# Social Cohesion and Natural Disaster Loss Recovery of Households: Experience from Bangladesh

M. Jahangir Alam Chowdhury
Department of Finance, and
Center for Microfinance and Development
University of Dhaka
Dhaka – 1000, Bangladesh

e-mail: mjac (at) univdhaka.edu
Tele: +880 1979 256 715

Abstract

The study intends to assess the impact of village level social cohesion on the natural disaster recovery of households in the rural areas of Bangladesh. The main objective is to see whether a higher level social cohesion helps households to recover successfully their natural disaster losses in a village. The analysis is based on a household-level survey of 3,481 (N=3,481) households. The sample households have been selected randomly from 140 villages from the different parts of the country. The descriptive and multivariate results indicate that the village level social cohesion has a significant positive impact on the recovery of the natural disaster losses of households. However, the results also indicate that the social cohesion is less effective in terms of recovering the natural disaster losses in those villages where the natural disaster is highly covariant i.e. almost all households in the village are affected by the natural disaster.

**Key words:** Social Capital, Social Cohesion, Natural Disaster Loss Recovery and Bangladesh.

First Draft

Dhaka

January 12, 2011

# Social Cohesion and Natural Disaster Loss Recovery of Households: Experience from Bangladesh

M. Jahangir Alam Chowdhury

## 1.0 Introduction

Natural disasters increase poverty and deprivation of people of affected areas. The magnitude of these negative effects is not equal for all households in the affected areas and it varies with the wealth level of households. The negative effects of the natural disaster on assets are relatively longer term and more acute for the lowest wealth group than other wealth groups in the society. The households with a higher level of wealth incur lower rates of damage to the home. Due to the natural disaster, some of the lower strata households fall into perpetual poverty traps without having a very little hope of escaping it. The households which are poorer are less prepared to deal with natural disaster shocks. Wealthy household can rebuild their lost assets rapidly compared to other households in the same locality (Morris et. al., 2002; Skoufias, 2003; Carter et. al., 2007;).

The coping strategy of households for recovering lost assets depends on their access to local markets and institutions. The extent of recovery of lost assets also depends on the same access to local markets and institutions. If the markers are full and complete without any information asymmetry problem, all households have the same access to local markets and institutions and they can use loan and insurance contracts keeping eyes on their future earnings for coping with assets and income losses caused by the natural disasters. The loans and insurance contracts help households to rebuild their lost assets quickly and continue having the same level of consumption without reducing their existing level of productive assets and future opportunities (Carter et. al., 2007). In developing countries, markets-especially credit and insurance markets-are not full and complete and moreover, credit and insurance markets are not available in many areas in developing countries. In such a situation, households, particularly poor households, depend on informal credit and insurance markets for coping with natural disaster losses.

They depend on informal risk sharing mechanisms, such as mutual insurance, for mitigating natural disaster shocks (Coate and Ravallion, 1993; Lu, Sato and Zhang, 2008). Informal insurance works better than formal insurance in terms of monitoring contracts in a network where people often interact with each other (Besely, 2005).

The success of a household in terms of the effective utilization of informal credit and insurance contracts for recovering natural disaster losses depends on the level of social capital it posses (Fafchamps, 2006). Putnam (1995) defines social capital as the co-operation and mutually supportive relations in communities and nations. The households in a network with a higher level of social capital are expected to help each other within the network when they face adverse shocks (Fafchamps and Lund, 2002). Carter and Maluccio (2003) finds that trust at the community level, a indicator of the level of social capital, has a positive impact on the mitigation of weather shocks on the nutritional status of children in South Africa. Similarly, Mongues (2006) suggests that the social network plays a positive role in the recovery and growth of asset of households after environmental shocks in Ethiopia. Social capital deals with only the extent of social networks of mutual co-operation and supportive relations in a society. It does not incorporate the issue of the distribution of opportunities in an area. Considering this limitation of social capital, social cohesion is a broader term than social capital as it includes the distribution of opportunities on top of the aspects of social capital. Maxell (1996) defines social cohesion as "building shared values and communities of interpretation, reducing disparities in wealth and income, and generally enabling people to have a sense that they are engaged in a common enterprise, facing shared challenges, and that they are members of the same community".

