



Natural Disasters and their Labor Market Consequences: Evidence from the 1998 Flood in Bangladesh

**Valerie Mueller (IFPRI)
Agnes Quisumbing (IFPRI)**

**WEAI Conference, Vancouver
June 30, 2009**

Background

- Natural disasters have long-term consequences on agricultural growth (Sachs, 2001; Gallup and Sachs, 2000)
 - Natural disasters impede accumulation of physical and capital stock (Yamauchi et al., 2008a, 2008b; Skoufias, 2003)
 - Climate change increasing droughts, floods, and sea level (IPCC, 2007)
 - Large development literature on constraints of households to cope with shocks
-

Research Objective

- Few studies focus on role of migration and labor markets in coping with natural disasters
 - Migration and employment in RNF sector used to cope with shocks
 - We evaluate how resilient labor markets in rural Bangladesh were to the 1998 “flood of the century” (short-term vs. long-term)
 - We also look at factors that mitigated the damages
 - Panel household survey collected for flood impact assessment (del Ninno et al., 2001)
-

Theoretical Insight on Disasters and Markets

- Consumption smoothing literature shows failure of the PIH model in developing countries
 - Literature lacks insight on long-term impacts of widespread shocks
 - Community risk-sharing less likely as informal creditors overburdened (Townsend, 1994)
 - Underinvestment because of risk aversion and asset depletion (Rosenzweig and Binswanger, 1993)
-

Long-term Disaster Impacts on Labor Markets

- Complementarity of capital and labor crucial
 - Decline in agricultural labor demand (most focus on this effect)
 - Non-farm labor market also vulnerable if migration is costly or local labor surplus from shock
-

The 1998 “Flood of the Century”

- Bangladesh use to annual floods
 - 1998 flood most severe due to duration and coverage
 - Food assistance programs available
 - Short-term effects on consumption, nutrition, assets, debt (del Ninno et al., 2001)
 - Recent studies focus on long-term impacts on consumption, and physical and human capital accumulation (Yamauchi et al., 2008a, 2008b; Quisumbing, 2005a, 2005b)
-

Data

- 757 households in 126 villages from November 1998-May 2004 (four rounds)
 - Focus on casual labor market module
 - Use previous month wage data*
 - Plot level information on normal and realized flood depth (feet)
 - Village flood measure averages the deviation of the 1998 depth from the normal
 - Mitigation: Irrigation, soil type, credit, distance to nearest market
-

Empirical Strategy

- Daily wage regression
 - Covariates
 - Individual labor supply characteristics
 - Flood measure
 - Control for initial labor market conditions in 1997
 - Include thana, month, and year fixed effects
 - Pooled OLS and Random effects models*
 - Short-term vs. Long-term models
 - Thana clustering for arbitrary correlation of flood impacts
-

Baseline results

	Pooled	RE	Pooled	RE
	OLS	GLS	OLS	GLS
1998 Flood shock	-0.019*	-0.017*	-0.009	-0.007
	(0.009)	(0.009)	(0.010)	(0.012)
1998 Flood shock*Year 1999 dummy			-0.021	-0.020
			(0.018)	(0.019)
1998 Flood shock*Year 2004 dummy			-0.047*	-0.044*
			(0.022)	(0.026)
Observations	1470	1470	1470	1470
R-squared	0.30	0.30	0.30	0.30

Agricultural vs. Non-Agricultural Wages

	Pooled	RE	Pooled	RE
	OLS	GLS	OLS	GLS
1998 Flood shock	-0.009 (0.013)	-0.009 (0.013)	0.014 (0.014)	0.014 (0.014)
1998 Flood shock*Year 1999 dummy			-0.036 (0.023)	-0.036 (0.025)
1998 Flood shock*Year 2004 dummy			-0.069** (0.023)	-0.065*** (0.025)
1998 Flood shock*Agriculture	-0.015 (0.018)	-0.013 (0.018)	-0.038** (0.014)	-0.036*** (0.015)
1998 Flood shock*Year 1999 dummy* Agriculture			0.027 (0.017)	0.027 (0.017)
1998 Flood shock*Year 2004 dummy* Agriculture			0.034*** (0.006)	0.032*** (0.007)
Observations	1470	1470	1470	1470
R-squared	0.30	0.30	0.31	0.31

Mitigation

- Percent Irrigation: Ability to shift cultivation to the dry season
 - Drainage capacity: soil type can reduce the scope of the crop loss
 - Presence and scale of informal credit system: Can reduce the distress sale of assets
 - Proximity to markets and bazaars: provide workers access to additional outlets for employment
-

Findings on Mitigation

- Areas with clay soil were most severely affected in the short term
 - Irrigation and credit access might mitigate flood impacts
 - Irrigation variable didn't vary over time, so couldn't identify statistically significant effect
 - Credit access results weren't robust
 - Labor markets closer to the weekly market or bazaar were less affected than those further away in the long-term
-

Conclusion

- Severe flood caused 4-5% decline in real wages
 - Emergency relief programs might have protected individuals in the short-term but not the long-term
 - Non-agricultural markets suffered perhaps due to their dependence on the recovery of other markets
 - Migration could possibly mitigate these impacts suggesting policies aimed at reducing moving and search costs may be a temporary solution to recover from major flood
-