	12.9	8,285.50	17.71	9,316.67	34.0	16,071.43	19.35	11,322.74
	Exposed	12.3	5,367.86	10.63	25,421.74	14.9	18,653.33	12.22	15,375.76
	All	12.5	6,135.66	12.87	26,236.40	20.5	23,547.83	14.27	13,799.58
	N	30		303		15		757	
Jan-June, 98	Not exposed	25.9	3,209.09	30.21	9,733.93	25.0	8,820.00	27.65	7,189.17
	Exposed	32.3	3,820.83	28.50	5,300.00	26.1	18,900.00	29.63	7,014.38
	All	30.6	3,677.66	29.04	6,710.80	25.8	16,247.37	29.06	7,062.05
	N	30		303		15		757	
July-Oct, 98	Not exposed	54.5	2,437.84	33.33	5,719.36	40.9	7,044.44	42.40	4,423.28
	Exposed	60.6	3,534.31	50.24	4,641.11	51.4	6,959.29	54.81	4,567.16
	All	59.0	3,267.76	44.88	4,892.43	48.3	6,980.00	51.25	4,532.68
	N	30		303		15		757	
Nov-Dec, 98	Not exposed	24.6	2,807.00	23.96	3,767.83	27.2	9,358.33	24.88	4,638.18
	Exposed	30.5	2,602.79	32.85	3,685.15	42.0	5,519.11	33.70	3,740.45
	All	29.0	2,649.74	30.03	3,705.82	37.7	6,327.37	31.18	3,949.67
	N	30		303		15		757	
Jan-June, 99	Not exposed	46.7	3,901.62	47.92	3,855.98	61.3	13,324.07	50.23	6,195.32
	Exposed	69.4	4,663.55	59.90	5,990.42	51.4	9,271.93	62.22	5,934.84
	All	63.7	4,516.72	56.11	5,409.45	54.3	10,574.41	58.78	5,999.23
	N	30		303		15		757	
July-Dec, 99	Not exposed	36.3	3,186.67	32.29	8,475.55	34.0	18,811.33	34.10	8,426.50
	Exposed	53.5	3,922.75	44.93	5,376.45	44.8	7,513.27	48.52	5,119.40
	All	49.1	3,773.55	40.92	6,113.12	41.7	10,161.25	44.39	5,852.11
	N	30		303		15		757	

Source: FMRSP-IFPRI Household Survey 1998-99

During the flood, between July and October, 1998, in the bottom 40 percent category, 60.6 percent of households exposed to the flood borrowed 3,534 Taka, whereas 54.6 percent of households not exposed to the flood borrowed 2,438 Taka. During the floods, in the top 20 percentile, a lower percentage (40.9 percent) of households took higher amounts of loans (7,044 Taka) compared to households in the lower welfare category. Irrespective of expenditure category, households exposed to the floods are likely to borrow more money than if they have not been exposed to the floods, poorer households are likely to continue to borrow money also after the flood (69.5 percent in the period between January and June, 1999) compared to the households in the top 20 percentile, who are less likely to borrow, but borrow in larger amounts.

Households in the bottom 40 percentile and exposed to the flood have taken out the most loans for food during the flood. 47.8 percent of exposed households in the bottom 40 percent welfare category have taken average food loans of 1,720 Taka, compared to 29.9 percent of exposed households in the top 20 percentile category who have borrowed food loans averaging 2,876 Taka. Immediately after the flood, there was a decline in the percentage of households who took loans, but as observed before, there was an increase in the percentage of households who had borrowed money for farming and business purposes.

While the percentage of households taking food loans significantly declined in January-June, 1999, the percentage of households (exposed to the flood and in the bottom 40 percentage) taking farming loans rose 5 times (from 3.1 to 15.5 percent) since the flood. For not-exposed households in the bottom 40 percentile category, the corresponding rise was from 6.5 percent to 11.7 percent. Even in the top 20 percentile category, the percent of households who borrowed for farming has increased from 7.5 percent (in the floods) to 17.8 percent (during Jan-June 1999). The other notable thing is the increase in exposed and poor households who borrowed to repay loans (from 0.9 to 7.96 percent).