There are some papers that deal with the relationship between social capital, natural disaster shocks and welfare of households. However, a gap in the literature exists in terms of linking social cohesion, natural disaster shocks and welfare of households. With the objective of making a contribution to bridging this gap, this paper intends to examine how village level social cohesion helps households in rural areas in Bangladesh to recover losses that incur from natural disasters. The structure of the paper is as follows.

Section two presents an overview of social cohesion and the methodology of constructing a social cohesion index. Section three discusses the methodology and the estimation strategy while section four describes the survey design. Section five presents the results and finally, conclusions and summary of the paper is presented in section six.

## 2.0 Social cohesion and Social cohesion index (SCI)

Dayton-Johnson (2003) defines social cohesion as a feature of a society which relies on the accumulated social capital of that society. He argues that social capital is flow of investments of individuals on different aspects of social capital and on the other hand, social cohesion is the accumulation of these investments that provide benefits at the individual and the social levels. Thus, social capital is also a feature of a society that motivates individuals to make investments in social capital by providing them higher returns to these investments and through reducing the related uncertainty. Therefore, social cohesion determines how a society "hangs together" (Maloutas and Pantelidou, 2004). Easterly, Ritzan and Woolcock (2006) defines social cohesion as the "nature and extent of social and economic division within a society". The societal divisions that arise due to income, ethnicity, religion, language, political belief and other differences are the factors that contribute to the development of societal schism which in turn reduces the social capital.

There is no single universally acceptable measure for social cohesion (von Haldenwang 2008). The European Union uses 21 indicators for measuring social cohesion. These 21 indicators belong to four categories: income, employment, education and health (EU 2005). The UN Economic Commission for Latin America and Caribbean has a broader understanding of social cohesion than EU. It distinguishes gap indicators, for example income, poverty, employment etc., from belongingness indicators, for example trust participation, participation, solidarity etc. (ECLAC 2007). The Inter-American Development Bank (IDB) constructs a social cohesion index and it consists of two dimensions: distribution of opportunities and social capital. The distribution of opportunities dimension looks at the distribution of income, the level of poverty, the size

of the middle class, access to education etc. indicators. On the other hand, the social capital dimension looks at trust, participation, conflict, crime etc. indicators (IDB 2006). Similarly, this paper constructs a social cohesion index (SCI) at the village level. This social cohesion index has been constructed after taking into consideration three dimensions of social cohesion at the village level and these dimensions are social capital, material condition, and social order. The village level social capital incorporates the number of social organizations in the village. The material condition dimension of social cohesion looks into the issue of income variations among households in the village. The social order dimension considers peace and security in the village. In order to capture this dimension of social cohesion, all sampled households were asked to give their opinion in response to a statement that "this village is peaceful and secured". All respondents gave their opinion on a 5-point scale, ranging from "strongly agree" to "strongly disagree". On the basis of the households' responses to the above mentioned statement, a household level peace and security score has been calculated for each household. In the case of an affirmative statement, the highest 5 points are awarded to a household whose response is "strongly agree" while the lowest 1 point is awarded to "strongly disagree". A village level peace and security score has been calculated though summing up scores of all households in the village. Finally, a social cohesion index is calculated for all villages incorporating above-mentioned all three dimensions of social cohesion. The value of SCI varies from 0 to 1. A higher value of SCI reflects a higher level of social cohesion in the village.

3.0 Estimation Strategy:

Using multivariate models, this paper tries to assess whether the village level social cohesion has a positive impact on the natural disaster loss recovery at the household level. The following models have been formulated for achieving the objectives of the paper.

$$Y_{ij} = \beta SCI_j + \Sigma \varphi X_{ij} + \Sigma \delta Z_j + u_i \quad (1)$$

$$Y_{ij} = \beta SCI_j + \phi COVRISK + \Sigma \varphi X_{ij} + \Sigma \delta Z_j + u_i \quad (2)$$

$$Y_{ij} = \beta SCI_j + \phi COVRISK + \lambda SCI * COVRISK + \Sigma \varphi X_{ij} + \Sigma \delta Z_j + u_i \quad (3)$$

where *Y* is the extent of natural disaster loss recovery of households, *X* and Z are vectors of some control variables at household and village level that are assumed to be exogenous (for example, education of the household head, the existence of electricity in the household, etc.), and SCI is the village level social cohesion index while *u* is the error term.

In the above mentioned multivariate models, the dependent variable is the extent of disaster loss recovery (DISASLOSS) of households. It has been calculated through dividing the total disaster loss recovery of a household by the total disaster loss of that household measured in Taka[1]. In the same model, social cohesion index (SCI) has been included on the right hand side of the model as a regressor to test whether households better able to recover their disaster losses in villages with a higher SCI. The coefficient of SCI, $\beta$, captures the impact of social cohesion at the village level on the extent of natural disaster loss recovery of households. If village level social cohesion is effective in helping households to recover disaster losses, $\beta$ is significantly positive. If it is ineffective, $\beta$ is not different from zero. Lu, Sato and Zhang (2008) argue that social capital is less effective in terms of coping natural disaster in those areas where covariant risk is very high. A variable that reflect the extent of covariant disaster risk ($COVRISK$) is added in abovementioned models 2 and 3. It is measured through dividing the number of disaster affected households by total number of households in the village. A higher value of this ratio reflects that the natural disaster is highly covariant. If $\phi$ is significantly positive, it reflects that a higher level of covariant risk helps households to recover their disaster losses at a higher extent, and vice versa. Following Lu, Sato and Zhang (2008), a interaction term, $SCI * COVRISK$, has been introduced in model 3 to understand the role of social cohesion in villages where the covariant risk of natural disaster is higher. The coefficient of this variable, $\lambda$, is expected to be negative as households are less likely to

[1] Taka is the currency of Bangladesh. The current exchange rate is approximately 1 USD = Taka 71.

help each other in a village where almost all households are affected by the natural disaster.

Besides incorporating *SCI* and *COVRISK* on the right side of the model, other regressors related to characteristics of households and villages have been incorporated to control for their impacts on the extent of natural disaster loss recovery of households. These other regressors are: two dummy variables that are related to the employment status of household heads: agriculture (EMPAG) and daily labor (EMPDL); one variable related to the total number of household members (MEMBERS); two variables related to the demographic information on household heads: age (AGE) and sex (MALE); one variable that are associated with the education level of the household head (EDUHEAD); one variable related to the religion of the household (MUSLIM); two variables on the size of household land ownership: irrigated land (LANDIRR), and non-irrigated land (LANDNIRR); two variables on the size of household non-land assets: productive assets (PASSETS) and livestock (LSTOCK); one variable on the income level of households (INCPC); two dummy variables on survey areas: flood affected area (FLOOD) and cyclone affected area (SIDR); seven village level variables: distance of a household from the nearest paved road (ROAD), distance of a household from the nearest school (SCHOOL), existence of electricity (ELECTRICITY), extent of river erosion in the village (RIVERERO), number of households (NHHS), number of homeless people (HOMELESS), and the number of persons migrated (MIGRATION); and finally, three variable related to the size of household loans: total amount of loans from commercial banks (LOANCB), total amount of loans from microfinance institutions (LOANMFI), and total amount of loans from local community based organizations (LOANCBO).

## 4.0 Data:

The analysis is based on a household-level survey of randomly selected two thousand six hundred and eighty (*N=2680*) households from 140 villages in different parts of the country. Besides information on social cohesion, and natural disaster loss and recovery, the survey collected detailed information from all households on a variety of other factors

such as demographic information (age, sex, marital status, etc.) and socio-economic information (education, employment, food consumption, expenditure on health, assets, microcredit etc.). The survey also collected detailed village level information such as the distance of a household from the nearest primary school, secondary school, market and district headquarters, along with variables describing village infrastructure such as the presence of schools, markets, roads, electricity, etc.