Table 8.2 — Annual Interest Rate by Source of Loan and Time Period

Source of Loan	Until Dec, 97		Jan-June, 98		July-Oct, 98		Nov-Dec, 98		Jan-June, 99		July-Dec, 99	
	Hh taking		Hh taking		Hh taking		Hh taking		Hh taking		Hh taking	
	Loans (%)	Interest Rate	Loans (%)	Interest Rate	Loans (%)	Interest Rate	Loans (%)	Interest Rate	Loans (%)	Interest Rate	Loans (%)	Interest Rate
INSTITUTIONAL												
Big NGO	5.56	17.25	12.73	12.76	5.41	12.86	7.63	11.44	6.97	12.67	7.44	12.98
Comm. bank	13.89	13.45	4.09	12.47	4.64	13.38	13.98	9.64	6.74	-	2.68	8.28
Coop	5.56	32.55	4.55	48.78	6.19	74.28	2.12	32.28	5.39	41.91	4.17	24.88
Total	23.07	21.26	20.91	22.04	15.46	42.47	23.73	12.24	18.65	24.50	13.99	18.14
NON- INSTITUTIONAL												
Mahajan	7.41	39.17	15.45	67.41	18.04	46.35	9.75	64.13	13.93	-	10.71	33.64
Neighbors	51.85	13.54	36.82	75.16	49.48	83.65	44.49	36.47	35.96	52.21	36.01	35.70
Relatives & others	31.48	7.26	29.55	58.27	36.86	45.06	26.69	19.43	43.15	22.93	44.05	19.56
Total	81.48	23.12	80.12	66.95	86.34	34.79	80.93	56.26	81.89	35.28	88.98	26.36
N	108		220		388		236		445		336	

Source: FMRSP-IFPRI Household Survey 1998-99

Table 8.2 reports the source and cost of the loans. It turns out that households borrowed mostly from non-institutional sources such as friends and neighbors rather than from NGOs and banks. During the flood period, 42 percent of households borrowed for food from their neighbors and a similar number borrowed from neighbors for education and health. NGOs and banks seem to be lending primarily for farming and business investments rather than for food, education/health and other reasons.

The interest rate for institutional loans was 21 percent before December, 1997, but in the following periods, the average interest rate went up to 42 percent. The interest rate for non-institutional loans, on the other hand, was much higher for the same periods. In fact, it is interesting to note that during the flood (June-September, 1998), the informal interest rate was 67 percent. Immediately after the flood, the informal interest rate declined to 35 percent and then went up to 56 percent and then went down to 35 percent in January to June, 1999 and down to 26.36 percent in the period up to December, 1999. The primary data thus confirms that it is typical for the borrowers to be exploited by the non-institutional lenders where the informal interest rates are in excess of the formal interest rate.

The level of debt after the flood (November, 1998) was the highest with 66 percent of the households holding an average of 7,937 Taka in outstanding debt. By May, 1999, the percentage of households with outstanding debt had progressively decreased to 61 percent and by November, 1999, further decreased to 54 percent. Among them, the percentage of households with food debt declined from 30 percent in November 1998 to 14.8 percent in November 1999.

The percentage of households with outstanding debt one year after the flood, reported in Table 8.3, decreased progressively, irrespective of flood exposure. For instance, 66.3 percent of households had outstanding debt in November, 1998, but this number decreased to 53.6 percent in November, 1999. Nevertheless, even though the percent of poor households exposed to the flood with outstanding debts decreased from 75 percent to 64 percent, it is still higher than that of richer households (52 percent).