## 5.0 Results

Table 1 illustrates the descriptive statistics of disaster loss and disaster loss recovery of households by the socio-economic status of households. During the last natural disaster, the hardcore poor households on an average lost assets and economic opportunities of Taka 23,600. During the same period of time, these households had total non-land assets of Taka 41,500. These estimates indicate that the total loss of hardcore poor households was 57 percent of their total non-land assets. The extent of the disaster loss of poor households was 48 percent as their total loss and total non-land assets were Taka 34,500 and Taka 71,300 respectively. The extent of the same loss as percentage of total non-land assets further declines for non-poor households as it goes down to 22 percent. The total disaster loss of non-poor households during the last natural disaster was Taka 49,400 and the total value of all non-land assets was Taka 221,400. These results indicate that the vulnerability of poor households to natural disasters is higher than non-poor households as their average loss as percentage of average total non-land assets is higher than that of non-poor households.

The extent of total disaster loss recovery of households is presented in Table 2. The total disaster loss recovery of hardcore poor households was Taka 4,200. These household could only recover 18 percent of their total disaster loss of the last natural disaster. In case of non-poor households, the total loss recovery was Taka 5,800 and it was 17 percent of the total disaster loss. The total loss recovery of non-poor households went up to Taka 7,400 and it was 15 percent of the total loss. These results illustrate that the extent of disaster loss recovery varies with the socio-economic status of households.

Relatively, the poor households are better off than non-poor households as their disaster loss recovery is higher compared to that of non-poor households. The reason might be that the major portion of the disaster loss of non-poor households comes from the agricultural sector. The crop loss is main disaster loss of non-poor households and this loss is not recoverable as there is no crop insurance available in rural areas of Bangladesh and the government does not compensate households for the crop loss. For poor households, the major portion of the disaster loss comes from the damage of the house. Usually houses of poor households are less strong than non-poor households. For this reason, the probability of experiencing house damage is higher for poor households than non-poor households. The government agencies and non-government organizations (NGOs) usually provide materials for house repairing after any natural disaster in Bangladesh. This might be one of the reasons behind having a higher extent of disaster loss recovery by poor households compared to non-poor households.

Table 3 presents the average total amount of disaster loss and disaster recovery by survey areas. The highest average household disaster loss comes from the SIDR area. In this area, households lost assets and income of an average amount of Taka 42,044 due to cyclone SIDR and they could only recover Taka 6,200 of the loss. The extent of the recovery of the disaster loss was 15 percent in this area. In the flood area, the total disaster loss was Taka 25,100 and the recovery was around Taka 5,000. The extent of recovery in this area was 19 percent. The results in Table 3 indicate that the extent of recovery was highest in other areas which are less disaster torn. In this area, households on an average had incurred a loss of Taka 8,500 and they had achieved a recovery of Taka 1,900. The extent of disaster loss recovery was 22 percent. These results indicate that other areas received more attention from the government, non-government organizations (NGOs) and local community based organizations in terms of receiving disaster assistance.

The results of the OLS estimation of the models mentioned in section 3 are presented in Table 5. The results indicate that the village level social cohesion (SCI) significantly determines the extent of disaster loss recovery of households. It also indicates that a 10