Table 8.3 — Percentage of Households with Outstanding Loans and Average Amount of Debt by Time Period, by Welfare Category and Flood Exposure

Period	Exposed to the flood in 1998	Bottom 40%		Mid 40%		Top 20%		All	
		Hh having outstanding (%)	Average amount (Taka)	Hh having outstanding (%)	Average amount (Taka)	Hh having outstanding (%)	Average Amount (Taka)	Hh having outstanding (%)	Average Amount (Taka)
Upto Dec, 97	Not exposed	7.79	11,957.50	10.42	14,455.00	27.27	21,591.67	12.90	16,978.39
	Exposed	7.52	8,263.94	7.25	34,090.67	10.28	25,681.82	7.96	21,729.00
	All	7.59	9,227.48	8.25	26,236.40	15.23	23,547.83	9.38	19,855.52
Upto Nov, 98	Not exposed	66.23	4,367.94	53.13	9,751.96	54.55	10,564.58	58.06	7,727.50
	Exposed	75.22	5,375.29	65.22	7,257.34	66.36	15,737.75	69.63	8,007.77
	All	72.94	5,142.83	61.39	7,941.35	62.91	14,430.84	66.31	7,937.42
Upto May, 99	Not exposed	50.65	3,910.51	50.00	4,573.65	54.55	15,954.17	51.15	6,801.31
	Exposed	68.58	4,464.84	64.25	5,552.55	56.07	9,216.67	64.44	5,699.83
	All	64.03	4,353.40	59.74	5,292.95	55.63	11,141.67	60.63	5,966.20
Upto Nov, 99	Not exposed	46.75	3,838.89	39.58	7,368.84	45.45	17,176.00	43.32	8,103.58
	Exposed	64.16	3,991.35	53.62	7,142.43	52.34	9,011.96	57.78	6,013.54
	All	59.74	3,961.02	49.17	7,200.17	50.33	11,160.39	53.63	6,497.44

Source: FMRSP-IFPRI Household Survey 1998-99

9. GOVERNMENT TRANSFERS

There are several relief programs the government usually operates throughout the year to help the poor and food insecure households. In the period during and after the flood, the government used the programs available to help poor and flood-exposed households.

TARGETING BY WELFARE CATEGORIES AND FLOOD EXPOSURE

The Gratuitous Relief (GR) and Vulnerable Group Feeding (VGF) programs were the largest programs in terms of coverage (particularly for bottom the 40 percent of the households) in the sample areas. The distribution transfer programs, presented in Tables 9.1 and 9.2, shows that in round one about 31 percent of the households in the bottom 40 percentile received transfers of GR grain (mainly rice) worth Taka 158 per household, and the same percentage of households received VGF grain (both wheat and rice) worth Taka 319 per household. On the other hand, the percentage of the poor households receiving transfers from VGF programs remains at the same level in both round one and round two, but the average value of transfer per household increased from Taka 319 in round one to Taka 531 in round two, when the program was in full swing. In the third round, when the program became much smaller in scope, the percentage of households receiving VGF transfers became very small.

The number and percentage of households exposed to flood who received some kind of transfers declines over the period and similar results were observed within each round. The VGF program achieved larger coverage for flood-exposed households with larger transfers per household in round two relative to round one and round three. The best target program towards flood-exposed households at the time of the flood was the GR program. Only 10 percent of GR recipients, compared to 19.3 percent of VGF recipients were not directly exposed to flood in round one.