percent increase in SCI increases the extent of disaster loss recovery by 2.5 percent. The probable reason is that a higher level of social cohesion reflects better communication among households and the availability of a higher number of informal institutions in the village. It also indicates that when a household is in trouble, other households in the village come forward with assistance to that household. In addition to that, informal institutions, like clubs and associations, also come forward with different types of assistances for example grants and loans, during a natural disaster. For these reasons, a higher level of social cohesion in the village helps households to recover their disaster losses at a higher extent. In models 2 and 3 (columns 2 and 3 in Table 5), the variable COVRISK is positive and statistically significant. These results indicate that households in villages where the natural disaster is highly covariant are more successful in terms of recovering disaster losses. This result is not surprising in the sense that the governmental agencies and NGOs, after a natural disaster, give more attention to those villages which are more affected and these villages receive more assistance from these organizations. Due to this probable reason, this variable is positive and statistically significant. In the model 3 (column 3 in Table 5), the interaction term SCI*COVRISK has the expected negative sign; however, it is not statistically significant. The negative sign of SCI*COVRISK indicates that social cohesion is less effective in those villages where the natural disaster is highly covariant. The likely reason is that households fail to help each other in those villages where almost all households are affected by the natural disaster. Lu, Sato and Zhang (2008) have also found a similar finding in their study.

Apart from the social cohesion index, nine other variables also significantly determine the extent of disaster loss recovery of households. These variables are: employment of the household head in the agricultural sector (EMPDL), total area of non-irrigated agricultural land (LANDNIRR), per capita weekly consumption expenditures of households (INCPC), loan from a community based organization (LOANCBO), total area of river erosion in the village (RIVERERO), number of households in the village (NHHS), the location of the village in the flood area (FLOOD) and the location of the village in the SIDR area (SIDR).

The results in Table 4 indicate that if the household head is employed in the agriculture sector (EMPAG) then the disaster loss recovery reduces significantly. This result indicates that the extent of disaster loss recovery reduces by 6 percent compared to other households when the household head is employed in the agriculture sector. The probable reason is that households which heads are engaged in agriculture are more likely to incur higher amount of disaster losses compared to other households in the village as the agriculture sector is likely to be more vulnerable to natural disaster. The descriptive statistics indicate that household with heads employed in the agriculture sector own 95 decimal more irrigated land than other households. Due to the heavy dependence on the agriculture sector, the disaster loss is comparatively higher for these households as the agriculture sector has a higher level of disaster risk. The average disaster loss of these households is Taka 38,000 and this loss is Taka 9,000 higher than that of other households. For these reasons, the employment status of a household head in the agriculture sector is a significant negative determinant of the extent of the disaster loss recovery of households. On the contrary, the total area of owned non-irrigated agricultural land (LANDNIRR) significantly positively determines the extent of the disaster loss recovery of households. The higher the total area of non-irrigated agricultural land ownership of a household is, the higher is the extent of the disaster loss recovery of that household. This result is logical in the sense that non-irrigated agricultural land is less vulnerable to the disaster risk as this type of land is usually located at an altitude above the flood water and cyclone water surge level. The type of land can be used for growing crops when low level land can not be used for the same purpose during the disaster period.

The per capita yearly total household income (INCPC) is significantly negatively related with the extent of disaster loss recovery. It means that with an increase in per capita yearly total household income, the extent of the disaster loss of a household decreases. The likely reason is that higher income households do not have an adequate access to post disaster assistances provided by governmental agencies and non-governmental organizations for recovering disaster losses as these organizations always target households which are poorer and have a lower level of income. An access to commercial

bank loans (LOANCB) has a significant negative impact on the extent of disaster loss of the households. Usually non-poor households which have assets to provide commercial banks as collateral have an access to commercial bank loans. An access of a household to a commercial bank loan reflects that that household is a non-poor household. As the status of a household is non-poor, it does not receive adequate post-disaster assistance provided by governmental agencies and NGOs and that is why, the extent of the disaster loss recovery is negatively related with an access to a commercial bank loan. However, an access of a household to a loan from a community based organization (LOANCBO) has a positive impact on the extent of disaster loss recovery of that household. The likely reason is that loans from community based organization are available to all types of households in the village and terms and conditions that are required to be followed by a household for getting a loan are less stringent than those of a commercial bank loan. Due to a wide coverage of households in the village, an access to a loan from a CBO has a positive impact on disaster loss recovery of households.

The number of households in a village has a negative impact on the extent of disaster recovery of households in that village. The probable reason is that larger villages have a higher amount of cumulative disaster loss and these villages get more attention from governmental agencies and NGOs for receiving assistance for post disaster loss recovery. Larger villages also receive more attention from elected political leaders who remain responsible for distributing some assistance to households after any disaster as these villages are more politically powerful due to having a higher number of voting rights. The results in Table 4 also indicate that the extent of disaster loss recovery is higher is areas which are more disaster torn. Two dummy variables (FLOOD and SIDR) representing two disaster torn areas show significant positive results in Table 4. These results indicate that these two areas received better attention from government agencies and NGOs for receiving disaster loss recovery assistance. Out of two disaster torn areas, flood area (FLOOD) received more attention from governmental agencies and NGOs for the post disaster assistance as results show that households in the flood area had on an average 8 percent higher disaster loss recovery than households in the SIDR area. Two probable reasons are that SIDR area is relatively away from the capital city of the country

and it is also relatively more remote than the flood area. For these reasons, flood area households probably on an average received more post disaster assistance than households in the SIDR area and that is why the extent of the disaster loss recovery of households is higher in the flood area.

## 6.0 Summary and Conclusion

This paper intends to assess the role of social cohesion in recovering household disaster losses in the rural areas of Bangladesh. A social cohesion index has been constructed through taking into consideration three different dimensions of social cohesion at the village level. These dimensions are social capital, material condition, and social order. The social cohesion index varies from 0 to 1. The descriptive statistics and multivariate techniques have been used to achieve the objective of the paper. The analysis is based on a sample survey of three thousand four hundred eighty one *(N=3,481)* households.

On the basis of the descriptive statistics and results from multivariate models, this paper concludes that there is a significant positive relationship between the village level social cohesion and the natural disaster loss recovery of households. It means that households can recover natural disaster losses better in those villages where social cohesion is higher. However, this paper also finds that social cohesion is less effective in those villages where the natural disaster is highly covariant. The likely reason is that households fail to help each other in those villages where almost all households are affected by the natural disaster.

## Reference:

Besley, T. (1995). Nonmarket Institutions For Credit and Risk Sharing in Low-Income Countries. *Journal of Economic Perspectives*, 9(3), 115-127.

Coate, S., & Martin, R. (1993). Reciprocity without Commitment: Characterization and Performance of Informal Insurance Arrangements. *Journal of Development Economics*, 40,1-24.

Dayton-Johnson, J. (2003). Social Capital, Social Cohesion, Community: A Macroeconomic Analysis. In L. Osberg (ed.), *The Economic Implications of Social Cohesion.* Toronto, ON: Univetsity of Toronto Press.

Easterly, W., Ritzan, J., & Woolcock, M. (2006). Social Cohesion, Institutions, and Growth. Working Paper Number 94, Center for Global Development, USA: Washington, DC.

EU (European Commission). (2005). Promoting social cohesion in Latin America. Brussels: European Commission (Doc. ECFIN/D2(2005)REP/52288).

ECLAC (UN Economic Commission for Latin America and the Caribbean). (2007). Social cohesion: inclusion and sense of belonging in Latin America and the Caribbean. Santiago de Chile: ECLAC

Fafchamps, M. (2006). Development and Social Capital. *Journal of Development Studies*, 42, 1180 - 1198.

Fafchamps, M. & Lund, S. (2002). Risk-sharing Networks in Rural Philippines. *Journal of Development Economics*, 71, 261-287.

IDB (Inter-American Development Bank). (2006). Social cohesion in Latin America and the Caribbean: Analysis, action, and coordination. Washington, DC: IDB

Lu, M., Sato, H., & Zhang, S. (2008). Does Social Capital Help Households Cope with Natural Disaster during Marketization? Evidence from Rural China. Paper presented at the conference on "The Emergence of China and India in the Global Economy Conference", London, UK.