Table 9.1 — Percentage of Households Receiving Total Transfers and Average Value (Kg) by Type, Welfare Category and Round

Code of revenue	Round 1				Round 2				Round 3															
	Bot 40%	Mid 40%	Top 20%	All	Bot 40%	Mid 40%	Top 20%	All	Bot 40%	Mid 40%	Top 20%	All												
	% of Averag Hh Value	% of Average Hh Value	% of Average H Value	% of Average Hh Value	% of Averag Hh Value	% of Averag Hh Value	% of Average Hh Value	% of Average H Value	% of Average Hh Value	% of Average H Value	% of Average Hh Value	% of Average Hh Value												
FFE	-	0.33	509.25	-	0.13	509.25	12.8	321.14	7.26	332.05	3.31	298.20	8.8	323.04	5.94	403.45	6.9	312.75	2.65	267.53	5.86	346.51		
Stipen	1.32	177.50	3.63	257.50	5.3	395.00	3.04	291.41	1.32	191.25	2.31	77.7	6.62	101.40	2.8	110.62	3.30	203.33	6.6	276.33	11.9	353.96	6.54	290.24
GR	30.6	158.29	22.4	175.62	15.8	168.65	24.4	166.01	1.98	243.14	2.31	55.2	1.32	325.95	2.0	166.51	3.30	136.42	0.6	113.65	-	-	1.63	132.63
TR	5.28	165.55	7.92	362.59	3.9	271.17	6.08	282.13	0.66	293.98	0.33	3,256.11		0.4	1,281.36	-	-	-	-	-	-	-	-	-
VGF	31.0	319.46	20.1	342.01	6.6	239.25	21.8	322.94	30.3	530.81	24.4	565.14	11.9	520.75	24.6	543.63	10.5	203.01	9.9	178.68	3.97	164.01	9.26	188.83
VGD	3.96	866.09	1.98	739.63	1.3	212.68	2.64	762.81	4.95	623.76	1.98	548.54		2.8	602.27	7.26	612.21	1.6	569.45	1.32	522.47	3.95	598.65	
ONG Ass	11.5	318.29	9.24	285.26	12.5	459.67	10.8	339.77	1.32	781.18	0.99	1,355.00		0.9	1,027.10	1.65	564.00	1.9	374.00	-	-	1.50	460.37	
OGO Ass	-	-	-	-	-	-	-	-	-	3.63	2,060.40	1.32	1,994.38	1.99	1,608.50	2.4	1,970.41	-	0.3	350.00	0.66	1,120.00	0.27	735.00
Total	60.4	255.56	48.5	278.05	37.0	295.25	50.9	269.88	51.8	578.61	34.3	539.38	23.8	462.65	39.7	550.82	30.3	340.72	25.4	276.62	22.0	341.63	27.2	316.18
N	303	303	15	757	303	303	303	151	74	303	30	151	734	303	30	151	734							

TRANSFER OF COMMODITIES BY WELFARE CATEGORIES AND FLOOD EXPOSURE

Rice, wheat and cash transfers were crucial during the flood, but were vital for the poorest households six months and one year after the flood, especially given the fact that many households had borrowed large sums of money and had not repaid their loans yet. During and after the flood, there was a growing belief that direct cash transfers and small transfers to the poor could have been an effective short-term instruments to increase their purchasing power. These strategies, that favored cash transfers and small transfers (like the GR) are reflected in the pattern of relief activities that prevailed in the immediate post-flood period.

IMPACT OF TRANSFERS ON FOOD CONSUMPTION

The average size of consumption expenditure of households not receiving transfers was higher than that of receiving households in all the periods. The budget shares of rice, wheat, pulses, oil and vegetables were higher for households receiving transfers in the third period. Per capita calorie consumption of households receiving transfers increased from 2,088 Kcal in round one to 2,286 Kcal in round two and decreased slightly to 2,121 Kcal in round three.

10. CONCLUSIONS

The flood of 1998 had a devastating impact on Bangladesh and on the lives of rural households. The people in rural Bangladesh suffered a lot in the period of the flood and they have been able to survive by modifying their consumption pattern and by using a variety of means and coping strategies, but a year after the flood they were still repaying debts that had been contracted to maintain a similar level of expenditure despite severe losses to assets and income. The level of the outstanding debts of many households were very high and correspond roughly to half of the average one month's household expenditure. It also appears that poor households exposed to the flood had to borrow more than other households.