Maluccio, J., Haddad, L. & May, J. (2000), Social capital and household welfare in South Africa, 1993-98. *Journal of Development Studies*, 36(6), 54 - 81.

Maloutas, T. and Pantelidou, M. (2004). The Glass Menagerie of Urban Governance and Social Cohesion : Concepts and Stakes/Concepts as Stakes. *International Journal of Urban and Regional Research 28(2), 49-65.*

Maxwell, J. (1996). Social dimensions of economic growth. *Eric John Hanson Memorial Lecture Series*, Volume 8, University of Alberta.

Putnam, R. D. (1995). Bowling Alone: America's Declining Social Capital. *Journal of Democracy*, 6(1), 65–78.

von Haldenwang, C. (2008). Taxation, social cohesion and fiscal decentralization in Latin America. Discussion Paper 1/2008, German Development Institute, Bonn, Germany.

Tables

Table 1. Disaster Loss as % of total household assets by socio-economic status of households

| Socio-economic Class | No. of observations | Total household assets | | Disaster loss | | Loss as % of total assets |
|---|---|---|---|---|---|---|
| | | Mean | S.D. | Mean | S.D. | |
| | | (1) | (2) | (1) | (2) | (3)/(1) |
| Hardcore poor | 1341 | 41,485 | 87,376 | 23,548 | 65,148 | 0.57 |
| Poor | 808 | 71,287 | 11,8201 | 34,499 | 61,183 | 0.48 |
| Non-poor | 489 | 221,357 | 717,771 | 49,372 | 91,275 | 0.22 |

Table 2. Disaster Loss recovery as % of total disaster loss by Socio-Economic Status of Households

| Socio-economic Class | No. of observations | Disaster loss | | Loss recovery | | Extent of loss recovery |
|---|---|---|---|---|---|---|
| | | Mean | S.D. | Mean | S.D. | |
| | | (1) | (2) | (3) | (4) | (3)/(1) |
| Hardcore po or | 1341 | 23,548 | 65,148 | 4,175 | 10,262 | 0.18 |
| Poor | 808 | 34,499 | 61,183 | 5,780 | 12,007 | 0.17 |
| Non-poor | 489 | 49,372 | 91,275 | 7,371 | 17,780 | 0.15 |

Table 3. Disaster Loss recovery as % of total disaster loss by disaster area

| Area | No. of pbservations | Disaster loss | | Loss recovery | | Extent of loss recovery |
|---|---|---|---|---|---|---|
| | | Mean | S.D. | Mean | S.D. | |
| | | (1) | (2) | (3) | (4) | (3)/(1) |
| Non-disaster area | 269 | 8,530 | 77,817 | 1,862 | 12,543 | 0.22 |
| Disaster area-flood | 1077 | 25,050 | 24,405 | 4,986 | 9,207 | 0.19 |
| Disaster area-SIDR | 1292 | 42,044 | 68,266 | 6,193 | 13,037 | 0.15 |

Table 4. Summary statistics

| Variables | Definition | Mean | S.D. |
|---|---|---|---|
| MITIGATION | Extent of household disaster loss mitigation | 0.26 | 0.27 |
| RELIGION | Dummy for the HH religion; 1 for Muslim and 0 otherwise | 0.94 | 0.24 |
| MEMBERS | Total HH members | 4.29 | 1.65 |
| AGE | Household head's age | 45.07 | 14.70 |
| SEX | Household head's sex | 0.91 | 0.28 |
| HEADEDU | Household head's education score | 3.19 | 5.03 |
| EMPAG | Household head's employment – agriculture | 0.21 | 0.41 |
| EMPDL | Household head's employmen t - daily labour | 0.26 | 0.41 |
| LANDIRR | Total area of irrigated agri land (decimal) | 274 | 5,126 |
| LANDNIRR | Total area of non-irrigated agri land (decimal) | 956 | 41,619 |
| PASSETS | Total household productive assets (log) | 6.35 | 2.21 |
| LSTOCK | Total Household Livestock (Taka thousand) | 6.85 | 3.54 |
| INCPC | Yearly per capita income (Taka thousand) | 14.45 | 16.04 |
| LOANCB | Total HH loans from CBs | 2,192 | 9,848 |
| LOANMFI | Total HH loans from MFIs | 856 | 7087 |
| LOANCBO | Total HH loans from CBOs | 314 | 2,946 |
| RIVERERO | Total area of river erosion | 10.61 | 53.77 |
| NHHS | Total number of HHs in the village | 376 | 290 |
| HOMELESS | No of homeless people in the village | 55 | 119 |
| MIGRATION | No. of people migrated in the village | 132 | 234 |
| ROAD | Distance from the nearest pacca road in the village (in kms) | 1.15 | 2.82 |
| SCHOOL | Distance from the nearest high school in the village (in kms) | 1.42 | 2.50 |
| ELECTRICITY | Existence of electricity in the village; 1 for electricity and 0 otherwise | 0.77 | 0.42 |
| FLOOD | Dummy for flood area; 1 for flood area and 0 otherwise | 0.41 | 0.50 |
| SIDR | Dummy for SIDR area; 1 for SIDR area and 0 otherwise | 0.49 | 0.50 |
| SCI | Social cohesion index | 0.17 | 0.09 |
| COVRISK | Extent of village level covariant risk | 0.83 | 0.16 |

.

Table 5. OLS estimates of disaster loss recovery

| Explanatory Variables | Dependent variable: extent of household disaster loss recovery | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| RELIGION | -0.0172 | -0.0227 | -0.0214 |
| MEMBERS | -0.000366 | -0.000139 | -0.000144 |
| AGE | 0.00239 | 0.00250 | 0.00249 |
| AGE Square | -2.30e-05 | -2.38e-05 | -2.35e-05 |
| SEX | -0.00797 | -0.00704 | -0.00695 |
| HEADEDU | -0.000644 | -0.000616 | -0.000602 |
| EMPAG | -0.0649*** | -0.0608*** | -0.0608*** |
| EMPDL | -0.00729 | -0.00353 | -0.00337 |
| LANDIRR | -1.01e-06 | -8.57e-07 | -8.35e-07 |
| LANDNIRR | 2.42e-07** | 2.42e-07** | 2.43e-07** |
| PASSETS | -0.00352 | -0.00370 | -0.00367 |
| LSTOCK | 0.00198 | 0.00205 | 0.00207 |
| INCPC | -7.11e-07** | -7.02e-07** | -7.14e-07** |
| LOANCB | -1.07e-06** | -1.15e-06** | -1.13e-06** |
| LOANMFI | 6.04e-07 | 5.60e-07 | 5.69e-07 |
| LOANCBO | 2.88e-06* | 2.94e-06* | 2.90e-06* |
| RIVERERO | 0.000269*** | 0.000205** | 0.000198** |
| NHHS | 7.66e-05*** | 6.62e-05*** | 6.60e-05*** |
| HOMELESS | -6.08e-05 | -0.000104** | -9.83e-05** |
| MIGRATION | -3.12e-05 | -2.53e-05 | -2.43e-05 |
| ROAD | 0.00164 | 0.00183 | 0.00172 |
| SCHOOL | -0.00266 | -0.00425* | -0.00404* |
| ELECTRICITY | -0.00543 | -0.00335 | -0.00369 |
| FLOOD | 0.159*** | 0.143*** | 0.145*** |
| SIDR | 0.0760*** | 0.0563** | 0.0573** |
| SCI | 0.259*** | 0.279*** | 0.540* |
| COVRISK | | 0.160*** | 0.213*** |
| SCI * COVRISK | | | -0.332 |
| Constant | 0.105* | -0.0108 | -0.0553 |
| Observations | 2588 | 2588 | 2588 |
| R-squared | 0.070 | 0.078 | 0.078 |

*** p<0.01, ** p<0.05, * p<0.1